FIRESTONE
COLORADO

PLANNING AND ZONING COMMISSION

REGULAR MEETING AGENDA

January 6, 2022
6:00 PM
9900 Park Avenue
Firestone, CO 80504

1. **Call to Order & Roll Call**

2. **Pledge of Allegiance**

3. **Approval of Agenda**

4. **Approval of Minutes**

   a. Regular Meeting 12-02-21

5. **Public Comment** * (maximum time permitted for all Public Comment is 30 minutes)

6. **Public Hearings**

   a. **PUBLIC HEARING: Resolution PC-22-01:** A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

   b. **PUBLIC HEARING: Resolution PC-22-02:** A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A FINAL DEVELOPMENT PLAN APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

   c. **PUBLIC HEARING: Resolution PC-22-03:** A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

* Individuals that desire to address the Planning and Zoning Commission are requested to sign up at the table at the entrance to the meeting room. Each individual will be provided an opportunity to speak (limited to two minutes) during Public Comment. Maximum time permitted for all Public Comment is 30 minutes for each Public Comment noted on Agenda.

If you need special assistance in order to participate in a Planning and Zoning Commission meeting, please contact the Town Clerk's Office at 303-833-3291 in advance of the meeting to make arrangements. A forty-eight-hour notice is requested.

d. **PUBLIC HEARING: Resolution PC-22-04:** A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A FINAL DEVELOPMENT PLAN APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

7. Staff Reports

8. Commissioner Comments

9. Adjournment

* Individuals that desire to address the Board of Trustees are requested to sign up at the table at the entrance to the meeting room. Each individual will be provided an opportunity to speak (limited to two minutes) during Public Comment. Maximum time permitted for all Public Comment is 30 minutes.

If you need special assistance in order to participate in a Board of Trustees meeting, please contact the Town Clerk's Office at 303-833-3291 in advance of the meeting to make arrangements. A forty-eight-hour notice is requested.

TOWN OF FIRESTONE, COLORADO
PLANNING AND ZONING COMMISSION
Regular Meeting
December 2, 2021

1.CALL TO ORDER

The Planning and Zoning Commission of the Town of Firestone met on December 2, 2021, at 9900 Park Avenue, Firestone, Colorado. Chairperson Haney called the meeting to order at 6:00 p.m.

The following were present upon the call of the roll:

Chairperson:	Dennis Haney
Vice-Chairperson:	Tim Spiegelberg - excused
Commissioners:	Jaci Daggett
	John Damsma - excused
	Amber Harper - excused
	Casey O'Donnell
	Jim Sutton
Staff:	Todd Bjerkaas – Director, Planning and Development
	Marty Ostholthoff – Planning Manager
	Michelle Dollmaier – Sr Planner
	Heather Lowe – Deputy Town Clerk

2.PLEDGE OF ALLEGIANCE

Chairperson Haney led the pledge of allegiance.

3.APPROVAL OF AGENDA

Commissioner Sutton motioned and Commissioner Daggett seconded to approve the agenda. Voice vote was taken. Motion carried unanimously.

4.APPROVAL OF MINUTES

a. September 16, 2021 – Regular Meeting
Commissioner O'Donnell motioned and Commissioner Daggett seconded to approve the meeting minutes of the September 16, 2021 Regular Meeting. Voice vote was taken. Motion carried unanimously.

5.PUBLIC COMMENT

None

Unapproved

6.PUBLIC HEARING

a. Resolution PC-21-09 – A RESOLUTION OF THE FIRESTONE PLANNING & ZONING COMMISSION RECOMMENDING THAT THE BOARD OF TRUSTEES APPROVE AN ORDINANCE AMENDING TITLE 16 OF THE FIRESTONE MUNICIPAL CODE

Chairperson Haney verified with the Director, Planning & Development, that proper notice of the Public Hearing had been provided and opened the Public Hearing at 6:03 p.m.

Todd Bjerkaas, Director, Planning & Development, provided a general overview of the proposed application request and reviewed the PowerPoint presentation of the Staff Report with the Commissioners. He also offered to answer any questions.

Chairperson Haney opened and closed the Public Comment portion at 6:28 p.m. Those wishing to speak:
None

The Town Staff PowerPoint presentation was entered into the record along with all application materials submitted by the applicant; all materials included in the Planning Commission packets; the PowerPoint presentations given tonight; all written referral and public comments received regarding the application; the proofs of public notice of the public hearing; and the Town's subdivision and zoning ordinances and development regulations.

The Commissioners held a general discussion with staff and questioned the applicant regarding the application. Chairperson Haney closed the Public Hearing at 6:29 p.m.

Commissioner Sutton motioned and Commissioner Daggett seconded to approve **Resolution PC-21-09 – A RESOLUTION OF THE FIRESTONE PLANNING & ZONING COMMISSION RECOMMENDING THAT THE BOARD OF TRUSTEES APPROVE AN ORDINANCE AMENDING TITLE 16 OF THE FIRESTONE MUNICIPAL CODE**

Voting was as follows:
Yes: Daggett, Haney, O'Donnell, Sutton
No: none
Absent: Damsma, Harper, Spiegelberg
Chairperson Haney declared the motion carried.

7.STAFF REPORTS

Marty
- Planning Commission will meet January 6th and 20th, 2022

8.COMMISSIONER COMMENTS

None

9.ADJOURNMENT

A motion was made and seconded to adjourn. Voice vote was taken. Chairperson Haney adjourned the meeting at 6:31 p.m.

Unapproved

Introduced and Approved this 6th day of January, 2022.

TOWN OF FIRESTONE, COLORADO

_____
Chairperson

ATTEST

_____
Lisa Bartley, Secretary

Unapproved

AGENDA INFORMATION MEMORANDUM

TOWN OF FIRESTONE
PLANNING AND ZONING COMMISSION

AIM#: 6.a

Public Hearings

Meeting Date: January 6, 2022

Initiated By: Marty Ostholthoff

Dept: Planning & Development

AGENDA TITLE

PUBLIC HEARING: Resolution PC-22-01: A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

SUMMARY

The Columbine 4-29HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate seven (7) horizontal oil and gas wells and associated production facilities within the Town.

HISTORY AND PREVIOUS BOARD ACTION

The Town of Firestone approved a Cooperative Development Plan Agreement with Kerr-McGee Oil & Gas Onshore LP on April 14, 2021.

RECOMMENDATION

Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-01, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

1. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.
2. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.
3. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.
4. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.
5. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to roadway improvements on Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.
6. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.
7. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.
8. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

ATTACHMENTS

1. Columbine PC Staff Report
2. Resolution PC-22-01

3. Columbine FDP Maps
4. Columbine SRU/FDP Application Materials
5. KMOG Cooperative Development Plan Agreement
6. Neighborhood Meeting Summary-Materials

Staff Report

Columbine 4-29HZ Pad and Production Facility

Special Review Use
and
Final Development Plan

Prepared by the
Town of Firestone for the
Planning and Zoning Commission

January 6, 2022

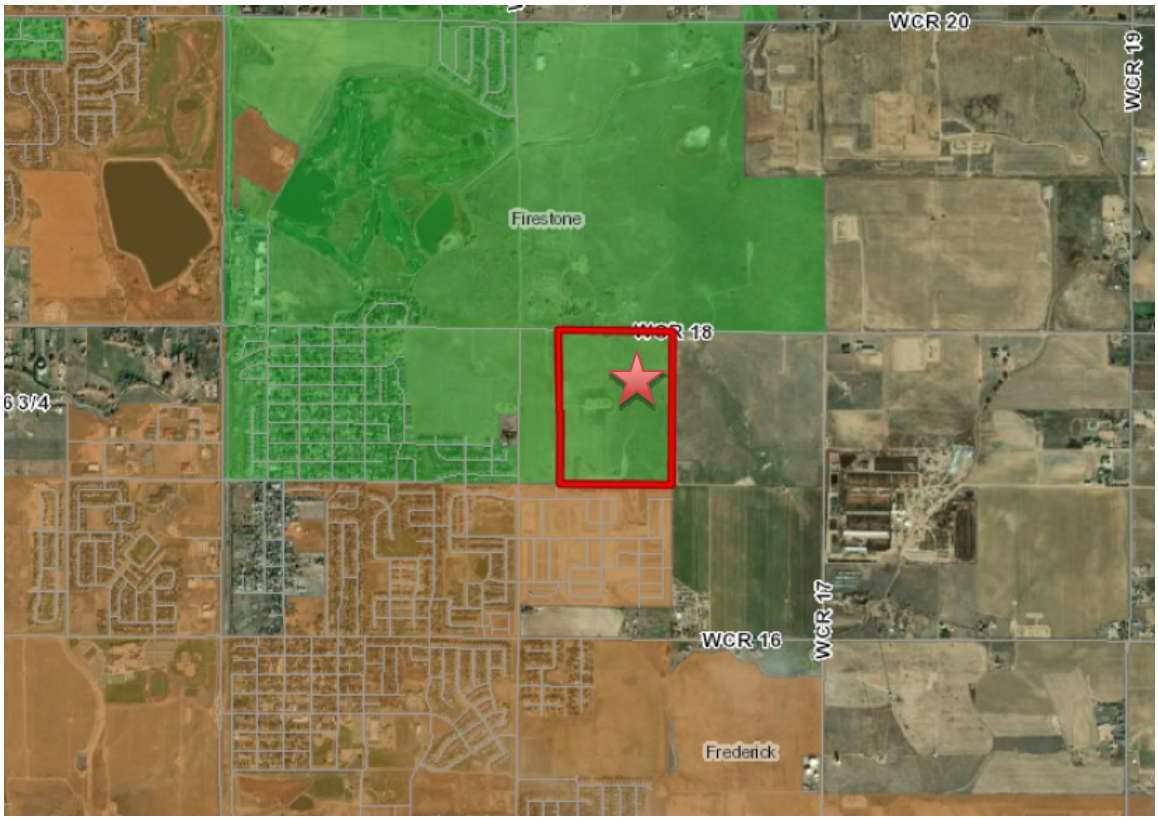
GENERAL INFORMATION

Purpose: This staff report is for the Columbine 4-29HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate seven (7) horizontal oil and gas wells and associated production facilities within the Town.

Applicant: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, CO 80202

Surface Owner: Anadarko E & P Onshore LLC
1099 18th Street
Denver, CO 80202

Location: The proposed well pad is located south of Grant Street (WCR 18) and east of Frontier Street (WCR 15).



Existing Conditions:

Existing Zoning: R-A (Residential-A)
Existing Use: Vacant land and oil/gas operations

Adjacent Land Use/Zoning:

	ZONING	LAND USE
NORTH	R-A – Residential-A	Vacant land + single-family residential
SOUTH	R-2 – Residential Medium (Town of Frederick)	Developing single-family residential
EAST	A – Agricultural (Weld County)	Vacant land + oil/gas operations
WEST	R-B – Residential-B	Vacant land + oil/gas operations

State Oil and Gas Regulations:

The Colorado Oil and Gas Conservation Commission (COGCC) governs the permitting and regulation of oil and gas wells throughout the state.

Town of Firestone Oil and Gas Regulations:

The Town of Firestone Development Code regulates siting, access roads, fencing and color of oil and gas wells and associated above ground production facilities through the review of the required Special Review Use and Final Development Plan applications for proposed oil and gas facilities. Other operational aspects of and oil and gas facility are regulated by the COGCC.

Columbine 4-29HZ Pad and Production Facility Analysis:

The proposed Columbine 4-29HZ Pad and Production Facility consists of seven (7) horizontal wells, well heads, well related equipment and facilities (combustors/separators, etc.), meter houses, access roads, drainage facilities and pipelines.

Pad Size:

- Approximately 12.6 acres of the site will be used for drilling and completions operations. When drilling and completions activities are finished, a large portion of the disturbed area will be reclaimed, leaving approximately 2.7 acres of disturbed area while the site is in the production phase.
- Construction of the pad site and improvements to the existing access road will take approximately 4 weeks to complete.
- When the wells have reached the end of production, the wells will be plugged and abandoned and the site will be reclaimed, including the removal of flowlines.

Access:

- Access into the Columbine pad will be from an existing oil and gas access road off of Grant Avenue.
- Per the FDC, the applicant will be required to pave (asphalt or concrete) the first 100-feet of the access road from Grant Avenue.
- Per standards in the Cooperative Development Plan Agreement, the applicant will be responsible for any damage caused to Town roads.
- Per a condition of approval, the applicant will be responsible for paving Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street.

Drilling Operations:

- Each well will take approximately 5 to 6 days to drill.
- Drilling occurs 24 hours per day.
- Well completions will occur after the drilling phase and takes approximately 4 to 6 days per well.
- Permanent production facilities installed after drilling and completions are completed.
- Interim reclamation of the site from 12.6 acres to 2.7 acres.

Mitigation Measures:

- Temporary 32-foot sound walls will be installed to control sound to the maximum extent practicable.
- Shrouding of lighting to the maximum extent practicable.
- Closed loop water system will be utilized to reduce truck trips and minimize site disturbance.
- Tankless facility is proposed to eliminate hydrocarbon storage tanks and associated emissions and to reduce truck trips.
- Air monitoring during pre-production and during the first six months of production.

Production Equipment/Facilities:

- All production equipment and facilities on the pad will be fenced and painted according to FDC requirements.
- No permanent liquid hydrocarbon tanks are included at this facility as the liquid hydrocarbons will be piped off-site.

Pipelines:

- Flowlines are proposed from the well heads to the production equipment and are internal to the pad. No flowlines are proposed outside of the pad area.

APPROVAL CRITERIA AND STAFF ANALYSIS

Special Review Use Approval Criteria and Staff Analysis:
The Special Review Use application for the Columbine 4-29HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.11 of the FDC. Staff makes the following findings.

A. The proposed use is generally consistent with the Town's Comprehensive Master Plan and all applicable provisions of this FDC and applicable State and Federal regulations;

Staff: *The proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan and Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

B. The proposed use is generally consistent with the purpose and intent of the zoning district in which it is located;

Staff: *The proposed use is consistent with the purpose and intent of the R-A zone district in that "Mining and Mineral Extraction" is permitted within the R-A zone district under the Special Review Use regulations of the Town.*

C. The proposed use is generally consistent with any applicable use-specific standards set forth in Section 3.2;

Staff: *There are no use-specific standards for "Mining and Mineral Extraction" within Section 3.2, however, the proposed use is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

D. The proposed use is compatible with adjacent uses in terms of scale, site design, and operating characteristics (hours of operation, traffic generation, lighting, noise, odor, dust, and other external impacts);

Staff: *The proposed use is compatible with adjacent uses in that the applicable development and design standards set forth in Section 16.6.14 of the FDC are met. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

E. Any significant adverse impacts anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable;

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. Facilities and services (including sewage and waste disposal, water, gas, election, police and fire protection, and streets and transportation, as applicable) will be available to serve the subject property while maintaining adequate levels of service for existing development;

Staff: *The proposed pad and production facility will not have a significant impact on any Town facilities or other utility providers.*

G. Adequate assurances of continuing maintenance have been provided; and

Staff: *The applicant will be responsible for the ongoing maintenance of the well pad and production facilities, including the reclamation of disturbed areas. In addition, all wells and production facilities are remotely monitored 24 hours/7 days a week.*

H. Any significant adverse impacts on the natural environment will be mitigated to the maximum extent reasonably practicable.

Staff: *The applicant will meet Town and State regulations relative to impacts on the natural environment to the maximum extent practicable. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

Final Development Plan Approval Criteria and Staff Analysis:
The Final Development Plan application for the Columbine 4-29HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.10 of the FDC. Staff makes the following findings.

A. The Final Development Plan is generally consistent with the Town's Comprehensive Master Plan;

Staff: *The FDP showing the proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan.*

B. The Final Development Plan is generally consistent with any previously approved subdivision plat, planned development, or any other precedent plan or land use approval as applicable;

Staff: *The FDP is consistent with previously approved land use actions for the subject property.*

C. No buildings or structures infringe on any easements so as to impact the full use of the easement;

Staff: *No buildings or structures proposed on the FDP will infringe on any easements.*

D. The Final Development Plan complies with all applicable development and design standards set forth in this FDC;

Staff: *The FDP is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

E. Any significant adverse impacts reasonably anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable; and

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. The development proposed on the Final Development Plan and its general location is or will be compatible with the character of surrounding land uses.

Staff: *The proposed pad and production facility meets applicable Town setback standards. In addition, the applicant is also the surrounding land owner and in control of any surface development in and around the pad and production facility.*

NEIGHBORHOOD MEETING

As required by the Firestone Development Code, a Neighborhood Meeting was held on August 25, 2021 at 6:00 pm as a virtual neighborhood meeting. The required notice for the Neighborhood Meeting was provided.

PUBLIC NOTICE

Notice of the Public Hearings has been provided as follows:

Published in the Longmont Times Call:	December 22, 2021
Property Posted:	December 20, 2021
Letters to Adjacent Property Owners:	December 20, 2021

RECOMMENDATIONS

Special Review Use:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-01, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to roadway improvements on Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

Final Development Plan:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-02, a resolution recommending approval of the Final Development Plan application to the Board of Trustees with conditions:

a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to roadway improvements on Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

FIRESTONE PLANNING AND ZONING COMMISSION

RESOLUTION NO. PC-22-01

A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, who is the owner of certain real property located in the Town of Firestone, having a legal description of NE ¼ of NW ¼ of Section 29, 2N, 67W ("Property"), has submitted an application for Special Review Use to construct and operate a new oil and gas well pad, including 7 wells and one production facility, to be known as the "Columbine 4-29HZ Pad and Production Facility," on the Property (the "Application"); and

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, has also submitted an application for a Final Development Plan relating to such special review use; and

WHEREAS, the Firestone Planning and Zoning Commission has conducted a public hearing on the Application, and has considered all the evidence presented at the public hearing, the relevant standards to accommodate oil and gas wells and facilities set forth in Sections 16.6.14 of the Firestone Development Code ("Code") and the special review use criteria set forth in Step 9, Section 16.7.11.C of the Code; and

WHEREAS, the Firestone Planning and Zoning Commission wishes to make a recommendation to the Board of Trustees regarding the Application.

NOW, THEREFORE, BE IT RESOLVED BY THE FIRESTONE PLANNING AND ZONING COMMISSION:

1. That the Firestone Planning and Zoning Commission recommends approval of the Application, with the following conditions:

   a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

   b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement attached hereto as Exhibit A.

   c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to, roadway/paving improvements on Grant Avenue (from Sherilynn Circle to one-half mile east of Frontier Street), which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

PASSED AND ADOPTED this ____ day of _____, 2022.

_____
Chairperson

ATTEST:

_____
Lisa Bartley, Secretary

EXHIBIT A
Cooperative Development Plan Agreement

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NE1/4 NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLOUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE COLUMBINE 4-29HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

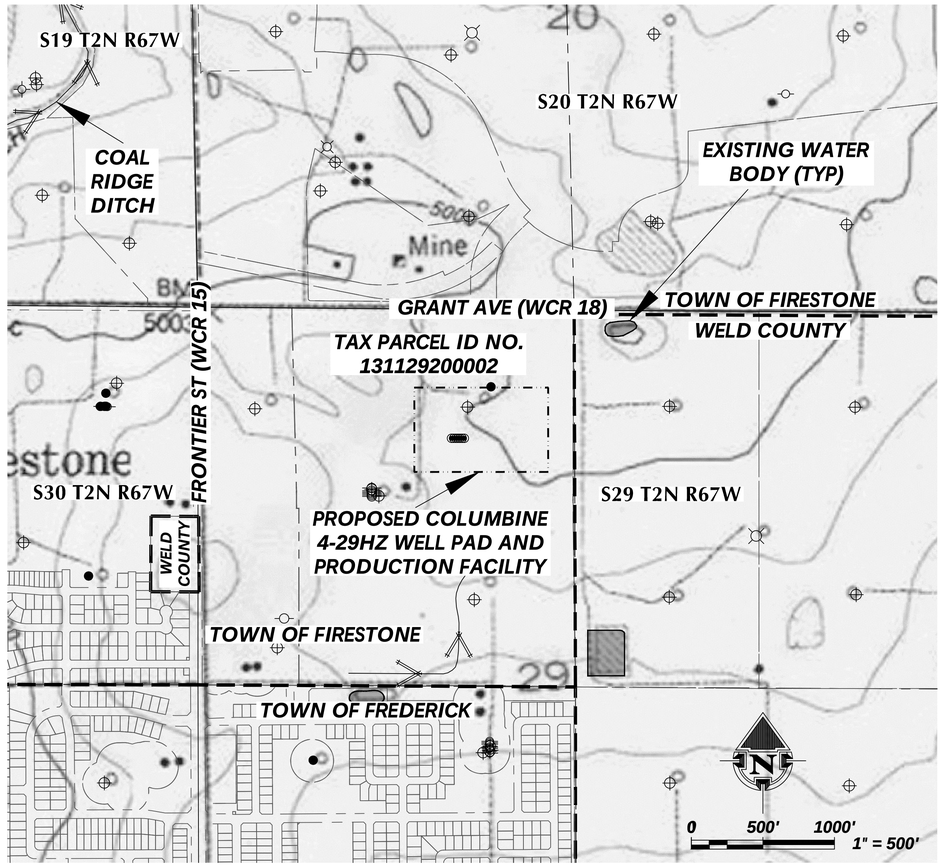
_____ MAYOR

ATTEST_____ TOWN CLERK

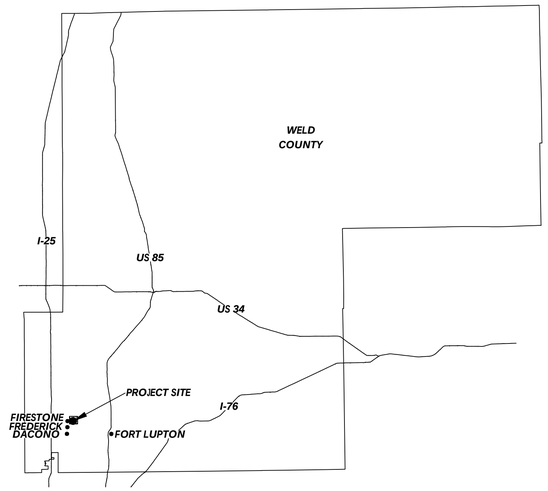
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- *CONSTRUCTION LIMITS OF DISTURBANCE*
- *PROPOSED WELL*
- *EXISTING WELL (PRODUCING)*
- *EXISTING WELL (PLUG & ABANDONED)*
- *EXISTING WELL (SHUT IN)*
- *EXISTING WELL (DRY AND ABANDONED)*
- *EXISTING WELL (TEMPORARILY ABANDONED)*
- *TOWN LIMITS*
- *WATER BODY*
- *PROPERTY LINE*
- *EXISTING DITCH / STREAM*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-013 / FDP21-013

SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP_COVER.dwg, 12/10/2021 3:20:53 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

OWNER: VISTAS AT SADDLEBACK (WELD COUNTY PARCEL I.D. 131119400038) ZONING: FIRESTONE

EXISTING FACILITY

S19 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300001) ZONING: FIRESTONE

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300025) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400034) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400005) ZONING: FIRESTONE

S20 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300002) ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300003) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120300022) ZONING: FIRESTONE

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273 DATE: 10/14/1889

TOWN OF FIRESTONE

GRANT AVE (WCR 18)

WELD COUNTY

OHP

ROAD EXISTING

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SEE ACCESS ROAD DETAIL

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300023) ZONING: FIRESTONE

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

EXISTING ROAD (TO BE IMPROVED)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200002) ZONING: FIRESTONE

PROPOSED ACCESS ROAD

TEMPORARY EQUIPMENT AREA (215' x 60')

20'

20' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1632344) DATE: 03/20/74

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

60'

FRONTIER ST (WCR 15) 60' EXISTING ROW (BOOK 86 PAGE 273) DATE: 10/14/1889

OWNER: ANADARKO E & P ONSHORE LLC TRACT I THE OVERLOOK AT FIRESTONE, REPLAT "A" (WELD COUNTY PARCEL I.D. 131130117000) ZONING: FIRESTONE

S30 T2N R67W

PROPOSED COLUMBINE 4-29HZ WELL PAD

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200001) ZONING: FIRESTONE

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION RPLTA

EXISTING FACILITY

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1751456) DATE: 04/25/78

50'

EXISTING ACCESS ROAD

EXISTING FACILITY

OWNER: PATTON ROY C, PATTON MARGARET D & KANZLER DAWN E (WELD COUNTY PARCEL I.D. 131130100024) ZONING: AG-A

TOWN OF FIRESTONE

WELD COUNTY

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1699366) DATE: 09/20/76

50'

30' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 4084912) DATE: 02/23/15

30'

DRAINAGE EASEMENT (RECEPTION NO. 4176525) DATE: 01/27/16

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691200, 1769650 & 1697790) DATE: 06/16/76, 10/13/78 & 09/01/76

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691207) DATE: 06/16/76

50'

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION

SUBDIVISION: VILLAGE EAST COMMUNITY RPLT #1

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #1

50'

EXISTING WATER BODY

50'

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #4

EXISTING WATER BODY

EXISTING ROAD

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129100013) ZONING: AG-A

S29 T2N R67W

WHEATLAND BLVD (WCR 17)

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129000011) ZONING: AG-A

WCR 17 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 17 PAGE 180

N

0 200' 400'

1" = 200'

ACCESS ROAD DETAIL

GRANT AVE (WCR 18)

106' 60'

30' R

42'

EXISTING FENCE (TYP.)

100' HARD SURFACE

EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273

PROPOSED ACCESS ROAD (26 FT.)

PROPOSED 15" CMP CULVERT

100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)

EXISTING ACCESS ROAD (TO BE IMPROVED)

N

0 50' 100'

1" = 50'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- EXISTING SANITARY SEWER LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING
- EXISTING DITCH / STREAM

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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SHERIDAN OFFICE
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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

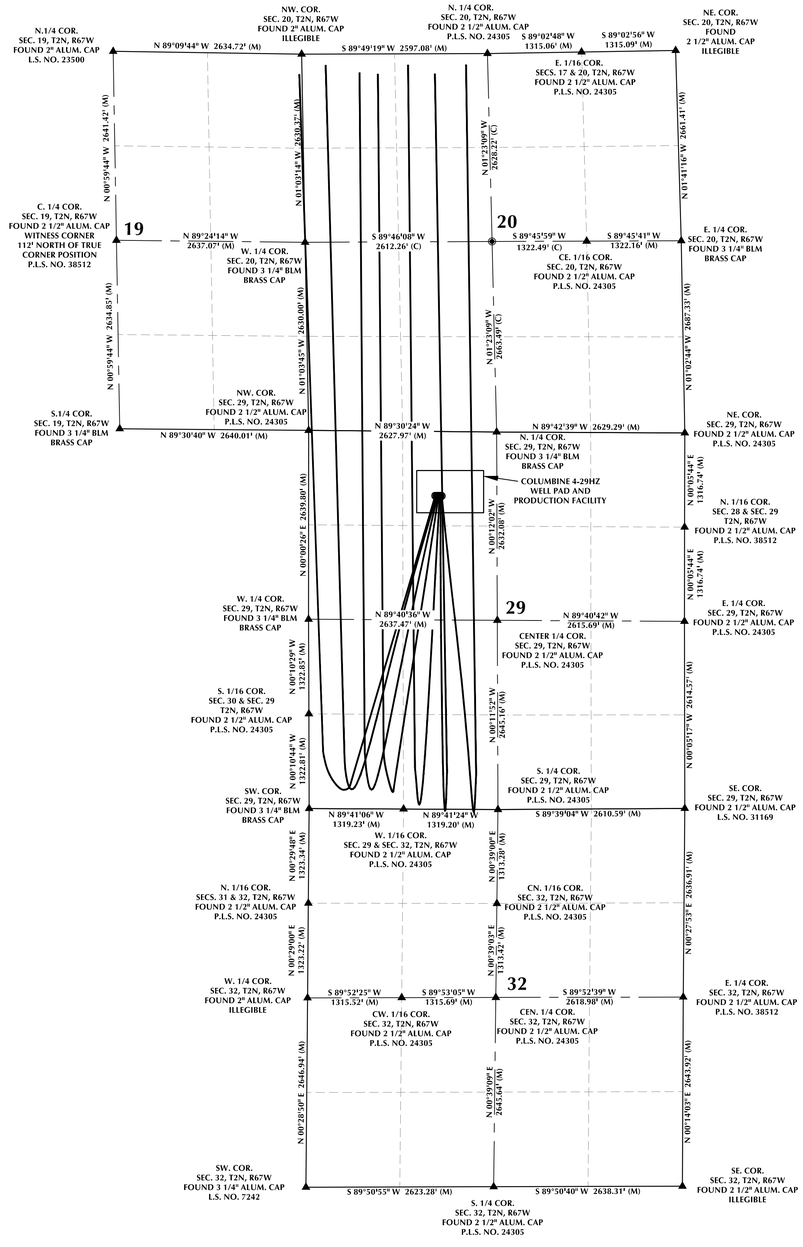
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-013 / FDP21-013

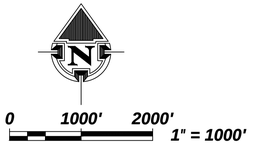
SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP.dwg, 12/10/2021 3:31:11 PM, cdey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- INDICATES CALCULATED SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. *BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.*
2. *ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972294 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-013 / FDP21-013

SCALE:	1" = 1000'	SHEET:	FDP-3
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

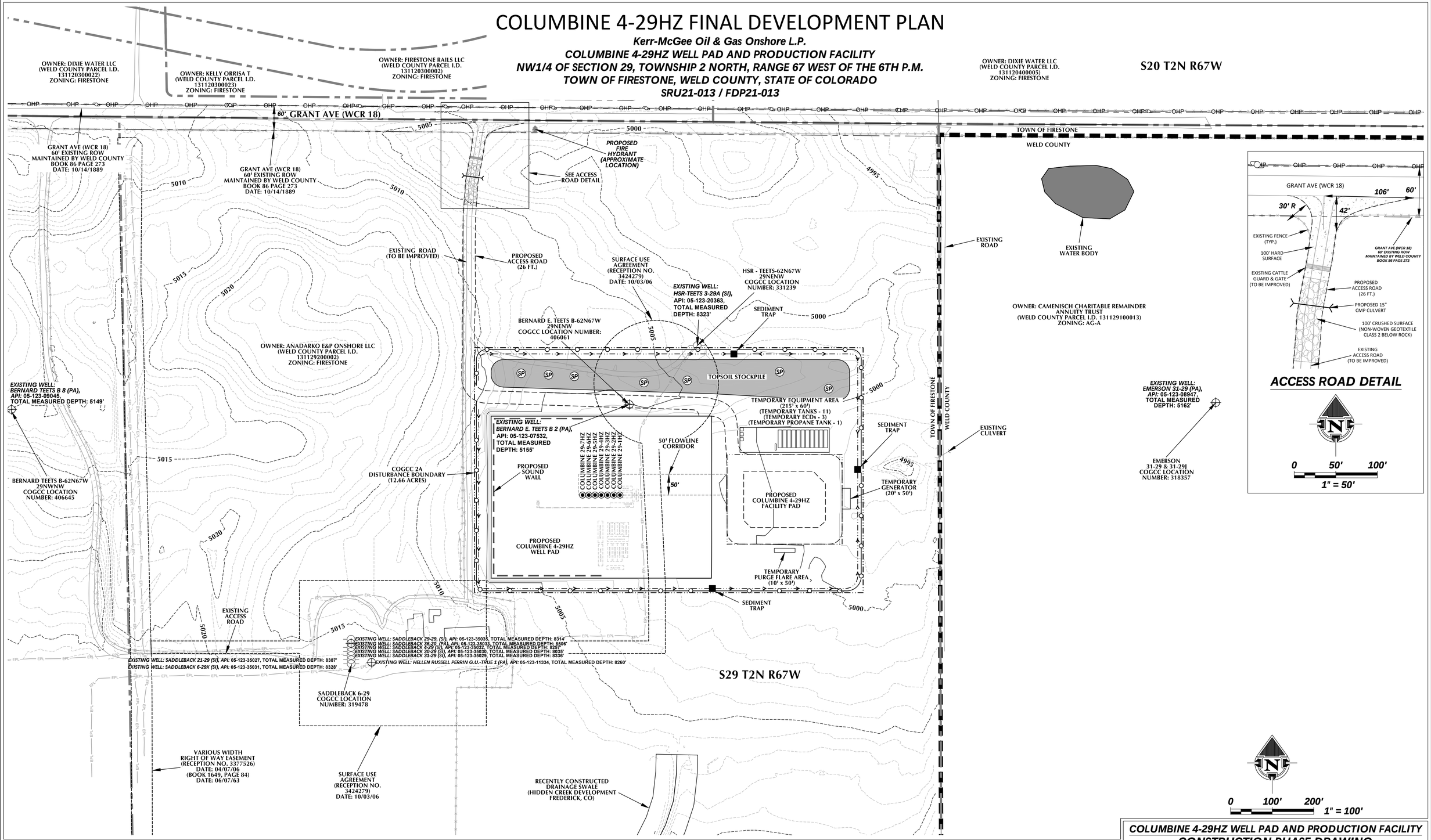
Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

CONSTRUCTION PHASE DRAWING

SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120300022)
ZONING: FIRESTONE

OWNER: KELLY ORRISA T
(WELD COUNTY PARCEL I.D.
131120300023)
ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC
(WELD COUNTY PARCEL I.D.
131120300002)
ZONING: FIRESTONE

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120400005)
ZONING: FIRESTONE

S20 T2N R67W

60' GRANT AVE (WCR 18)

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

TOWN OF FIRESTONE
WELD COUNTY

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

SEE ACCESS ROAD DETAIL

EXISTING ROAD (TO BE IMPROVED)

PROPOSED ACCESS ROAD (26 FT.)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

EXISTING WELL: HSR-TEETS 3-29A (SI), API: 05-123-20363, TOTAL MEASURED DEPTH: 8323'

HSR - TEETS-62N67W 29NENW COGCC LOCATION NUMBER: 331239

BERNARD E. TEETS B-62N67W 29NENW COGCC LOCATION NUMBER: 406061

OWNER: ANADARKO E&P ONSHORE LLC
(WELD COUNTY PARCEL I.D.
13112900002)
ZONING: FIRESTONE

EXISTING WELL: BERNARD TEETS B 8 (PA), API: 05-123-09045, TOTAL MEASURED DEPTH: 5149'

BERNARD TEETS B-62N67W 29NWNW COGCC LOCATION NUMBER: 406645

EXISTING WELL: BERNARD E. TEETS B 2 (PA), API: 05-123-07532, TOTAL MEASURED DEPTH: 5155'

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PROPOSED COLUMBINE 4-29HZ WELL PAD

COLUMBINE 29-7HZ, COLUMBINE 29-6HZ, COLUMBINE 29-5HZ, COLUMBINE 29-4HZ, COLUMBINE 29-3HZ, COLUMBINE 29-2HZ, COLUMBINE 29-1HZ

50' FLOWLINE CORRIDOR

50'

OFF-SITE FLOW DEFLECTION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE VISUAL MITIGATION BERM CROSS SECTION DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

SEEDED TOPSOIL STOCKPILE FOR FINAL RECLAMATION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

EXISTING ROAD

EXISTING WATER BODY

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST
(WELD COUNTY PARCEL I.D. 131129100013)
ZONING: AG-A

TOWN OF FIRESTONE
WELD COUNTY

EXISTING CULVERT

EXISTING WELL: EMERSON 31-29 (PA), API: 05-123-08947, TOTAL MEASURED DEPTH: 5162'

EMERSON 31-29 & 31-29J COGCC LOCATION NUMBER: 318357

EXISTING ACCESS ROAD

EXISTING WELL: SADDLEBACK 29-29, (SI), API: 05-123-35035, TOTAL MEASURED DEPTH: 8314'
EXISTING WELL: SADDLEBACK 36-20 (PA), API: 05-123-35033, TOTAL MEASURED DEPTH: 8506'
EXISTING WELL: SADDLEBACK 4-29 (SI), API: 05-123-35032, TOTAL MEASURED DEPTH: 8257'
EXISTING WELL: SADDLEBACK 30-29 (SI), API: 05-123-35030, TOTAL MEASURED DEPTH: 8035'
EXISTING WELL: SADDLEBACK 31-29 (SI), API: 05-123-35029, TOTAL MEASURED DEPTH: 8336'
EXISTING WELL: HELLEN RUSSELL PERRIN G.U.-TRUE 1 (PA), API: 05-123-11334, TOTAL MEASURED DEPTH: 8260'
EXISTING WELL: SADDLEBACK 21-29 (SI), API: 05-123-35027, TOTAL MEASURED DEPTH: 8387'
EXISTING WELL: SADDLEBACK 6-29X (SI), API: 05-123-35031, TOTAL MEASURED DEPTH: 8328'

SADDLEBACK 6-29 COGCC LOCATION NUMBER: 319478

S29 T2N R67W

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

GRANT AVE (WCR 18)
106' 60'
30' R
42'
EXISTING FENCE (TYP.)
100' HARD SURFACE
EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)
GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273
PROPOSED ACCESS ROAD (26 FT.)
PROPOSED 15" CMP CULVERT
100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)
EXISTING ACCESS ROAD (TO BE IMPROVED)

ACCESS ROAD DETAIL

0 50' 100'
1" = 50'

0 100' 200'
1" = 100'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED PERMANENT SEEDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6***

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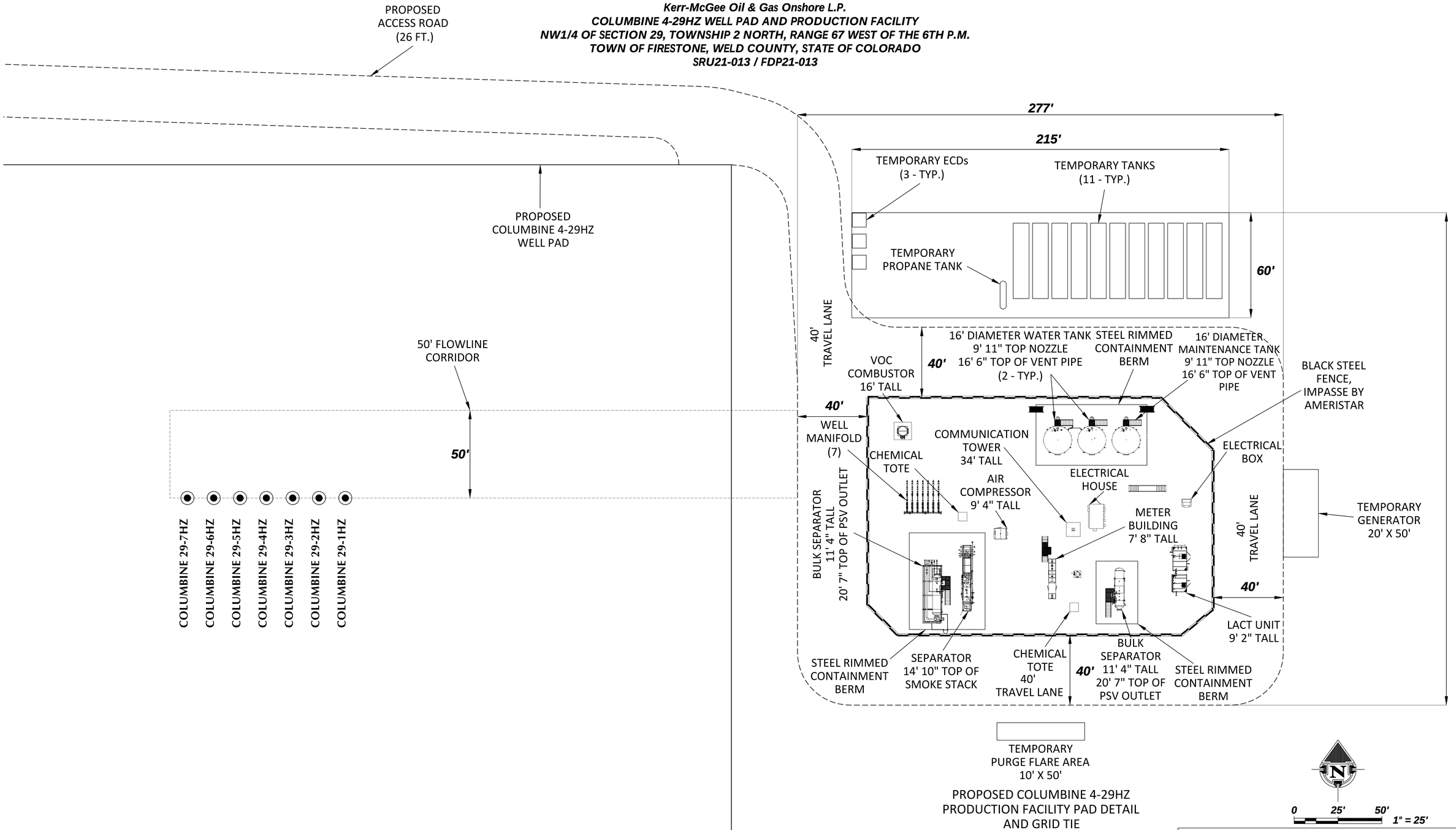
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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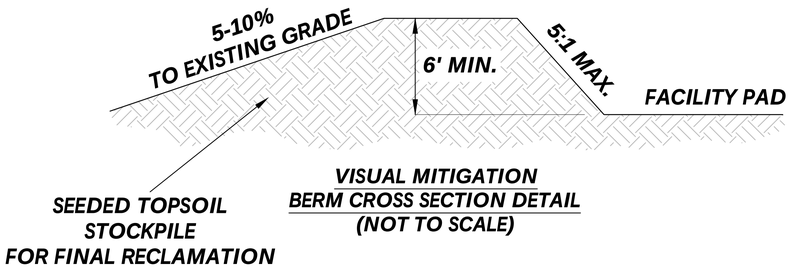
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 25'	SHEET:	FDP-6
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

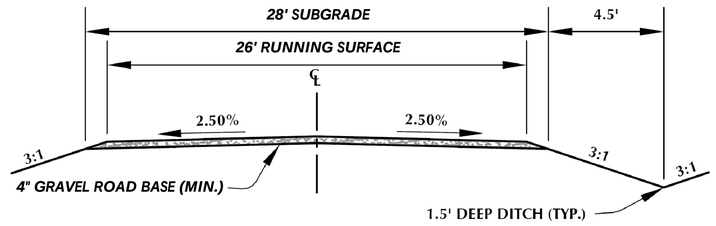
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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

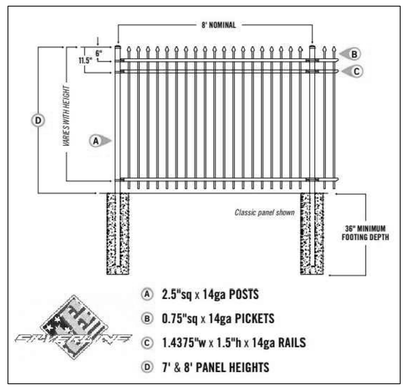
Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



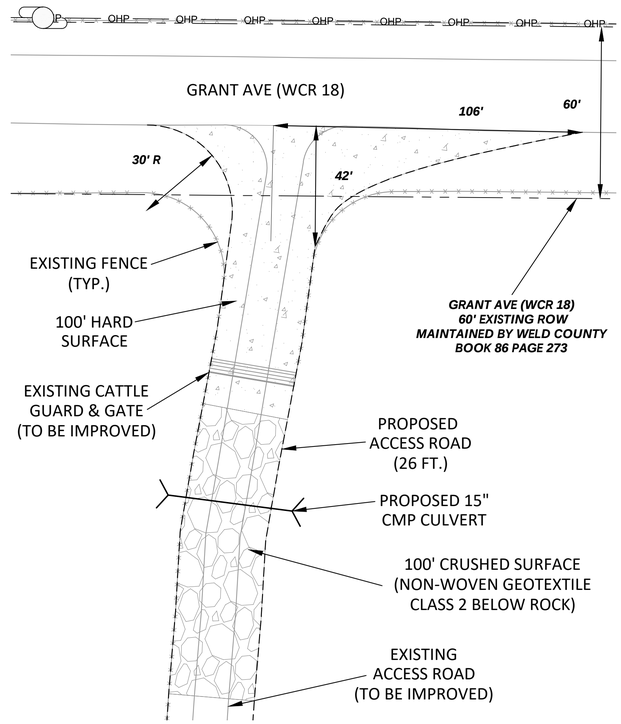
VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



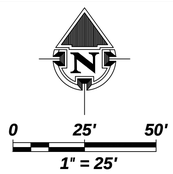
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE COLUMBINE 4-29HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

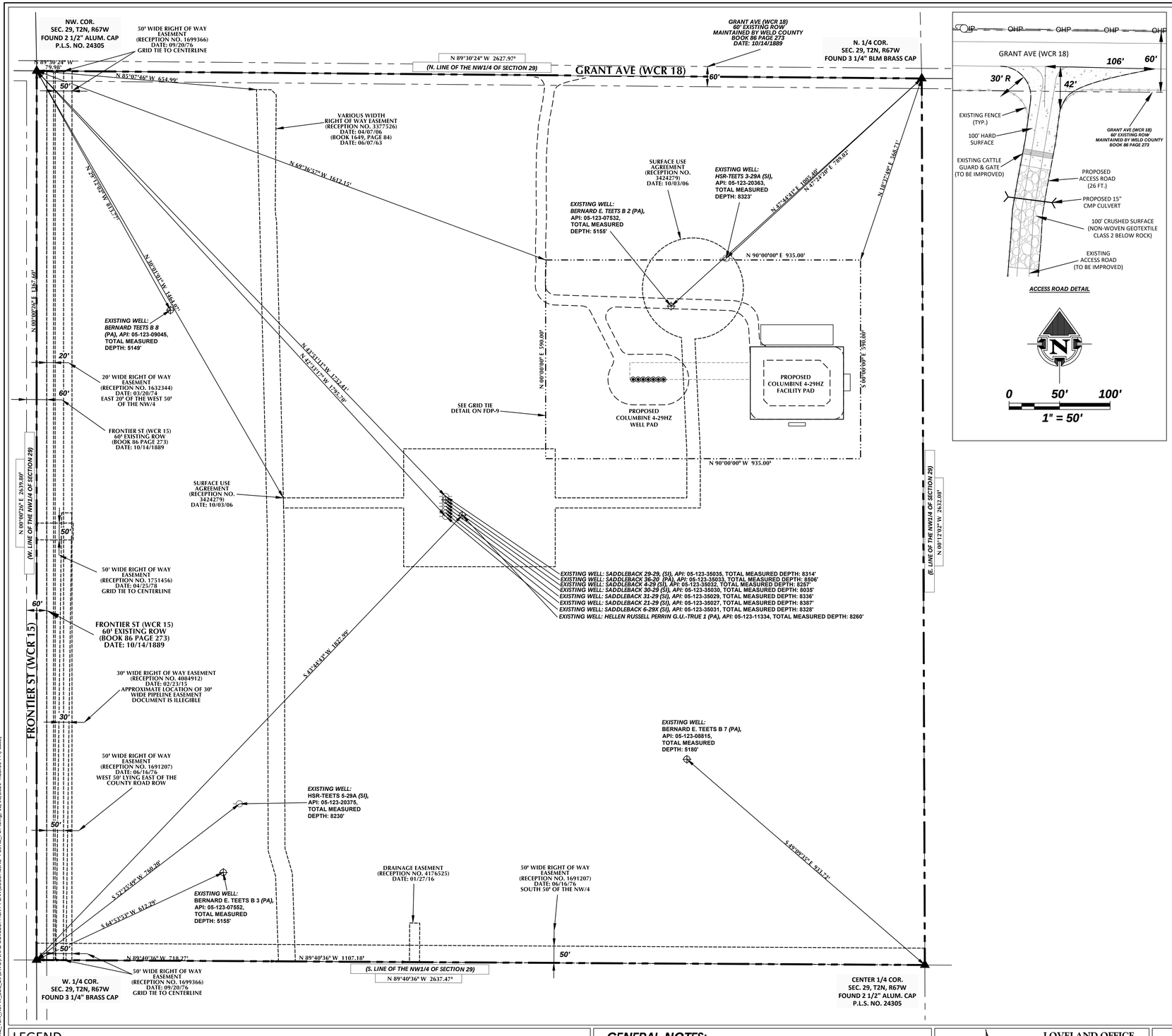
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-013 / FDP21-013

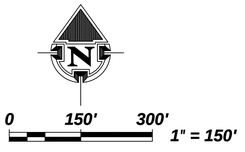
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

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Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

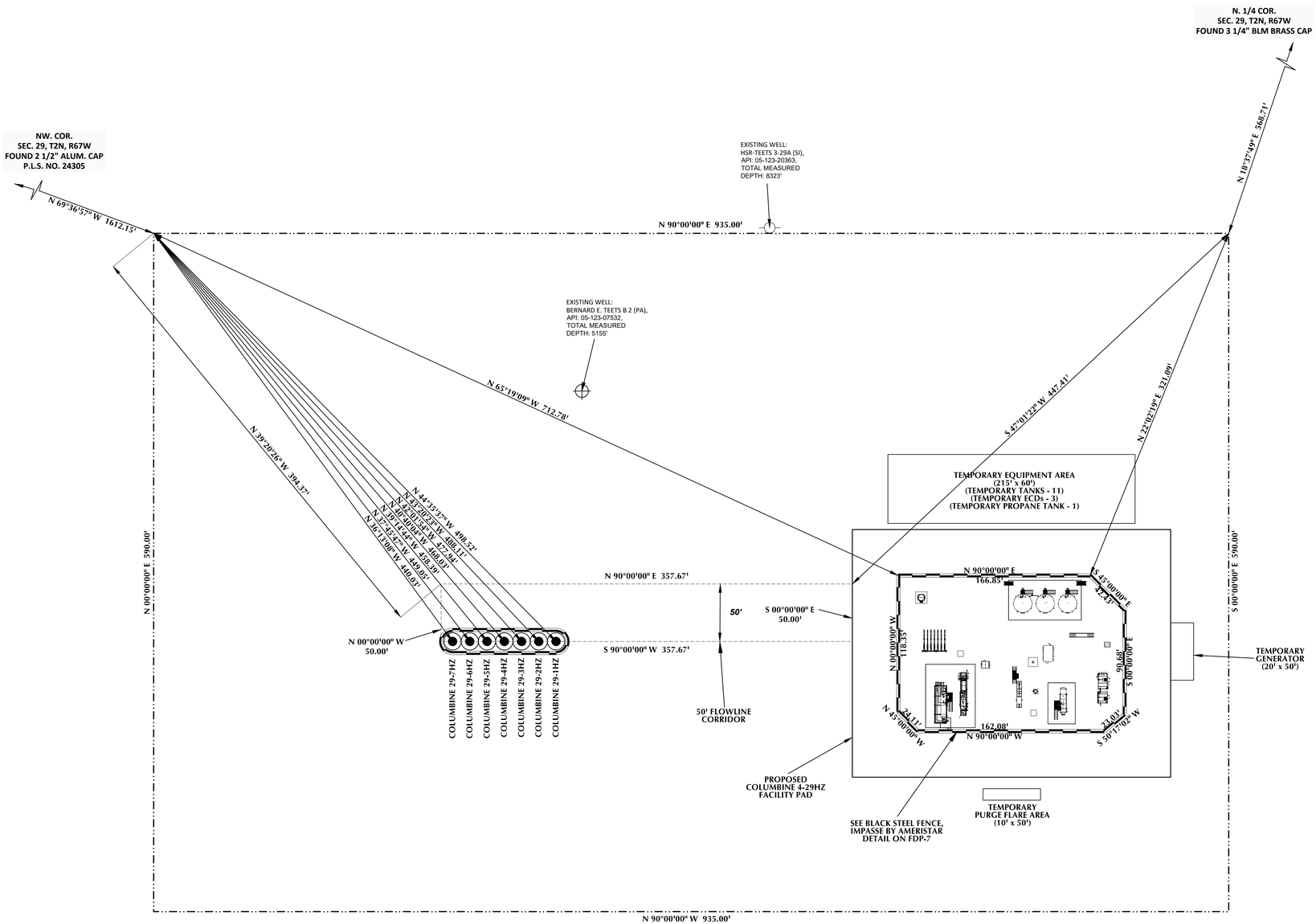
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-013 / FDP21-013

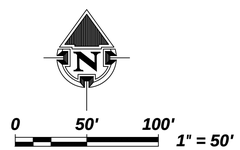
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)

GENERAL NOTES:

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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-013 / FDP21-013

SCALE:	1" = 50'	SHEET:	FDP-9
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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Special Review Use Application
Town of Firestone

Columbine 4-29HZ Pad and Production Facility

Township 2 North, Range 67 West, 6th P.M.
Section 29: NENW
Firestone, Colorado
Parcel # 131129200002
7274 Grant Avenue

Location Lat/Long (NAD 83): 40.114092, -104.915717
Access Road Lat/Long (NAD 83): 40.116598, -104.918317

APPLICANT:

Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Revised December 2021

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Section 1

Application Form

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

TOWN OF FIRESTONE
DEVELOPMENT REVIEW APPLICATION

Incomplete applications will not be processed. Attach additional sheets if necessary. Application fees must accompany application.

PROJECT INFORMATION	
Project Name: Columbine 4-29HZ well pad and facility	
Address/Location: NENW of Section 29, 2N 67W	
Brief Project Description: KMOG proposes to construct a new oil and gas well pad including seven wells and one production facility.	
Date of Pre-Application Conference with Staff: 6/26/2020	
Submittal Check List Attached: Yes	Fee Payment Included with Application: Yes
Mark As Applicable:	
Current Zoning: PUD	Proposed Zoning: No change
Current Use: AG	Proposed Use: N/A
# of Lots Proposed: N/A	Density Proposed: N/A
Gross Floor Area Proposed: N/A	
SITE INFORMATION	
Legal Description: NENW of Section 29, 2N 67W	
Location Size: ~ 12.66 Acres (DA); ~ 2.73 Acres (Interim Rec)	Floodplain On Site: No
SERVICE PROVIDERS	
Water: N/A	School District: N/A
Sewer: N/A	Fire District: Frederick Firestone Fire District
Gas: N/A	Ditch Company: N/A
Electric: N/A	Other:
Metro District: N/A	Other:
PROPERTY OWNER	**APPLICANT**
Name/Company: Anadarko E&P Onshore LLC	Name/Company: Kerr McGee Oil and Gas Onshore LP
Address: 1099 18th St., Denver CO 80202	Address: 1099 18th St., Denver CO 80202
Phone Number: 720-929-6026	Phone Number: 720-929-6907
Email Address: don_jobe@oxy.com	Email Address: shayelyn_marshall@oxy.com
MINERAL RIGHTS OWNER	**MINERAL LEASE HOLDER**
Name/Company: Please see list attached.	Name/Company: **Please see list attached.**
Contact Information:	Contact Information:

Please see page 2 of this application.

FOR OFFICE USE ONLY	
Date submitted:	Project #:
Fees Paid:	Planner:

ACKNOWLEDGEMENT & AUTHORIZATION

The undersigned is fully aware of the request/proposal being made and the actions being initiated on the referenced property. The undersigned understand that the application must be found to be complete by the Town of Firestone before the request can officially be accepted and the development review process initiated.

The undersigned is aware that the applicant is fully responsible for all reasonable costs associated with the review of the application/request being made to the Town of Firestone. Applicants shall pay all costs billed by the Town for legal, engineering and planning costs incurred by staff, including consultants acting on behalf of staff, necessary for project review. By this acknowledgement, the undersigned hereby certify that the above information is true and correct.

Property Owner Signature: Don C. Jost III

Date: 6/23/2021

Applicant Signature: Shayelyn Marshall

Digitally signed by: Shayelyn Marshall
DN: CN = Shayelyn Marshall email = shayelyn_marshall@oxy.com C = AD
Date: 2021.06.23 12:50:31 -06'00'

Date: 6/23/2021

DEVELOPMENT REVIEW FEE SCHEDULE

	Application Type	Fee	Deposit
Annexation			
☐	Major (10+ Acres)	$4,000	$2,500
☐	Minor (<10 acres)	$2,000	$1,500
Zoning / Rezoning			
☐	Initial Zoning	$1,500+$10/acre	n/a
☐	Rezoning	$1,500+$10/acre	$2,500
☐	PUD Rezoning	$3,000+10/acre	$5,000
☐	Overlay Rezoning	$2,000+10/acre	$2,500
☐	Minor Amendment	$500	n/a
Final Development Plan			
☐	Major Amendment	$1,000	n/a
☐	Minor Amendment	$400	n/a
☐	Residential	$1,400+$10/unit	$5,000
☐	Non-Residential (>10,000 sf)	$2,500	$1,500*
☐	Non-Residential (<10,000 sf)	$1,500	$1,500*
Miscellaneous			
☐	Metro District Service Plan	$10,000	n/a
☐	Other**:		

	Application Type	Fee	Deposit
Comprehensive Plan Amendment			
☐	Major Amendment	$3,000	$1,500
☐	Minor Amendment	$1,000	n/a
Subdivision			
☐	Preliminary Plat	$2,000+$40/lot	$5,000
☐	Final Plat	$2,000+$20/lot	$10,000
☐	Minor Subdivision Plat	$2,000+$20/lot	$1,500
☐	Non-residential Minor Plat	$2,000+$20/lot	$5,000
☐	Minor Plat Amendment	$500	n/a
Special Use Review			
☐	Major	$1,000	n/a
☐	Minor	$500	n/a
☑	Oil & Gas	$1,000 per well	$1,500

*All fees **include** both Town of Firestone Planning & Engineering review. These fees **do not include** referral agency review fees, outside consultant review fees, or review fees incurred by consultants acting on behalf of staff.*

** may be waived at staff's discretion*

*** fee provided at pre-application meeting*

Columbine Surface Location: 2N-67W-29: NW				
Lease Holder	**Address**	**City**	**State**	**Zip**
Kerr-McGee Oil & Gas Onshore LP	PO Box 173779	Denver	CO	80217
Mineral Owner	**Address**	**City**	**State**	**Zip**
Richard John Hartman	1651 Adams Street	Denver	CO	80206
Kim Wallace Hartman	3337 S. Chester Court	Denver	CO	80231
KAB Acquisition LLLP-VII	410 17th Street, Suite 1151	Denver	CO	80202
Morse Energy Partners LLC	410 17th Street, Suite 1150	Denver	CO	80202
Dios Del Mar Petroleum, Inc.	PO Box 621128	Littleton	CO	80162
MDC Partners, LLC	3415 S. Clayton Blvd.	Englewood	CO	80113
Anadarko E&P Onshore LLC	PO Box 173779	Denver	CO	80217
Anne Hurley Luke	11636 NE 149th St.	Kirkland	WA	98034
James Perrin Rice	733 East Glenhaven Dr.	Phoenix	AZ	85048
Ronald L. Anderson & Imrie V. Anderson, Co-Trustees of The Ronald & Imrie Anderson Family Trust dated July 21, 2006	25647 Paseo La Cresta	Laguna Nigu	CA	92677
Hellen Rice Crowe Living Trust	30300 Antelope Rd., #1913	Menifee	CA	92584
Incline Minerals, LLC	5011 N. Central Expressway	Dallas	TX	75205
Magnolia Minerals Trust, LLC	1660 17th Street, Suite 325	Denver	CO	80202
Raisa II Minerals, LLC	PO Box 987	Denver	CO	80201
Raisa II Minerals, LLC	1560 BROADWAY, SUITE 2050	Denver	CO	80202
Vivian R. Teets	10091 Prima Run Place	Colorado Sp	CO	80924
Arnette Resources, LLC	PO Box 16781	Golden	CO	80401
Kenneth C. Sawyer III & Mary Presley Sawyer, JT	245 Dahlia Street	Denver	CO	80220

Section 2

Narrative

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

NARRATIVE

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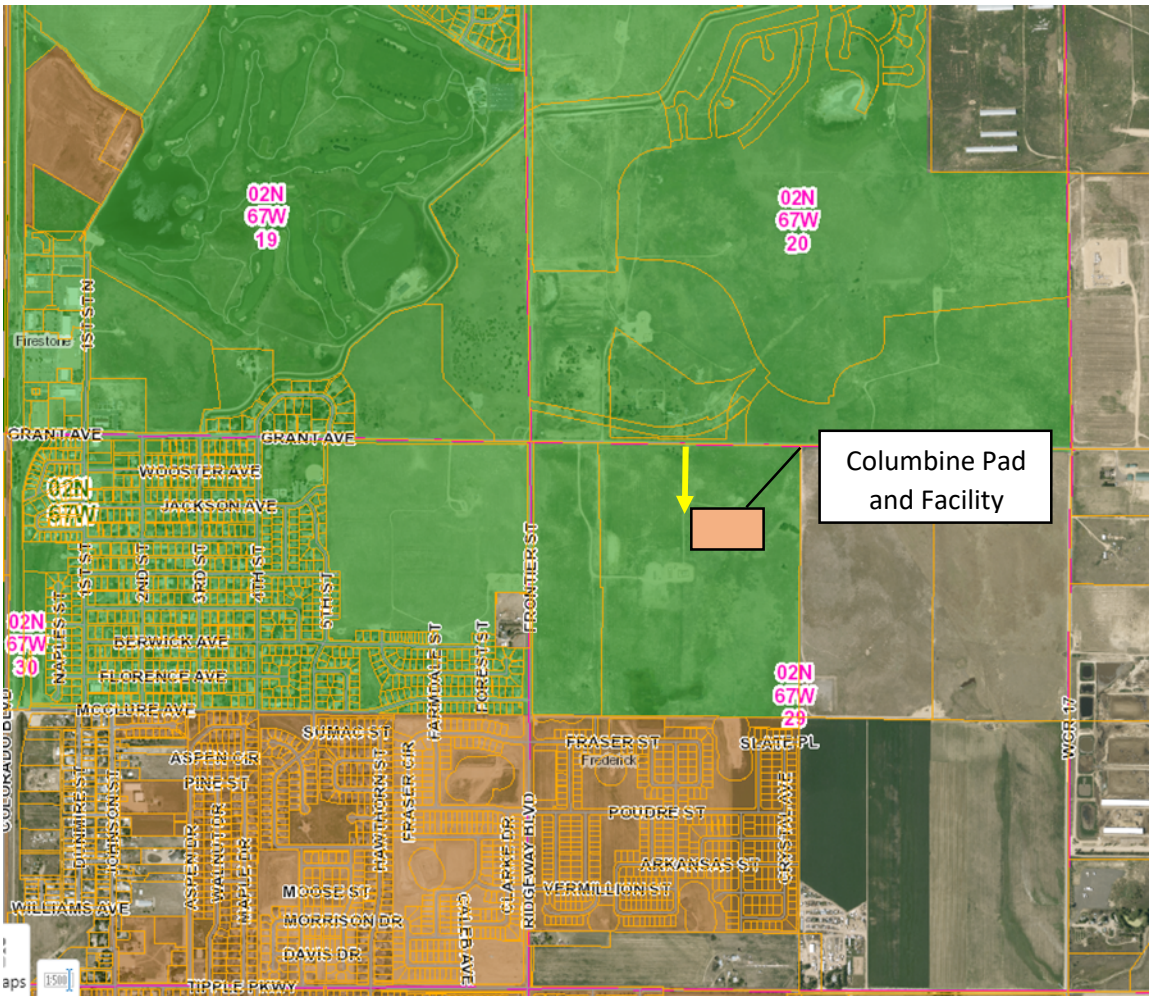
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1. Narrative

1.1 DESCRIPTION OF INTENDED USE

Kerr-McGee Oil & Gas Onshore LP (KMOG), intends to horizontally drill seven (7) oil and gas wells from one well pad location. The well names are listed in Section 1.2. The desired outcome of this application is to permit the wells to all formations. The purpose of the wells is to produce hydrocarbons from underlying formations known to have commercial potential from the production of such substances.

The proposed well and production facility are located in Section 29, Township 2 North, Range 67 west 6th P.M. See the aerial vicinity map below showing an arrow for the site access from WCR 18/Grant Ave.



1.2 SITE IMPROVEMENTS

KMOG is proposing one temporary operations area of approximately 12.66 acres for drilling and completions operations. After drilling and completions activities the site will be reclaimed to approximately 2.73 acres, as the permanent disturbance area.

Columbine 4-29HZ Well Pad:

Columbine 29-1HZ
Columbine 29-2HZ

Columbine 29-3HZ
Columbine 29-4HZ
Columbine 29-5HZ
Columbine 29-6HZ
Columbine 29-7HZ

A Final Develoment Plan is included with this application for further use and review.

After the wells have been drilled to their total depths and completed as wells capable of production, KMOG will reclaim the drill site. The reclamation will be in accordance with the applicable rules and regulations of the Colorado Oil and Gas Conservation Commission (COGCC). The completed well sites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the well sites regularly upon completion of the wells. Flowlines will be laid to connect the wells to the production facility.

If any of the wells are not capable of production, that specific well (or wells) will be plugged and abandoned as a dry hole and the same reclamation of the site will apply.

1.3 CHARACTERISTICS OF INSTALLATION

These wells will have a wellhead assembly installed on site as well as production and gathering facilities. Pumping units may be installed should pressure within the wells necessitate their use.

1.4 CHARACTERISTICS OF DRILLING AND COMPLETION OPERATIONS

KMOG management will utilize authorized employees and professional contractors to conduct the drilling and completion operations on site. The actual drilling phase is approximately 5 to 6 days per well, under normal circumstances. Drilling will be continuous, 24 hours a day, for this period. Completion operations will be performed on each well following the drilling phase. The production facility will be installed, and the wells put on-line. KMOG anticipates mobilization and pad construction to begin the fourth quarter 2022 contingent upon approval from the Town of Firestone. Completion of all construction activities including site preparation, drilling, completion, facility and pipeline installation and final re-grading will occur within six months of the completion of hydraulic fracturing, construction of production facility and the initiation of oil and gas production.

1.5 CHARACTERISTICS OF MAINTENANCE

A lease operator will inspect the wells on a regular basis under normal conditions and as required by any special circumstances under the supervision of the KMOG Area Manager. In addition, all wells and production facilities are remotely monitored 24 hours a day / seven days a week from our Integrated Operations Center (IOC) located in Platteville, Colorado.

1.6 DISPOSAL METHODS STATEMENT

- Drilling mud will be spread on lands outside of the town limits in a manner approved by the COGCC or taken to a commercial disposal.
- A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation.
- Human waste will be properly handled by portable sanitary facilities located on site. KMOG will contract a sanitary service company to provide and maintain the self-contained sanitary facilities throughout the oil and gas operation.

- Produced water will be disposed of off-site as approved by the COGCC.

2. Operator Information

2.1 OPERATOR IDENTIFICATION

Kerr-McGee Oil & Gas Onshore LP
(Subsidiary of Occidental Petroleum Corporation)
1099 18th Street
Denver, Colorado 80202
Tel:(720) 929-6000
Fax: (720) 929-7297

Kerr-McGee Oil & Gas Onshore LP (KMOG), a subsidiary of Occidental Petroleum Corporation, is a fully insured and bonded oil and gas operator, organized as a Delaware Limited Partnership and authorized to do business in the State of Colorado as Kerr-McGee Oil & Gas Onshore LP. All insurance and bonds held by KMOG meet the requirements as set forth in the rules and regulations as adopted by the Colorado Oil and Gas Conservation Commission.

2.2 SURFACE OWNER

Anadarko E&P OnShore LLC
PO Box 173779
Denver, Colorado 80217

The surface owner is the applicant and therefore a surface use agreement is not applicable.

3. Operating Plan

3.1 CONSTRUCTION & DRILLING PHASE

The construction and drilling operations for this location are expected to take about three months (under normal circumstances). The subject land is first surveyed, and a well location is staked in accordance with Colorado Oil and Gas Conservation Commission (COGCC) regulations. The drilling pad is designed to prevent run off so that any spills would be contained on-site. The pad is lined with a layer of compacted clay materials to help prevent fluids from migrating vertically to the subgrade. From this point forward, twenty-four (24) hour operations of dirt work equipment begins preparing the location including leveling the surface where the drilling rig will be located. After the location has been prepared, a drilling rig will move in to drill the surface intervals of the wells and cement the surface pipe to protect ground water formations. This process will take approximately one day per well under normal circumstances, subsequently a seven well pad will take seven days to drill and cement the surface casing pipes. Depending on the size/type of rig utilized to drill the surface interval, production drilling operations will either begin immediately with the same rig or a different rig will be moved onto location at a later date to drill the production interval. Drilling the production interval of the well will take four to five days per well, under normal circumstances. The actual drilling proceeds at a constant rate unless below the surface or mechanical problems are encountered.

If the well is deemed viable, casing is run in the hole and cemented (alternatively the well is plugged according to COGCC regulations). The casing, constructed of steel pipe, is designed to specific criteria to provide an integral conduit for transporting hydrocarbons to the surface. The casing strength is further enhanced by the cementing process. Cement is placed in the space between the casing and the wall of the

hole. The cement anchors the casing, provides increased burst resistance, and contains the fracturing and produced fluids. The cement is also designed to special criteria. The cement is then allowed to cure and concurrently the rig is moved off location. At this point the drilling phase is complete.

3.2 DRAINAGE AND EROSION CONTROL PLAN

Changes in the current drainage patterns are not anticipated. The well site will be monitored during the drilling and completion phases for any problems with drainage or erosion. Necessary measures will be taken to correct any problems. Once the drilling and completion phases are complete, the drill site will be restored as near as practical, to its original grade and vegetation planted as required by regulations and surface use agreements. KMOG will continue to monitor the site until all applicable regulatory requirements for revegetation have been met.

KMOG uses a closed loop or "pitless" system for drilling and fluid management and does not construct a reserve pit. The drilling company will actively manage the area around the rig equipment such that any minor fluid spills will be diverted and drain to small pumps strategically located and from there, if only water, will be pumped into the drilling fluid system. If the fluid is contaminated by fluids other than water, it will be pumped into a separate container and removed from the site to an approved disposal facility.

Please see the Phase III Drainage Study in Section five (of the permit) for more detail.

3.3 WATER SOURCES FOR ACTIVITIES

Water for use in completions operations will be secured by KMOG through its own "Water On Demand" system, or from a water supplier in the immediate area of the drill site. Water use will be approved for commercial and industrial use and will be subject to a mutually acceptable agreement between KMOG and the water supplier. The water-on-demand system is a network of over 180 miles of underground pipeline that stretches the length of the 20-mile by 30-mile field to source and transport water to completions crews. This system eliminates more than 2,000 truck trips per day field wide, also reducing associated concerns of traffic, noise, emissions and dust.

KMOG plans to install temporary lay flat waterlines to transfer water from its permanent infrastructure ending on parcel #131121000003 to the well pad for use during completions operations.

3.4 COMPLETIONS PHASE

Sometime after the drilling rig has rigged down, horizontal completions operations may begin.
The construction of the production facility, where practical, may occur concurrent with the drilling and/or completions operations. Completions operations include all operations performed after drilling the well up to delivering a producing well to be managed by the Production Operations group. These completions operations consist of well preparation, fracture stimulation, and preparing the well for production to sales.

The well preparation phase of completions operations is performed to prepare for the fracture stimulation operation. Initially, the necessary wellhead equipment is installed to conduct well preparation operations. KMOG wells are designed, built, operated and maintained to the highest standards. Logging is performed to confirm the cement quality behind the well casing meets KMOG and regulatory standards. The wellbore is pressure-tested to confirm the casing can withstand the high pressures associated with a fracture stimulation. The casing is then perforated at the toe end of the wellbore to prepare the well for the initial fracture stimulation. Lastly, the remaining necessary wellhead equipment is installed to ready the well for fracture stimulation. A crew of one to six people are required to perform the above operations. The cumulative duration of the well preparation operations is three to four days.

The fracture stimulation operation is conducted to stimulate the flow of hydrocarbons from the targeted geologic formation to the wellbore and up to the wellhead. Fracture stimulation consists of pumping a water and sand mixture into the wellbore at a high pressure and flow rate. The water/sand mixture exits the wellbore to contact the rock formation through perforations made to the well casing. The stimulation operation for each well is performed in stages to concentrate the stimulation of the rock formation at designed intervals along the wellbore. In the event multiple wells are included in the fracture stimulation operations, only one well is under stimulation at one time. During stimulation, a crew of 35 to 45 people are required. The cumulative duration of the fracture stimulation operation is three to seven days per well.

At the end of the fracture stimulation operation, the well is prepared for long-term production. A coiled tubing unit is utilized to mill the plugs set in the wellbore to isolate the stimulation stages and to clean out the wellbore. Production tubing is installed to direct the flow of hydrocarbons inside the wellbore to the wellhead at surface. Once the production tubing is landed, the well is managed by the Production Operations group. The cumulative duration of the post fracture stimulation operations is two to five weeks with a crew of three to ten people.

The completion process is a 24 hour a day / seven-days a week operation and crews are rotated every 12 hours for continuous operations. Once fracture stimulation operations begin there will be varying activity on location until the well is turned over to permanent production operations.

3.5 PRODUCTION PHASE

The production phase may overlap the completion phase. After the completions fleet has cleared location, the wells are connected to a production facility. Gathering equipment may also be installed on location by a third-party gathering company. The production and gathering facility, may consist of maintenance/oil tank(s), water tank(s), separator(s), LACT(s) units (Lease Automatic Custody Transfer), vapor recovery unit(s) (VRU), emission control device(s) (ECDs), meter(s) house, chemical tote(s), purge flare(s), communications tower, temporary produced water tanks, temporary ECDs and temporary generator. The temporary equipment will be on site for six to 12 months and then will be removed. In addition, pumping units may be installed. The production facility will be connected to the wells by pressure tested flowline buried approximately four feet deep. At this point, the gas and oil purchasers are preparing to connect the gas and oil sales meter loop.

The production facility installation is completed by constructing an earthen or metal berm around the production tank(s) and separator. The enclosed area will have sufficient volume to contain the entire contents of the largest tank plus adequate freeboard to contain a 24-hour 25-year precipitation event. The berms will be inspected at regular intervals and maintained in good condition. When a berm is provided around tanks no potential ignition sources shall be installed inside that area.

The lease operator then begins his monitoring of the wells. Reports consist of tank measurements, gas sales estimates, and pressure reading. This information is compiled monthly and filed with the COGCC.

When a well is completed for production, all disturbed areas no longer needed will be restored and re-vegetated as soon as practicable. All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established. All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions. The segregated soil horizons will contour as near as practicable to achieve erosion control

and long-term stability and shall be tilled adequately to establish a proper seedbed. The disturbed area then shall be re-seeded in the first favorable season.

At some point in the well's life, tubing may be run in the well with the possible addition of a plunger lift and/or pumping unit. This will extend the well's producing life and maximize reserves.

3.6 PLUGGING AND ABANDONMENT PHASE

Plugging and abandonment is the cementing of a well and removal of its associated production facility. This also includes the removal of flowlines after all the wells on the pad are plugged and the remediation and reclamation of the well site.

Upon the plugging and abandonment of a well, all cellars will be backfilled. All debris abandoned gathering line risers, and flowline risers, and surface equipment will be removed, and the location will be graded and re-contoured. Within 90 days after a well is plugged and abandoned, the well site shall be cleared of all non-essential equipment, and debris. All access roads to the plugged and abandoned wells and associated production facilities shall be closed, graded and re-contoured in accordance with the COGCC regulations and Surface Use Agreement (if applicable). Culverts and any other obstructions that were part of the access road(s) shall be removed. Well locations, access roads and associated facilities shall be reclaimed. As applicable, compaction alleviation, restoration, and revegetation of well sites and access roads shall be performed. After plugging a well, reclamation work will be completed within three months on crop land, and six months on non-crop land, or with landowner consent reclamation will occur during optimal re-vegetation times of the year.

Successful Final Reclamation of the well sites and access roads will be considered completed when:

1. Reclamation of crop land has been performed and over two growing seasons has indicated no significant un-restored subsidence.
2. Reclamation of non-crop land has been performed and the total cover of live perennial vegetation, excluding noxious weeds, provides sufficient soils erosion control. The total cover of live perennial vegetation of adjacent or nearby undisturbed land, not including overstory or tree canopy cover, having similar soils, slope and aspect of the reclaimed area.
3. Disturbances resulting from flow line installations shall be adequately reclaimed when the disturbed area is reasonably capable of supporting the pre-disturbance land use.
4. A Sundry Notice, Form 4, will be submitted to the COGCC, which describes the final reclamation procedures and any mitigation measures associated with final reclamation

KMOG will evaluate the 39 wells below for potential plug and abandon operations. The 39 wells are associated with 10 locations and if plugged, nearly 37 acres of previously created pads will be reclaimed.

FIRESTONE 20-29D
FIRESTONE V 20-03
FIRESTONE V 20-04D
FIRESTONE V 20-18D

ROCKY MOUNTAIN FUEL 19-4N (currently being plugged and abandoned)
ROCKY MOUNTAIN FUEL V 19-6JI
ROCKY MTN FUEL V 19-5JI
CENTEX 40-25

TOM L RUSSELL UNIT 1
DUNAWAY U 13-10 (currently being plugged and abandoned)
VICTORIA U 01-14JI
DACONO STATE 22-36 (currently being plugged and abandoned)
DACONO STATE 6-36 (currently being plugged and abandoned)
HSR-TEETS 11-20A
TEETS 12-20A
FIRESTONE 12-30
KUGEL 12-18
KUGEL V 18-4
OVERLOOK 21-30
OVERLOOK 2-30
OVERLOOK 27-30
OVERLOOK 28-30
OVERLOOK 8-30

WALSH GAS UNIT 6-24
WALSH U 24-15 JI
HIDDEN CREEK 12-29
HIDDEN CREEK 13-29X
HIDDEN CREEK 14-29
HIDDEN CREEK 19-29
HIDDEN CREEK 22-29
HIDDEN CREEK 25-29
HIDDEN CREEK 35-29
DACONO STATE 17-36
DACONO STATE 24-36
DACONO STATE 39-36
FREDERICK STATE 1-36 (currently being plugged and abandoned)
NEWTON 1
HSR-TEETS 5-29A
FIRESTONE V 20-2 (currently being plugged and abandoned)

4. Graphics

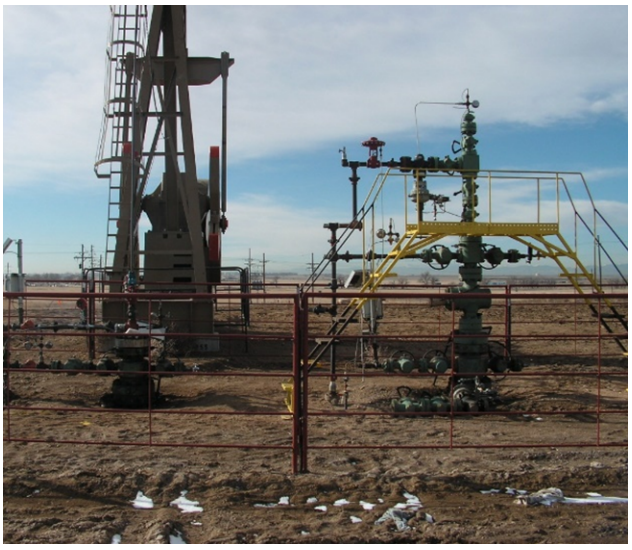
4.1 TYPICAL DRILLING RIG

Temporary, used during the drilling phase.



4.2 TYPICAL WELLHEADS

Permanent equipment for the life of the well.





4.3 TYPICAL SEPARATORS

Permanent equipment, part of the production facility.



Bulk Separators – approximately 11 to 21-foot-tall to top of Pressure Safety Valve (PSV) outlet.



Production Separators - 12 to 15 -foot tall to top of exhaust stack.

4.4 TYPICAL MAINTENANCE – CONDENSATE/OIL AND WATER TANKS

Permanent equipment, part of production facility – approximately ten -foot tall top of tank, 17 -feet tall to top of vent pipes.

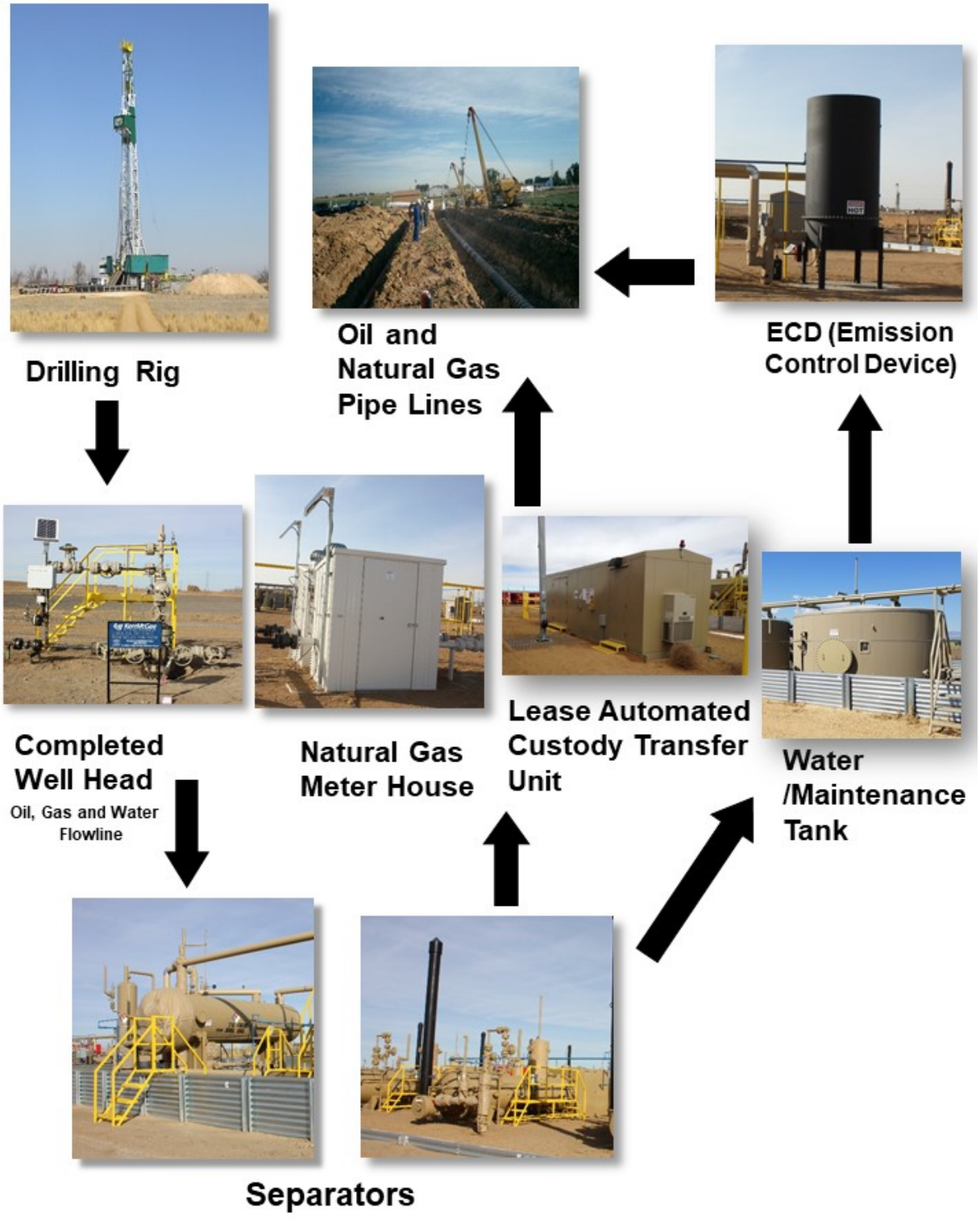


4.5 LACT UNIT - (LEASE AUTOMATED CUSTODY TRANSFER)

Permanent Equipment part of the production facility – nine to ten foot tall.



4.6 TYPICAL FLOW DIAGRAM



Section 3

COGCC Permits

Please see the submitted COGCC permit attached.

FORM 2A Rev 01/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Oil and Gas Location Assessment

Document Number: 402667820

Date Received: 07/12/2021

Location ID:

Expiration Date:

This Oil and Gas Location Assessment is to be submitted to the COGCC for approval prior to any ground disturbance activity associated with oil and gas operations. Approval of this Oil and Gas Location Assessment will allow for the construction of the below specified Location; however, it does not supersede any land use rules applied by the local land use authority. Please see the COGCC website at https://cogcc.state.co.us/ for all accompanying information pertinent this Oil and Gas Location Assessment.

[X] New Location [ ] Refile [ ] Amend Existing Location # _____

If this Location assessment is a component of an Oil and Gas Development Plan (OGDP) application, enter the OGDP docket number(s).

Docket Number	OGDP ID	OGDP Name
210700114		

If this Location assessment is part of an existing Oil and Gas Development Plan, enter the OGDP ID number(s).

<No existing OGDP number provided>

CONSULTATION

[ ] This location is included in a Comprehensive Area Plan (CAP). CAP ID # _____

[ ] This Location or its associated new access road, utility, or Pipeline corridor meets Rule 309.e.(2).A, B, or C.

[ ] This Location is within 2,640 feet of a GUDI or Type III Well per Rule 411.b.(4).

[ ] This Location includes a Rule 309.e.(2).E variance request.

[ ] This location includes a Rule 309.f.(1).A.ii. variance request.

Operator

Operator Number: 47120

Name: KERR MCGEE OIL & GAS ONSHORE LP

Address: P O BOX 173779

City: DENVER State: CO Zip: 80217-3779

Contact Information

Name: Shayelyn Marshall

Phone: (720) 9296907

Fax: ( )

email: shayelyn_marshall@oxy.com

FINANCIAL ASSURANCE

[X] Plugging and Abandonment Bond Surety ID (Rule 706): 20010124

[ ] Gas Facility Surety ID (Rule 711): _____

[ ] Waste Management Surety ID (Rule 704): _____

LOCATION IDENTIFICATION

Name: COLUMBINE Number: 4-29HZ

Provide the location description and the latitude and longitude of a single point near the center of the Working Pad Surface as a reference for this Location.

QuarterQuarter: NENW Section: 29 Township: 2N Range: 67W Meridian: 6 Ground Elevation: 5003

Latitude: 40.114127 Longitude: -104.917132

GPS Quality Value: 1.3 Type of GPS Quality Value: PDOP Date of Measurement: 06/18/2021

RELATED REMOTE LOCATIONS

(Enter as many Related Locations as necessary. Enter the Form 2A document # only if there is no established COGCC Location ID#)

This proposed Oil and Gas Location is:	LOCATION ID #	FORM 2A DOC #
☐		

RELEVANT LOCAL GOVERNMENT SITING INFORMATION

County: WELD Municipality: Firestone

Per § 34-60-106 (1)(f)(I)(A), the following questions pertain to the "Relevant Local Government approval of the siting of the proposed oil and gas location."

This proposed Oil and Gas Location is in an area designated as one of State interest and subject to the requirements of § 24-65.1-108, C.R.S. No

Does the Relevant Local Government regulate the siting of Oil and Gas Locations, with respect to this location? Yes

A siting permit application has been submitted to the Relevant Local Government for this proposed Oil and Gas Location: Yes

Date Relevant Local Government permit application submitted: 07/08/2021

Current status or disposition of the Relevant Local Government permit application for this proposed Oil and Gas Location: In Process

Status/disposition date: 07/08/2021

If Relevant Local Government permit has been approved or denied, attach final decision document(s).
Provide the contact information for the Relevant Local Government point of contact for the local permit associated with this proposed Oil and Gas Location:

Contact Name: MARTY OSTHOLTHOFF Contact Phone: 303.531.6275

Contact Email: mostholthoff@firestoneco.gov

PROXIMATE LOCAL GOVERNMENT INFORMATION

For every Proximate Local Government (PLG) associated with this proposed Oil and Gas Location, provide the PLG's point of contact and their contact information.

< No row provided >

FEDERAL PERMIT INFORMATION

A Federal drilling permit (or related siting application) has been submitted for this proposed Oil and Gas Location: No

Date submitted:

Current status or disposition of the Federal drilling permit (or related siting application) for this proposed Oil and Gas Location:

Status/disposition Date:

If Federal agency permit has been approved or denied, attach the final decision document(s).
Provide the contact information of the Federal point of contact for the Federal permit associated with this proposed Oil and Gas Location.

Contact Name: Contact Phone:

Contact Email: Field Office:

Additional explanation of local and/or federal process:

Since 2019, KMOG has worked with the Town of Firestone to negotiate a Cooperative Development Agreement which includes the proposed location. After years of thoughtful planning and significant input from the Town staff, the Board of Trustees approved the Agreement in April of 2021. KMOG submitted the local permit to the town on July 8, 2021.

RELEVANT LOCAL GOVERNMENT OR FEDERAL PRE-APPLICATION CONSULTATION

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Did a pre-application Formal Consultation Process occur with the Relevant Local Government per Rule 301.f.(3)?` No

Date of local government consultation:

Did a pre-application Formal Consultation Process occur with the Federal land manager per Rule 301.f.(3)? No

Date of federal consultation:

Was an ALA that satisfies Rule 304.b.(2).C (or substantially equivalent information per Rule 304.e) developed during a federal or local government permit application process? If yes, attach the ALA to the Form 2A. Yes

ALA APPLICABILITY AND CRITERIA

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Does the proposed Oil and Gas Location meet any of the criteria listed in Rule 304.b.(2)B? Yes

If YES, indicate by checking the box for every Rule 304.b.(2).B criterion met by this proposed Location, and attach an ALA. See Rule 304.b.(2).B.i-x for full text of criteria.

- [X] i. WPS < 2,000 feet from RBU/HOBU
- [ ] ii. WPS < 2,000 feet from School/Child Care Center
- [ ] iii. WPS < 1,500 feet from DOAA
- [ ] iv. WPS < 2,000 feet from jurisdictional boundary and PLG objects/requests ALA
- [ ] v. WPS within a Floodplain
- [ ] vi.aa. WPS within a surface water supply area
- [ ] vi.bb. WPS < 2,640 feet from Type III or GUDI well
- [ ] vii. WPS within/immediately upgradient of wetland/riparian corridor
- [ ] viii. WPS within HPH and CPW did not waive
- [ ] ix. Operator using Surface bond
- [ ] x. WPS < 2,000 feet from RBU/HOBU/School within a DIC

Is the proposed Oil and Gas Location within the exterior boundaries of the Southern Ute Indian Reservation, and the Tribe objects to the Location or requests an ALA? If YES, attach an ALA to the Form 2A. No

Operator requests the Director waive the ALA requirement per Rule 304.b.(2).A.i: [ ]

Provide an explanation for the waiver request, and attach supporting information (if necessary).

ALTERNATIVE LOCATIONS DASHBOARD

List every alternative location reviewed and included in the ALA. Provide a latitude and longitude for the approximate center of the alternative location, all Rule 304.b.(2).B Criteria met, if a variance would be required to permit the location, and a brief comment on the key points of the alternative location.

304.b.(2).B.i-x Criteria Met:

< No row provided >

SURFACE & MINERAL OWNERSHIP

Surface Owner Info:

Name: Anadarko E&P Onshore LLC Phone: 720-929-6000
Address: 1099 18th St. Fax:
Address: Email:
City: Denver State: CO Zip: 80202

Surface Owner at this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Check only one:

- [X] The Operator/Applicant is the surface owner.
- [ ] The Operator has a signed Surface Use Agreement for this Location – attach SUA.
- [ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the surface owner owns the minerals beneath this Location and is committed to an oil and gas lease – attach lease map or provide lease description.
- [ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the Operator intends to use a surface bond per Rule 703 to secure access to this Location – attach lease map or provide lease description.

Surface Owner protection Financial Assurance type: N/A Surety ID Number:

Mineral Owner beneath this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: Yes

Lease description if necessary:

SITE EQUIPMENT LIST

Indicate the number and type of major equipment components planned for use on this Oil and Gas Location:

Wells	7	Oil Tanks	0	Condensate Tanks	1	Water Tanks	2	Buried Produced Water Vaults	0
Drilling Pits	0	Production Pits	0	Special Purpose Pits	0	Multi-Well Pits	0	Modular Large Volume Tank	0
Pump Jacks	7	Separators	3	Injection Pumps	0	Heater-Treaters	0	Gas Compressors	0
Gas or Diesel Motors	0	Electric Motors	0	Electric Generators	0	Fuel Tanks	0	LACT Unit	1
Dehydrator Units	0	Vapor Recovery Unit	0	VOC Combustor	1	Flare	0	Enclosed Combustion Devices	0
Meter/Sales Building	1	Pigging Station	0			Vapor Recovery Towers	0		

OTHER PERMANENT EQUIPMENT

< No Row Provided >

OTHER TEMPORARY EQUIPMENT

< No Row Provided >

GAS GATHERING COMMITMENT

Operator commits to connecting to a gathering system by the Commencement of Production Operations? Yes

If the answer is NO, a Gas Capture Plan consistent with the requirements of Rule 903.e MUST be attached on the Plans tab.

FLOWLINE DESCRIPTION

Per Rule 304.b.(6), provide a description of all onsite and off-location oil, gas, and/or water flowlines.

Please see Operator Comments Section for flowline description.

CONSTRUCTION

Size of disturbed area during construction in acres: 12.66

Size of location after interim reclamation in acres: 2.73

Estimated post-construction ground elevation: 5002

DRILLING PROGRAM

Will a closed-loop drilling system be used? Yes

Is H2S gas reasonably expected to be encountered during drilling operations at concentrations greater than or equal to 100 ppm? No If YES, attach H2S Drilling Operations Plan.

Will salt sections be encountered during drilling: No

Will salt based (>15,000 ppm Cl) drilling fluids be used? No

Will oil based drilling fluids be used? Yes

DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

Please see the Waste Management Plan attached.

Beneficial reuse or land application plan submitted? Yes

Reuse Facility ID: _____ or Document Number: _____

Centralized E&P Waste Management Facility ID, if applicable: 149021

CURRENT LAND USE

Current Land Use: check all that apply per Rule 304.b.(9).

Crop Land: ☐ Irrigated ☒ Non-Irrigated ☐ Conservation Resource Program (CRP)

Non-Crop Land: ☐ Rangeland ☐ Forestry ☐ Recreation ☐ Other

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

Describe the current land use:

The current land use is agriculture, more specifically dry cropland. There are no plans to subdivide the property or add any other types of land use at this time.

Describe the Relevant Local Government's land use or zoning designation:

Current zoning designation is a Planned Unit Development.

Describe any applicable Federal land use designation:

N/A

FINAL LAND USE

Final Land Use: check all that apply per Rule 304.b.(9).

Crop Land: ☐ Irrigated ☒ Non-Irrigated ☐ Conservation Resource Program (CRP)

Non-Crop Land: ☐ Rangeland ☐ Forestry ☐ Recreation ☐ Other

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

REFERENCE AREA INFORMATION

If Final Land Use includes Non-Crop Land (as checked above), the following information is required:
Describe landowner's designated final land use(s):

Reference Area Latitude: Reference Area Latitude:

Provide a list of plant communities and dominant vegetation found in the Reference Area.

< No row provided >

Noxious weeds present:

SOILS

List all soil map units that occur within the maximum extent of the proposed Oil and Gas Location. Attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" listing the typical vertical soil profile(s). This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS website at https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/ or from the COGCC website GIS Online map page. Instructions are provided within the COGCC website help section.

NRCS Map Unit Name: 73—Vona loamy sand, 3 to 5 percent slopes

NRCS Map Unit Name: 44—Olney loamy sand, 1 to 3 percent slopes

NRCS Map Unit Name:

GROUNDWATER AND WATER WELL INFORMATION

Provide the distance and direction, as measured from the Working Pad Surface, to the nearest:

water well: 648 Feet S

Spring or Seep: 5280 Feet W

Estimated depth to shallowest groundwater that can be encountered at this Oil and Gas Location: 15 Feet

Basis for estimated depth to and description of shallowest groundwater occurrence:

648' S, Permit 62167-MH, depth 20' (proposed), Static Water Level unknown, Elev 5011' (permit issued)
2202' W, Permit 45389, depth 43', static water level 23', Elev 5011'
Loc Elev 5003
SWL Calc: (5003 - 5011) + 23 = 15'

SURFACE WATER AND WETLANDS

Provide the distance and direction to the nearest downgradient surface Waters of the State, as defined 746 Feet NE

in the 100-Series Rules, measured from the Working Pad Surface:

If less than 2,640 feet, is the Waters of the State identified above within 15 stream miles upstream of a Public Water System intake? No

Provide the distance and direction to the nearest downgradient wetland, measured from the Working Pad Surface: 746 Feet NE

Provide a description of the nearest downgradient surface Waters of the State:

This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is ponded, and the surrounding land use appears to be agricultural.

If the proposed Oil and Gas Location is within a Rule 411.a Surface Water Supply Area buffer zone, select the buffer zone type:

If the proposed Oil and Gas Location is within a Rule 411.b GUDI/Type III buffer zone, select the buffer zone type:

Is a U.S. Army Corps of Engineers Section 404 permit required for the proposed Oil and Gas Location, access road, or associated pipeline corridor? No

If a U.S. Army Corps of Engineers Section 404 permit is required, provide the permit status, and permit number if available:

Is the Location within a Floodplain? No Floodplain Data Sources Reviewed (check all that apply):

[X] Federal (FEMA) [ ] State [X] County [ ] Local

[ ] Other

Does this proposed Oil and Gas Location lie within a Sensitive Area for water resources, as defined in the 100-Series Rules? Yes

CONSULTATION, WAIVERS, AND EXCEPTIONS

When Rule 309.e.(2) Consultation must occur, check all that apply:

- [ ] This location is included in a Wildlife Mitigation Plan
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within federally designated critical habitat or an area with a known occurrence for a federal or Colorado threatened or endangered species. Provide description in Comments section of Submit tab.
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within an existing conservation easement established wholly or partly for wildlife habitat. Provide description in Comments section of Submit tab.

When Rule 309.e.(3) Consultation is not required, check all that apply:

- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Protection Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Mitigation Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable conservation plan.

Pre-application Consultation:

- [ ] A pre-application consultation with CPW, regarding this Oil and Gas Location, occurred on:

CPW Waivers and Exceptions (check all that apply and attach all CPW waivers to this Form 2A):

- [ ] The applicant has obtained a Rule 304.b.(2).B.viii CPW waiver for the requirement to complete an ALA.
- [ ] The applicant has obtained a Rule 309.e.(2).G CPW waiver and consultation is not required.
- [ ] The applicant has obtained a Rule 309.e.(5).D.i CPW waiver and is requesting an exception from Rule 1202.c.(1).R.
- [ ] The applicant has obtained a Rule 309.e.(5).D.ii CPW waiver and is requesting an exception from Rule 1202.c.(1).S.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iii CPW waiver of Rule 1202.c.(1).T.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iv CPW waiver and is requesting an exception from Rule 1202.c.(1) in accordance with an approved CAP.
- [ ] The applicant has obtained a Rule 1202.a CPW waiver.
- [ ] The applicant has obtained a Rule 1202.b CPW waiver.
- [ ] In accordance with Rule 1203.a.(3), the applicant requests an exception from compensatory mitigation

Rule(s):

HIGH PRIORITY HABITAT AND COMPENSATORY MITIGATION

This Oil and Gas Location, associated access roads, utility, or Pipeline corridor falls wholly or partially within the following High Priority Habitats (Note: dropdown options are abbreviated - see Rule 1202 for full rule text):

< No row provided >

The following questions are for Oil and Gas Locations that cause the density to exceed one Oil and Gas Location per square mile in Rule 1202.d High Priority Habitat:

Direct Impacts:

Is Compensatory Mitigation required per Rule 1203.a for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address direct impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Direct impact habitat mitigation fee amount: $

Indirect Impacts:

Is Compensatory Mitigation required per Rule 1203.d for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address indirect impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Indirect impact habitat mitigation fee amount: $

Operator Proposed Wildlife BMPs

No BMP

CPW Proposed Wildlife BMPs

No BMP

AIR QUALITY MONITORING PROGRAM

Will the Operator install and administer an air quality monitoring program at this Location? Yes

Operator Proposed BMPs

No BMP

CDPHE Proposed COAs OR BMPs

No BMP

PLANS

Total Plans Uploaded: 0

- [ ] (1) Emergency Spill Response Program consistent with the requirements of Rules 411.a.(4).B, 411.b.(5).B, & 602.j
- [ ] (2) Noise Mitigation Plan consistent with the requirements of Rule 423.a
- [ ] (3) Light Mitigation Plan consistent with the requirements of Rule 424.a
- [ ] (4) Odor Mitigation Plan consistent with the requirements of Rule 426.a
- [ ] (5) Dust Mitigation Plan consistent with the requirements of Rule 427.a
- [ ] (6) Transportation Plan
- [ ] (7) Operations Safety Management Program consistent with the requirements of Rule 602.d
- [ ] (8) Emergency Response Plan consistent with the requirements of Rule 602.j
- [ ] (9) Flood Shut-In Plan consistent with the requirements of Rule 421.b.(1)
- [ ] (10) Hydrogen Sulfide Drilling Operations Plan consistent with the requirements of Rule 612.d
- [ ] (11) Waste Management Plan consistent with the requirements of Rule 905.a.(4)
- [ ] (12) Gas Capture Plan consistent with the requirements of Rule 903.e
- [ ] (13) Fluid Leak Detection Plan
- [ ] (14) Topsoil Protection Plan consistent with the requirements of Rule 1002.c
- [ ] (15) Stormwater Management Plan consistent with the requirements of Rule 1002.f
- [ ] (16) Interim Reclamation Plan consistent with the requirements of Rule 1003
- [ ] (17) Wildlife Plan consistent with the requirements of Rule 1201
- [ ] (18) Water Plan
- [ ] (19) Cumulative Impacts Plan
- [ ] (20) Community Outreach Plan
- [ ] (21) Geologic Hazard Plan

VARIANCE REQUESTS

Check all that apply:

- [ ] This proposed Oil and Gas Location requires the approval of a Rule 502.a variance from COGCC Rule or Commission Order number: _____

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

RULE 304.d LESSER IMPACT AREA EXEMPTION REQUESTS

Check the boxes below for all Exemptions being requested. Lesser Impact Area Exemption Request must be attached, and will include all requested exemptions.

- ☐ 304.b.(1). Local Government Siting Information
- ☐ 304.b.(2). Alternative Location Analysis
- ☐ 304.b.(3). Cultural Distances
- ☐ 304.b.(4). Location Pictures
- ☐ 304.b.(5). Site Equipment List
- ☐ 304.b.(6). Flowline Descriptions
- ☐ 304.b.(7). Drawings
- ☐ 304.b.(8). Geographic Information System (GIS) Data
- ☐ 304.b.(9). Land Use Description
- ☐ 304.b.(10). NRCS Map Unit Description
- ☐ 304.b.(11). Best Management Practices
- ☐ 304.b.(12). Surface Owner Information
- ☐ 304.b.(13). Proximate Local Government
- ☐ 304.b.(14). Wetlands
- ☐ 304.b.(15). Schools and Child Care Centers
- ☐ 304.c.(1). Emergency Spill Response Program
- ☐ 304.c.(2). Noise Mitigation Plan
- ☐ 304.c.(3). Light Mitigation Plan
- ☐ 304.c.(4). Odor Mitigation Plan
- ☐ 304.c.(5). Dust Mitigation Plan
- ☐ 304.c.(6). Transportation Plan
- ☐ 304.c.(7). Operations Safety Management Program
- ☐ 304.c.(8). Emergency Response Plan
- ☐ 304.c.(9). Flood Shut-In Plan
- ☐ 304.c.(10). Hydrogen Sulfide Drilling Operations Plan
- ☐ 304.c.(11). Waste Management Plan
- ☐ 304.c.(12). Gas Capture Plan
- ☐ 304.c.(13). Fluid Leak Detection Plan
- ☐ 304.c.(14). Topsoil Protection Plan
- ☐ 304.c.(15). Stormwater Management Plan
- ☐ 304.c.(16). Interim Reclamation Plan
- ☐ 304.c.(17). Wildlife Plan
- ☐ 304.c.(18). Water Plan
- ☐ 304.c.(19). Cumulative Impacts Plan
- ☐ 304.c.(20). Community Outreach Plan
- ☐ 304.c.(21). Geologic Hazard Plan

OPERATOR COMMENTS AND SUBMITTAL

Comments

The Town of Firestone approved a Cooperative Development Agreement for this location in April of2021. Please see the approved agreement attached as other. Upon entrance of the Cooperative Development Agreement and prior to filing this Application, Kerr-McGee presented an alternative location analysis to the Director pursuant to Rule 301.f.(4) and engaged in a Formal Consultation Process with the Director and the Town of Firestone.

Please ensure that all correspondence associated with this permit goes to the analyst and DJ Regulatory email addresses, as listed on this permit.

The alternative locations for the proposed Columbine pad are listed as #5-#9 in the ALA narrative, maps and template.

This location is not proposed within 2,000 feet of a Residential Building Unit, High Occupancy Building Unit, or School Facility located within a Disproportionately Impacted Community, a Rule 304.c.(20) Community Outreach Plan is not required. KMOG's “Community Consultation Plan” attached as Other is intended to provide supplemental information regarding efforts on community outreach and communication.

The attached ERP was submitted to the Frederick/Firestone Fire Protection District on 7/6/2021. KMOG has a meeting with the staff on 7/15/2021. An approved copy will be sent to the COGCC OGLA staff.

KMOG`s general Air Monitoring Plan has been approved by the CDPHE and is attached to the 2B. A site-specific Air Monitoring Plan for this location will be submitted to the COGCC and CDPHE for approval of air monitor locations prior to operations.

Temporary above ground polyethylene water pipelines (diameter 10" - 12" with a 60 BPM capacity) will deliver water to location operations from larger trunk lines for completions operations.

Flowlines: 7 flow lines will flow to the production facility location. During production, flow direction in the flow lines is from the wellhead to the production facility. The size of flow lines is typically 2". Flow lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the production facility.

Custody Transfer: Gas custody transfer occurs at the custody transfer meter located on the proposed production facility location. Oil custody transfer occurs at the LACT Unit located on the proposed production facility location.

Two 500 barrel skid-mounted tanks will be temporarily placed onsite for use of the pre-spud rig only. One tank will store water and the other will store water-based mud. A temporary ECD may be utilized during drilling.

Gas Lift Lines: Gas lift lines are also occasionally installed (one per well) from the well head to the production facility. During operation flow direction in the gas lift lines will be from the production facility to the well head. The size of the gas lift lines is typically 2". Gas lift lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the tank battery.

11 temporary 500 barrel skid-mounted frac tanks will be utilized during flowback and initially for produced water. It is estimated the three temporary ECDs and the temporary tanks will be on location for 9 - 12 months and will be removed as water production declines. A temporary generator may be placed on location if needed and would be in place until electric power is available. Temporary purge flares may be placed on location for up to 60 days. A temporary 250-gallon propane tank will be used on location to provide fuel gas during facility equipment startup.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: _____ Date: 07/12/2021 Email: DJRegulatory@oxy.com

Print Name: Shayelyn Marshall Title: Regulatory Analyst

Based on the information provided herein, this Oil and Gas Location Assessment complies with COGCC Rules, applicable orders, and SB 19-181 and is hereby approved.

COGCC Approved: _____ **Director of COGCC** Date: _____

Conditions Of Approval

All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.

COA Type	Description

Best Management Practices

No	BMP/COA Type	Description
1	Planning	Access Road: KMOG will utilize an existing access road from CR 18 for drilling, completions, and production operations, including maintenance equipment. The road will be properly constructed and maintained to accommodate for emergency vehicle access.
2	Community Outreach and Notification	KMOG held Surface Impact Planning (SIP) meetings for this location. These meetings are attended by KMOG internal teams. This is a multi-disciplinary team including construction, operations, facilities, EHS, stakeholder relations, regulatory, surface land and mitigation. The team reviews potential impacts to the surrounding residents, identify and plan for necessary mitigations, and identify BMPs that should be included in the pad development moving forward. The team reviews noise, odor, lights, traffic, haul routes, rig orientation and visual mitigation and any input we have receivedfrom surrounding communities either from response line calls or community meetings, relative to our operations. The purpose of the meeting is to proactively identify potential concerns, exhaust possible options and provide best in class solutions in order to have compatible operations.
3	Traffic control	KMOG currently plans to use the water-on-demand system on this location which is anetwork of over 180 miles of underground pipelines that stretches the length of the 20 -mile by 30-mile field to source and transport water to completions crews. This systemeliminates more than 2,000 truck trips per day, also reducing associated concerns oftraffic, noise, emissions and dust.
4	Traffic control	The operator will obtain access and ROW permits from Firestone and will implement traffic control plans prior to the commencement of operations.
5	General Housekeeping	Loadlines: All loadlines shall be bullplugged or capped.
6	General Housekeeping	Removal of Surface Trash: A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation. Uponcompletion of operations, the commercial trash bin will be removed from the locationand disposed of in an appropriate manner.
7	Material Handling and Spill Prevention	Pit Level Indicators: All storage tanks used for active drilling operations (used in lieu of pits) contain pit level monitors with Electronic Drilling Recorders (EDR). KMG uses EDRs with pit level monitor(s) and alarm(s) for production rigs. Basic level gauges are used on tanks utilized for the surface rig.
8	Construction	Fencing Requirements: The completed wellsites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the wellsites upon completion of the wells. Authorized representatives and/or KMOG personnel shall be on-site during drilling and completionoperations.
9	Emissions mitigation	All seven of the wells are commingled into a bulk and test design. This reduces the total number of separators on location on a per well basis which in turn allows to have a smaller facility footprint. Reducing the total number of separators per well also reduces the total noise and emissions from the separator burners.
10	Emissions mitigation	Temporary ECD(s) will be utilized to mitigate releases of emissions from temporary produced water storage tanks for the duration which the tanks are on location and being used.
11	Drilling/Completion Operations	Green Completions: Test separators and associated flow lines, sand traps and emission control systems shall be installed on-site to accommodate green completions techniques. When commercial quantities of salable quality gas are achieved at each well, the gas shall be immediately directed to a sales line or shut in and conserved. If a sales line is unavailable or other conditions prevent placing the gas into a sales line, KMG shall not produce the wells without an approved variance.
12	Drilling/Completion Operations	KMOG`s Integrated Operations Center is staffed 24-hours per day, seven days per week, 365 days per year providing real-time remote monitoring capabilities for all of KMOG`s wells. Employees in the Integrated Operations Center are able to shut in wells remotely and dispatch personnel to a location within 5-15 minutes.
13	Drilling/Completion Operations	Guy line anchors will not be used. Base Beams will be used to stabilize the rig and removed after drilling.
14	Final Reclamation	Well Site Cleared: The wellsite will be cleared of all non-essential equipment within ninety (90) days after all wells associated with the pad have been plugged and abandoned.

15	Final Reclamation	Identification of Plugged and Abandoned Wells: Once the well has been plugged and abandoned, KMOG will identify the location of the wellbore with a permanent monument that will detail the well name and date of plugging.

Total: 15 comment(s)

Attachment List

Att Doc Num	Name
402667820	FORM 2A SUBMITTED
402733359	OTHER
402738989	LOCATION PICTURES
402739007	LOCATION DRAWING
402740042	LOCATION AND WORKING PAD GIS SHP
402743028	OTHER
402798300	ACCESS ROAD MAP
402798301	ALA DATASHEET
402798304	ALA NARRATIVE SUMMARY
402798305	CULTURAL FEATURES MAP
402798306	DIRECTIONAL WELL PLAT
402798307	GEOLOGIC HAZARD MAP
402798308	HYDROLOGY MAP
402798310	LAYOUT DRAWING
402798311	NRCS MAP UNIT DESC
402798312	PRELIMINARY PROCESS FLOW DIAGRAMS
402798318	RELATED LOCATION AND FLOWLINE MAP
402798319	WILDLIFE HABITAT DRAWING
402828380	OTHER

Total Attach: 19 Files

General Comments

User Group	Comment	Comment Date
OGLA	The Director has determined this OGDP application is complete. Form pushed to IN PROCESS.	10/01/2021
OGLA	Plans, attachments, and NRCS soil units attachments updated.	10/01/2021
OGLA	The following changes were made with Operator concurrence: - added Firestone meeting attachment as OTHER	09/09/2021
OGLA	Returned to draft for: - missing access road soil units; correct air monitoring plan Submit tab comment - attachment and Plan corrections	08/11/2021

Total: 4 comment(s)

Public Comments

No public comments were received on this application during the comment period.

Section 4

Emergency Response Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

Location: Near Frontier Street (CR 15) and Grant Avenue (CR 18)
Address: 7274 Grant Avenue

EMERGENCY RESPONSE PLAN

Revised October 2021



1099 18th Street, Suite 1800

Denver, Colorado 80202

Columbine 4-29HZ Well Pad and Facility

Section 29, T2N – R67W

Firestone, Colorado

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

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LOCAL RESPONDING AGENCIES

Name	Emergency	Office Number
Frederick Firestone Fire Protection District	911	303-833-2742
Firestone Police Department	911	303-833-0811
Colorado State Patrol	911	970-506-4999

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SIGNATURES

Kerr McGee Oil & Gas Onshore, LP			
Name	Signature	Title	Date
Brent Naherny	DocuSigned by: Brent Naherny D81BF2E6EAE74CF...	Director of Operations	10/15/2021
Frederick-Firestone Fire Protection District			
Name	Signature	Title	Date
Steve Iacino		Assistant Chief of Planning	

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LEGAL DISCLAIMER

This plan serves as an overall guidance document and is based on the best information available at the time of its submission. Actual conditions can and will evolve and possibly change between the submission of this plan for permitting purposes and actual operations, which may not occur for several months or even years. As necessary, and in consultation with state and local agencies, this plan can and will be updated to reflect current conditions. In particular, there could be modifications to equipment, layout, and chemicals located on site to reflect current or updated practices and advances in technology. In most cases, these changes will not be material and will not impact public health, safety, welfare, the environment, or wildlife resources. KMOG understands that accurate information is necessary in any emergency situation and if any change is significant or has the potential to impact public health, safety, welfare, the environment, or wildlife resources, the plan will be updated as appropriate.

LOCATION INFORMATION

DIRECTIONS TO OIL & GAS LOCATION

From the intersection of HWY 52 and Colorado BLVD travel north approximately two miles to Grant Avenue. Turn right and travel approximately 1.28 miles. Turn right (south) on the lease access road and proceed to the well pad and production facility.

INGRESS AND EGRESS INFORMATION

Ingress and egress to and from the location will be via the lease access road.

LEGAL DESCRIPTION OF LOCATION

API NUMBER: Pending COGCC Permit Approval

LEGAL DESCRIPTION: NENW of Section 29, Township 2 North, Range 67 West, 6th P.M.

ADDRESS: 7274 Grant Avenue

GPS COORDINATES FOR WELL PAD (NAD 83): LAT: 40.114129°, LONG: -104.917454°

GPS COORDINATES FOR ACCESS ROAD (NAD 83): LAT: 40.116598°, LONG: -104.918317°

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EMERGENCY CONTACT NUMBERS

NAME	OFFICE PHONE		EMERGENCY
Kerr McGee Integrated Operations Center IOC	970- 515-1500		970-515-1500
KMOG EMERGENCY MANAGEMENT TEAM	MOBILE PHONE	Function	LOCATION
Moe Felman	303-585-1309	Incident Command	Denver, CO
Brent Naherny	720-284-1112	Incident Command	Denver, CO
Travis Forducey	303-709-4034	Safety Officer	Platteville, CO
Lynna Scranton	303-906-1711	Safety Officer	Denver, CO
Gregory Hamilton	970-590-6256	Environmental Unit Leader	Platteville, CO
Phil Hamlin	707-478-8029	Environmental Unit Leader	Platteville, CO
FIRE OR EXPLOSION OR WELL CONTROL LOSS	EMERGENCY	OFFICE PHONE	STAFFING
Frederick Firestone Fire Protection District	911	303-833-2742	Full Time
Wild Well Control		281-784-4700	Full Time
Carbon Valley Emergency Management Agency		303-319-1008	Full Time
SPILL RESPONSE ORGANIZATIONS	EMERGENCY	OFFICE PHONE	STAFFING
EnviroServe	720-450-1316	800-488-0910	Full Time
EHS –Environmental HAZMAT Services	303-525-3111	720-225-9252	Full Time
Wild Well Control	281-784-4700	281-784-4700	Full Time
Cudd Pressure Control	800-990-2833	303-260-6422	Full Time
REGULATORY CONTACTS	EMERGENCY	OFFICE PHONE	STAFFING
COGCC		303-894-2100	Full Time
CDPHE		877-518-5608	Full Time
Colorado Parks & Wildlife (CPW)		303-291-7227	Full Time
National Response Center		800-424-8802	Full Time
MEDICAL FACILITIES	EMERGENCY	OFFICE PHONE	STAFFING
UC Health Urgent Care Firestone		720-652-7055	Full Time
North Colorado Medical Center	911	970-810-4121	Full Time
UC Health Longs Peak Hospital	911	720-718-7000	Full Time
GOVERNMENT AGENCIES	EMERGENCY	OFFICE PHONE	STAFFING
Firestone Police Department	911	303-833-0811	Full Time
Colorado Oil and Gas Conservation Commission (COGCC)		303-894-2100	Full Time

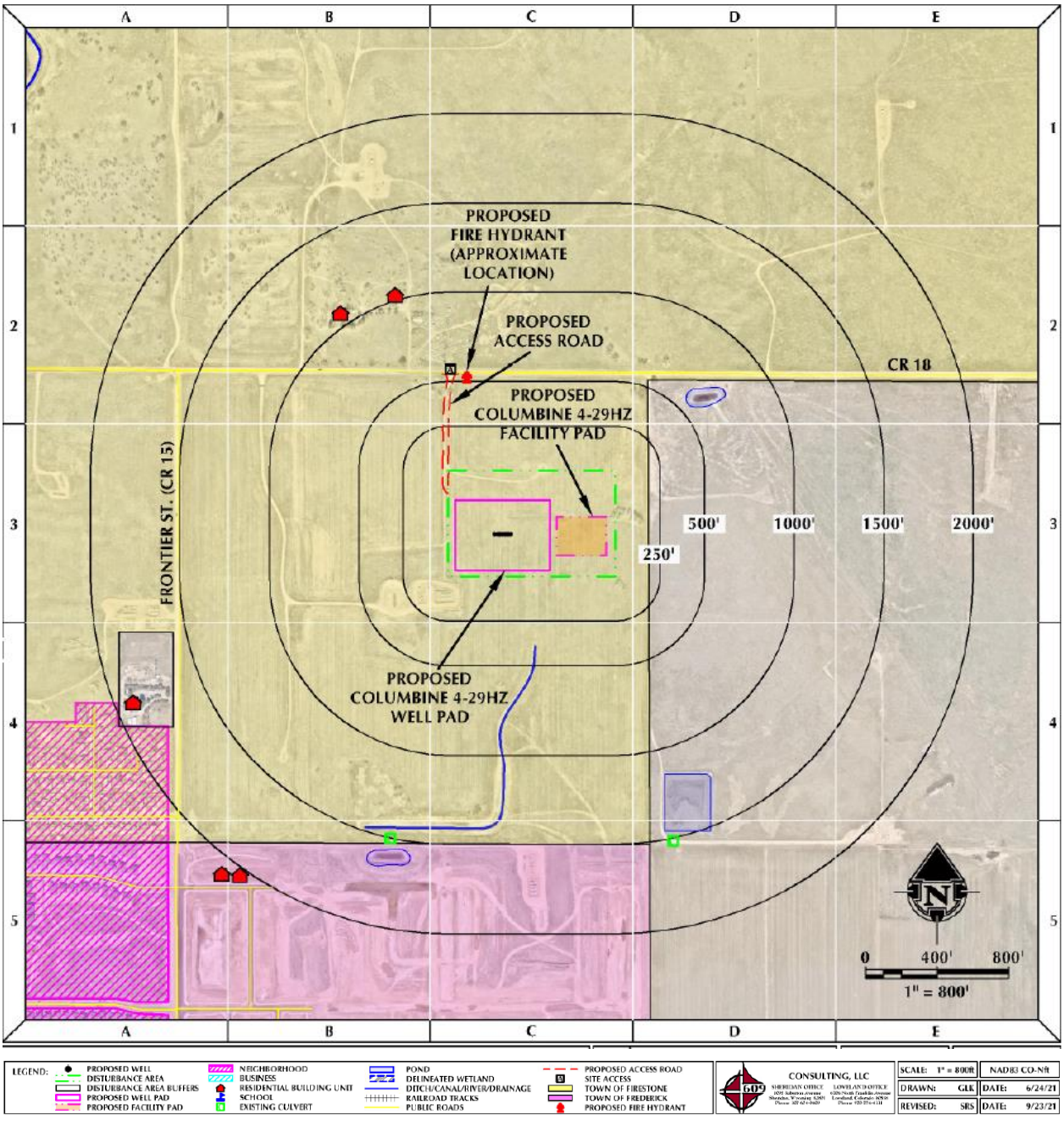
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Colorado Dept. of Health and Environment (CDPHE)		877-518-5608	Full Time
Marty Ostholthoff - Firestone Planning Manager and Local Govt. Designee (LGD)		303-531-6275	Full Time
RAILROAD EMERGENCY RESPONSE	EMERGENCY	OFFICE PHONE	STAFFING
BNSF	800-832-5452		Full Time
Great Western Railway	800-533-9416	303-398-4500	Full Time
Union Pacific Railroad	888-877-7267		Full Time

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SITE DESCRIPTION & LAYOUT

The Columbine 4-29HZ well pad and facility are surrounded by agriculture and residential acreage. There will be 7 horizontal wells on the well pad with up to 11 temporary produced water tanks and 1 condensate tanks.



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KEY LOCATION INFORMATION

In the event of an incident it is important to understand what equipment is on location, what types of chemicals are present and where they are stored and where one can quickly access safety equipment.
Depending on the operations taking place on location, the equipment, chemicals and safety equipment on location will vary. The sections below will show the anticipated quantities and locations during each major phase of the ODGP location. Safety Data Sheets (SDSs) will be available from the Company Representative present or the contractor performing work on location. KMOG does not maintain any response equipment beyond the insipient stage. All response equipment is intended for incidental release mitigation only.

An incidental release is considered to be a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee tasked with mitigating the released product, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up.

Incidental Situations include, but are not limited to, the following examples:

- No significant safety or health hazard to workers in immediate area
- Limited in quantity, exposure potential, toxicity, etc.
- Release that can be absorbed, neutralized or otherwise controlled immediately by onsite workers

All personnel responding to an incident will satisfy the applicable Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements of 29 CFR 1910.120. Additional information may be found in Annex 1 HAZWOPER Program and Training Guidance of the Emergency Preparedness and Response Plan.

CONSTRUCTION PHASE

EQUIPMENT

During construction operations the following fuel powered equipment is anticipated to be on location.

INITIAL PAD BUILD	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Cat 815 Compactor	1	132	132
Belly dump semi	15	240	3600
Mini Excavator	1	12	12
Skid Steer	1	27	27
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	4	130	520
Total			**5217**
CONDUCTOR SETTING OPERATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Conductor Rig	1	80	80
Cement truck	1	120	120
Low Boy Semi	1	120	120
Pump	1	20	20
Skid	1	27	27
Pickup w/ 100 Gallon Transfer Tank	2	130	260
Total			**627**

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MITIGATION INSTALL AND REMOVAL	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Man-lift	1	26	26
8-10k All terrain forklift	1	26	26
Skid Steer	1	27	27
Truck mounted crane	1	120	120
Excavator/vibe hammer or conductor rig	1	80	80
Flatbed semi	2	120	240
Pickup w/ 100 Gallon Transfer Tank	1	130	130
Total			**649**
INTERIM RECLAMATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Belly dump semi	15	240	3600
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	3	130	390
Total			**4916**

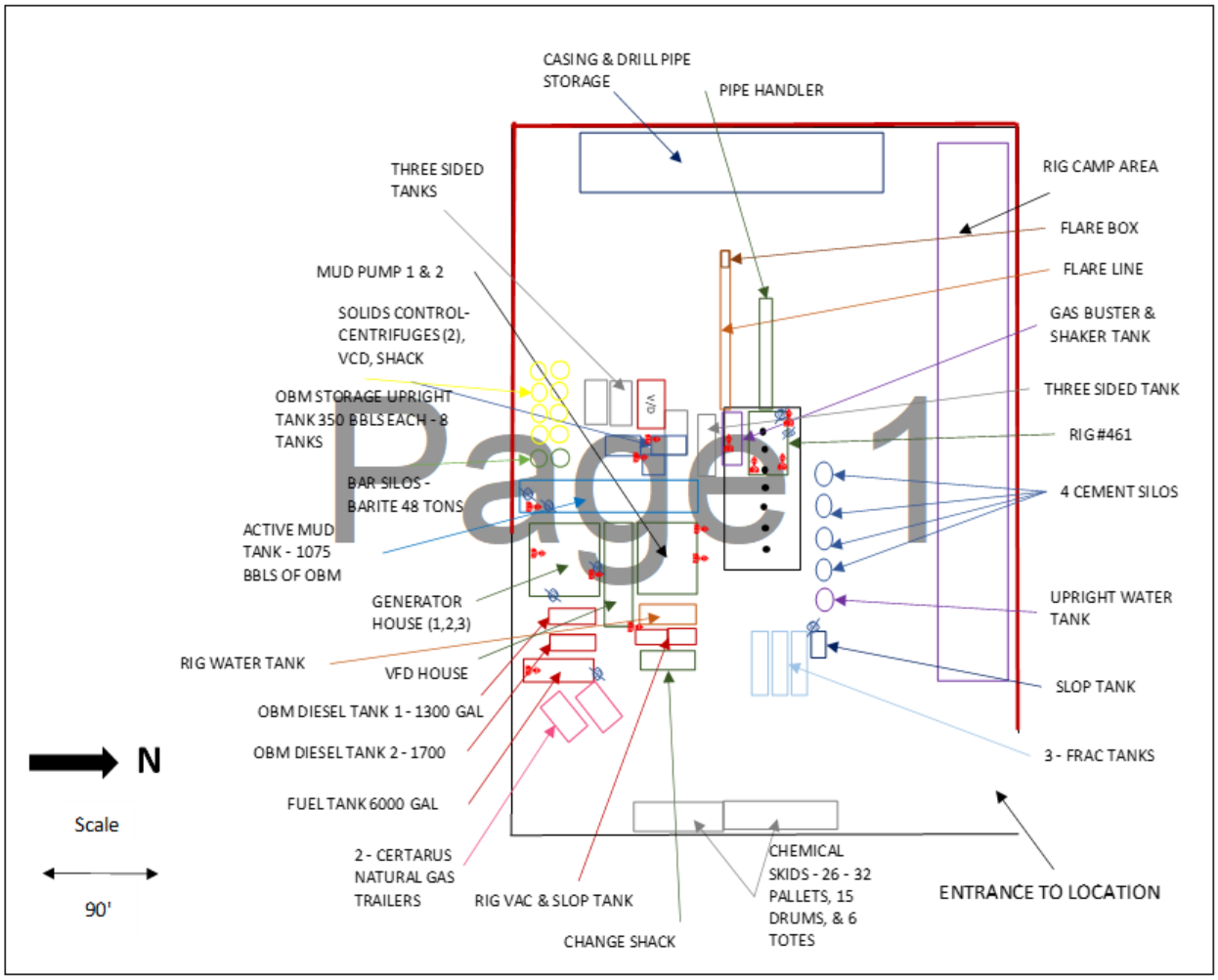
SAFETY EQUIPMENT

During construction operations each piece of construction equipment, heavy duty truck and light duty pickups are all equipped with a dedicated fire extinguisher and spill response kit. There will not be any safety equipment stored on location during these operations.

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DRILLING PHASE:

TYPICAL DRILLING LAYOUT



Page 1

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EQUIPMENT LIST					
EQUIP CONTRACTOR	COLOR CODE	EQUIPMENT	DIMENSIONS	# OF UNITS	ADDITIONAL COMMENTS
PD		RIG		1	
		PIPE HANDLER		1	
		MUD PUMP #1		1	
		MUD PUMP #2		1	
		VFD HOUSE		1	
		GENERATOR HOUSE		1	
		BOILER TANK		1	
		ACTIVE MUD TANKS	12.6' x 45'	3	1075 bbls of OBM
		SHAKER TANK	12.6' x 30'	1	326 bbls of OBM
		FUEL TANK	8' x 40'	1	6000 GAL
		OBM DIESEL TANK 1	8' x 20'	1	1300 GAL
		OBM DIESEL TANK 2	8' x 25'	1	1700 GAL
CERTARUS		CERTARUS NAT GAS TRAILER	8.6' x 40'	2	380 MCF
		RIG WATER TANK	12' x 45'	1	400 bbls Fresh Water
		FRAC TANKS	12' x 45'	3	500 bbls each
		SLOP TANK	8' x 12'	1	200 bbls
		THREE SIDED TANK	10' x 36'	4	150 yards of cuttings
		UPRIGHT WATER TANK	12' x 11.5'	1	350 bbls for Cement job
		CEMENT SILOS	7.8' x 7.5'	4	450 sks per silo
		BAR SILOS	7.8' x 7.5'	2	48 tons barite
		OBM UPRIGHT STORAGE TANK	12' x 11.5'	8	350 bbls each tank
		CENTRIFUGE		2	
		VCD		1	
		SOLIDS CONTROL SHACK		1	
		CHEMICAL SKID	10' x 40'	2	26-32 pallets, 15 drums, 6 totes
		FLARE LINE		1	
		FLARE BOX		1	
		GUARD SHACK		1	
		CASING & DRILL PIPE STORAGE			
		RIG CAMP AREA			
		SOUND WALL			

EMERGENCY EQUIPMENT	
Eye Wash stations	
Fire Extinguishers	

Page 2

CHEMICALS

During drilling operations, the following chemicals are anticipated to be on location:

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CHEMICALS ON LOCATION	
NAME	UNITS
ADAPTA	25 kg bag
BA.STOPPIT	50 lb BA
BARAKLEAN	5 gal CA
BAROID 41	100 lmb bag
BAROID 41 (ST)	1 Uston bulk
BARO-SEAL CLASSIC	40 lbm bag
CAL CHLORIDE POWDER	50 lb bag
DILTREAT	55 gal drum
FORTI-MUL	55 gal drum
GRAPHITE	50 lbm bag
LIME	50 lbm bag
ODOR ARMOR	1 gal tote
RHEMOD L	55 gal drum
SALT	50 lbm bag
SAWDUST FINE	5.5 cuft bag
WALL-NUT MEDIUM	50 lbm bag

SAFETY EQUIPMENT

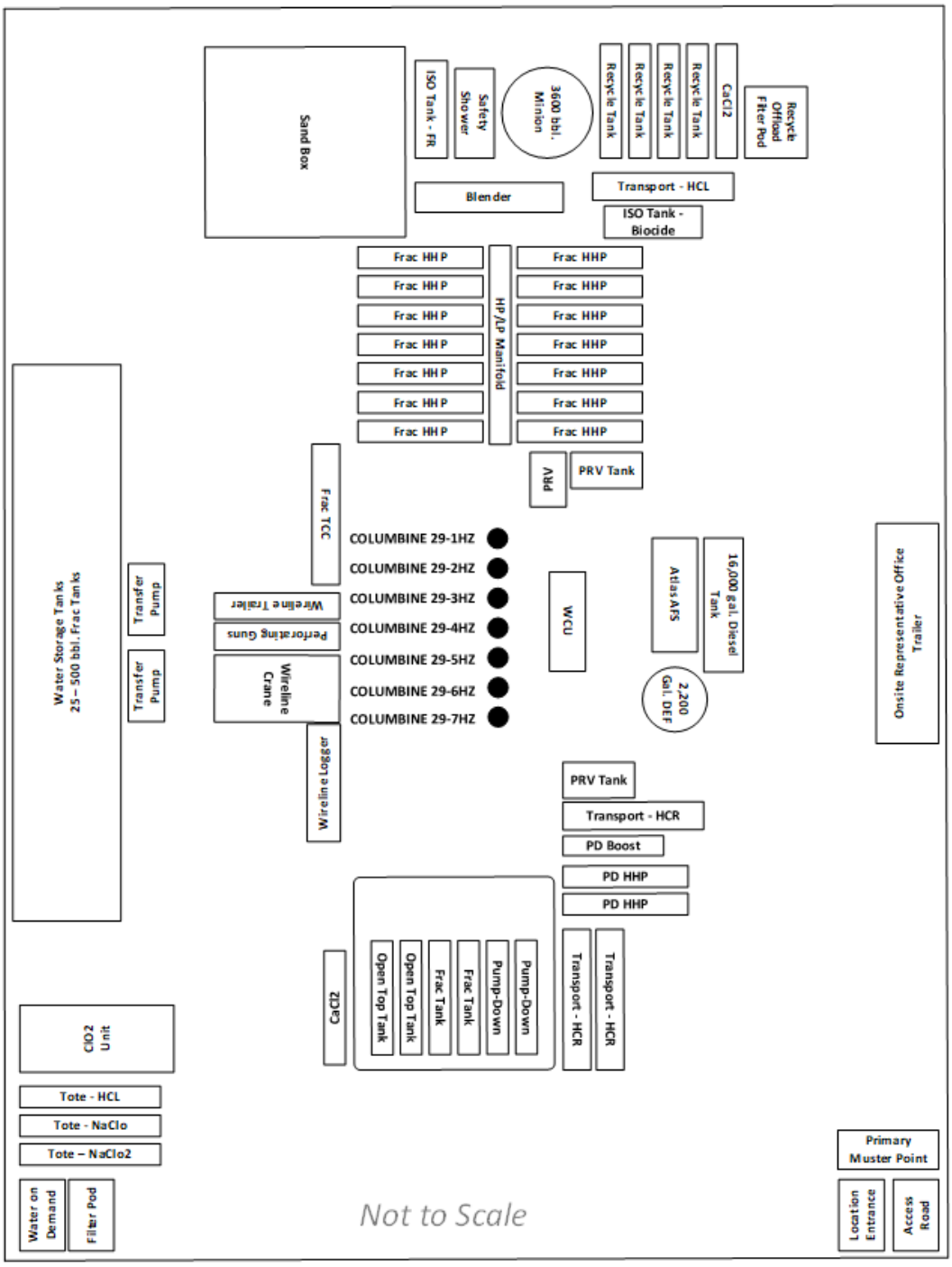
During drilling operations, the following response equipment is staged on location as depicted in the drilling layout shown above

SAFETY EQUIPMENT DETAILS	LOCATION	COMMENTS
Fire Extinguishers	Rig	3
	Shaker Tank	1
	Mud Pump 1	1
	Mud Pump 2	1
	Fuel Tank	1
	Boiler Tank	1
	Generator House	2
	Solids Control/Centrifuges	2
	Active Mud Tank	1
Eye Wash Stations	Rig	2
	Mud Pump 1	1
	Fuel Tank	1
	Generator House	2
	Active Mud Tank	2
	Slop Tank	1

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HYDRAULIC FRACTURING PHASE:

TYPICAL HYDRAULIC FRACTURING LAYOUT



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EQUIPMENT

During hydraulic fracturing the following equipment is expected to be on location:

EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
FRAC HHP	16	FIRE SUPRESSION BUILT INTO EACH UNIT
BLENDER	1	FIRE SUPRESSION BUILT INTO THE BLENDER TUB
FRAC TCC	1	
FRAC HP/LP MANIFOLD	1	
ACID TRANSPORTS	1	4000 GAL CAPACITY
HCR SYNTHETIC ACID TRANSPORT	2	4000 CAPACITY EACH
FRICTION REDUCER ISO	1	4500 GAL CAPACITY
BIOCIDE ISO	1	6000 GAL CAPACITY
WELLHEAD CONNECTION UNIT (WCU)	1	
WL PERFORATING GUN TRAILER	1	
WL CRANE (W/ OUTRIGGERS)	1	
WL TRAILER	1	
WL LOGGER	1	
FUEL TRAILER	1	16000 GAL CAPACITY DIESEL TANK
DEF TANK	1	2200 GAL DEF TANK
ONSITE REPRESENTATIVE OFFICE TRAILER	1	
MINION TANK	1	3600 BBL CAPACITY
STORAGE TANKS	25	500 BBL CAPACITY EACH
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH
SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
BIOCIDE TREATMENT TRAILER	1	REFER TO CHEMICAL TABLE FOR INFO
GREASE SKID	1	
PRV / PRV TANK	1	
SAND FORKLIFT	1	
TRANSFER PUMPS	2	
BOOST PUMPS	2	
WOD FILTER PODS	2	
FORKLIFT/MANLIFT	2	TYPICALLY 1 OF EACH ON LOCATION
FLAMELESS HEATERS	5	WINTER OPS ONLY
GLYCOL HEATERS	2	WINTER OPS ONLY
GENERATORS	4	
AIR COMPRESSORS	2	
VAC TRUCK	1	
DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
GATE GUARD SHACK	1	

CHEMICALS

During hydraulic fracturing operations the following hydrocarbons, hazardous, reactive and flammable materials are anticipated to be in on location:

CHEMICAL	# OF UNITS	VOLUME	COMMENTS
HYDROCHLORIC ACID	1	4000 GAL TRANSPORT	
HCR SYNTHETIC ACID	2	4000 GAL TRANSPORT	
SODIUM BICARBONATE		200-300 LB	ACID NEUTRALIZER
CALCIUM CHLORIDE (BRINE)	1	500 BBL CAPACITY	WINTER OPS
FRICTION REDUCER (FR)	1	4500 GAL CAPACITY ISO	
HYDROCHLORIC ACID (BIOCIDE TRAILER)	1	4000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM CHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM HYPOCHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
PREVENTATIVE BIOCIDE (TTPC)	1	4500 GAL CAPACITY ISO	
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH	PRODUCED WATER ORIGINATES AT ARF FACILITY (FACILITY ID 456644). TYPICALLY 800-1200 BBL PER DAY
DIESEL FUEL TANK	1	16000 GAL CAPACITY	
DEF TANK	1	2200 GAL CAPACITY	

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SAFETY EQUIPMENT

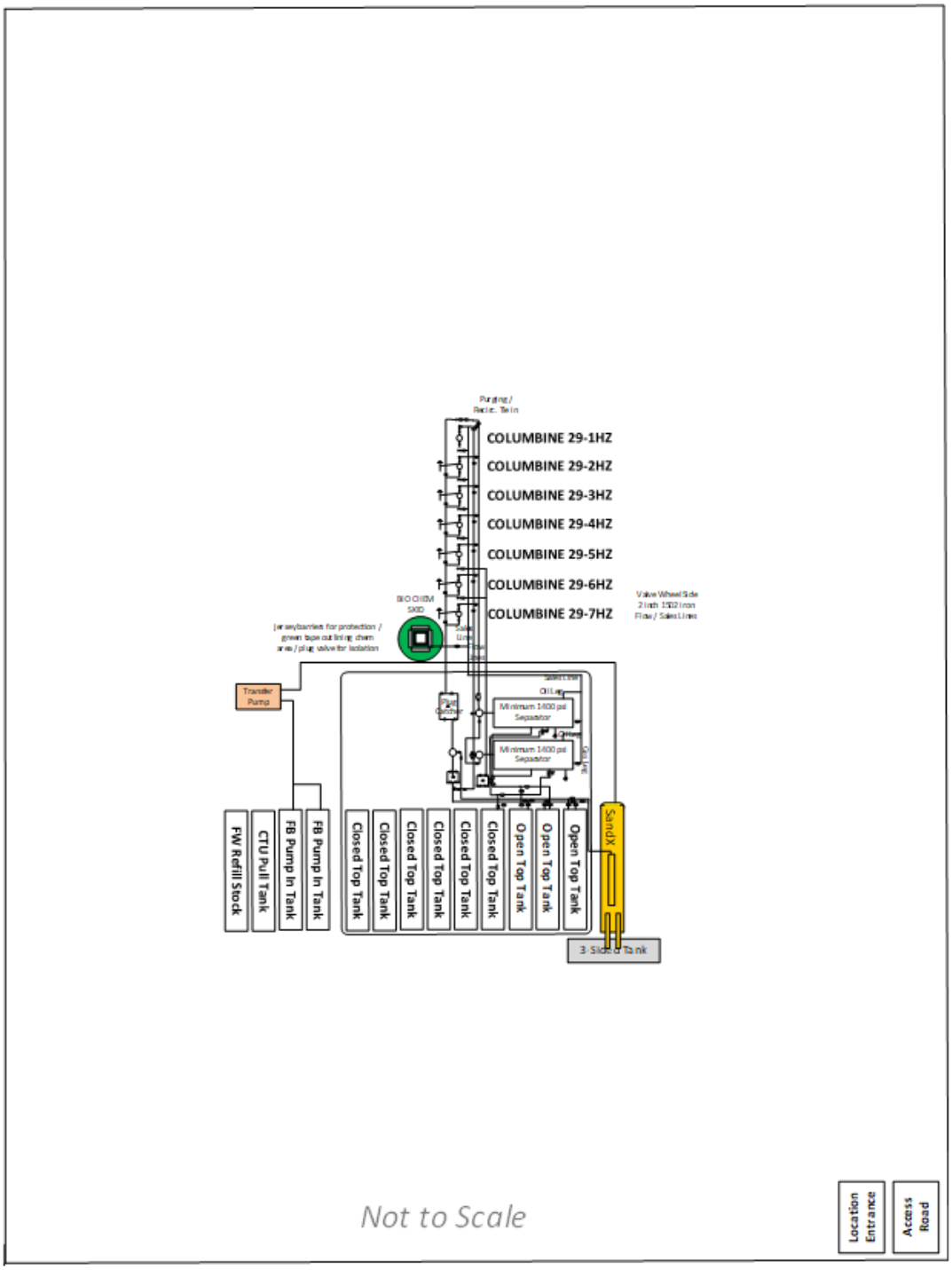
During hydraulic fracturing operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
FIRE SUPRESSION SYSTEM	BUILT INTO XLE PUMPS AND BLENDER TUB
ACID NEUTRALIZER PALLET	200-300 LB SODIUM BICARBONATE
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS AND FLOWBACK OPERATORS
RADIOS	FRAC, CONSULTANTS, WL OPERATOR, FLOWBACK OPERATOR
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

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WELL PREPARATION PHASE:

TYPICAL FLOWBACK LAYOUT



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EQUIPMENT

During preparation, coil and flowback operations the following equipment is expected to be on location:

EQUIPMENT LIST (COMPLETIONS OPERATIONS)			
COMPLETIONS ACTIVITY	EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
COIL	COILED TUBING UNIT	1	
	COIL EQUIPMENT SUPPORT TRAILER	1	
	CRANE (AND OUTRIGGER MATS)	1	
	PUMP TRUCKS	2	
	N2 PUMP	1	
	N2 TRANSPORT	1	120 BBL TRANSPORT
	1502 HARDLINE	VARIES	
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
	MIXING PLANT (CHEMICAL TRAILER)	1	REFER TO CHEMICAL LIST TABLE
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	COIL BHA	1	TYPICALLY STORED ON PALLET ON PAD
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	GENERATORS	5	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
	AIR COMPRESSORS	2	
	CENTRIFUGAL TRANSFER PUMP	1	
	VAC TRUCK	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
FLOWBACK (COIL)	3" DRILLOUT LINE	1	
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	SEPARATORS	3	4-PHASE SEPARATION
	PLUG CATCHER	1	
	SAND KNOCKOUTS	3	
	VX METER	1	NOT USED ON EVERY PAD
	MANIFOLD	1	
	CHEMICAL INJECTION CUBE	2	350 GAL CAPACITY EACH
	SAND X W/ 3-SIDED SAND BIN	1	
	SANDX CONTROL PANEL	1	
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
RIG/SNUB	WORKOVER RIG	1	
	BASE BEAM	1	
	RIG PUMP	1	
	PUMP MANIFOLD & 1502 HARDLINE	1	
	RIG TANK	1	
	PIPE WRANGLER	1	
	PIPE RACKS	1	
	SNUBBING UNIT & BASKET	1	
	SNUBBING TRAILER & CONTROL PANEL	1	
	BOP STACK	1	
	ACCUMULATORS & CONTROL PANELS	2	1 FOR BSR & 1 FOR PIPES/BLINDS
	TUBING & TUBING TRAILER	1	
	TORQUE & TEST UNIT	1	
	TORQUE UNIT	1	
	/DRAULIC LUBRICATOR & EQUALIZING HOSE/MANIFOL	1	
	BOBTAIL	1	TYPICALLY TRANSPORTS 40-60 BBL PER WELL
	WINCH TRUCK	1	
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
	GENERATORS	4	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	AIR COMPRESSORS	2	
	CHEMICAL INJECTION CUBE	2	350 BBL CAPACITY EACH
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
FLOWBACK (RIG/SNUB)	SEPARATORS	3	4-PHASE SEPARATION
	SAND KNOCKOUTS	3	1 FOR EACH SEPARATOR
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	FLOWBACK SHACK	1	

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CHEMICALS

During preparation, coil workover and flowback operations the following hydrocarbons, hazardous, reactive, and flammable materials are anticipated to be in on location:

COMPLETIONS ACTIVITY	CHEMICAL	# OF UNITS	VOLUME	COMMENTS
COIL	FRICTION REDUCER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	BIOCIDE	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	DEFOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	NANO BEADS	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	H2S SCAVENGER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FRICTION REDUCER	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	LIQUID N2	1	120 BBL TRANSPORT	COIL PROVIDER (NOT ALWAYS ON PAD)
	OIL ON PAD	N/A	20 BBL MAX ALLOWED	HAUL OFF OIL BEFORE IT REACHES 20 BBL
	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
RIG/SNUB	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	50/50 METHANOL	1	500 GAL CAPACITY	WINTER OPS ONLY
	BIO WATER	N/A	TYPICALLY 60 BBL/WELL	BROUGHT OUT IN BOBTAIL TRUCK
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)

SAFETY EQUIPMENT

During preparation, coil workover and flowback operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RADIOS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

PRODUCTION PHASE:

Once drilling and completion activities are finalized, the site will transition to its production phase and the primary chemicals stored on site will be crude oil stored in the condensate storage tank and produced water stored in the water storage tanks.

During production there is no emergency response equipment stored on location. Well operators will wear the proper PPE and will have a fire extinguisher in their vehicle.

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NEARBY SENSITIVE AREAS

There are minimal sensitive areas in the surrounding area that are likely to be impacted by a potential spill or a release. The National Hydrology Dataset (NHD) indicates that an open water feature (Lake/Pond), is located approximately 480 feet northeast of the Project Area. This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is inundated intermittently, and subject to livestock disturbance. The surrounding land use appears to be subject to ranching and agricultural practices.

The National Hydrology Dataset (NHD) indicates that an open water feature (Lake/Pond), is located approximately 1,700 feet southwest of the Project Area. This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is ponded, and the surrounding land use appears to be agricultural.

MITIGATION OF POTENTIAL IMPACTS TO THE ENVIRONMENT

If a spill is found reportable, it will be mitigated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and Environment (CDPHE) requirements. Once a release has been identified, it will be immediately stopped and contained if possible and safe to do so. When containing a spill; pig blankets, snakes, absorbent materials, or earthen berms will be constructed around the release to keep material from spreading. These materials will be provided by KMOG and the contract company as applicable.

Diligent efforts will be made to minimize contact with live vegetation or open water if release is outside of secondary containment structures.

In the event of a large incident requiring outside assistance, KMOG has contracted with EHS. EHS possesses a working knowledge of oil and gas operations, emergency response and Incident Command. Once notified EHS personal can be on location with two hours.

Spills deemed as emergency will include notification to the local fire department using 911.

MITIGATION OF POTENTIAL IMPACTS TO THE NEARBY POPULATION

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail. In the event of an actual emergency, the following steps will be immediately taken:

The KMOG representative will immediately notify proper authorities, including the sheriff's office, Colorado State Patrol, and any other public officials and will enlist their assistance in warning people in the calculated radius of exposure. The KMOG representative will coordinate with local authorities to warn residents down-wind of the location and within radius of exposure from the well site. Additional evacuation zones may be necessary as the situation warrants

The KMOG representative will coordinate with appropriate emergency personnel to divert traffic in the vicinity away from the potentially dangerous area

The area included within the radius of exposure is considered to be the zone with the maximum potential hazard. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated.

In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public. KMOG will fully cooperate with these authorities and will provide careful advice to such

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authorities.

KMOG will dispatch appropriate personnel to the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as necessary.

DETERMINATION OF INCIDENT TYPE & APPROPRIATE RESPONSE

The following initial response actions and mitigation procedures shall be conducted immediately, or as soon as it is safe to do so, upon discovery of an emergency or threat of an emergency:

INITIAL RESPONSE CHECKLIST		
	Secure the source	As quickly as possible, safely shut down the operation responsible for the emergency **IF SAFE TO DO SO, PROPERLY TRAINED & HAVE PROPER PPE**
	Notify	Pull an alarm, push an evacuation button, use radio or *call 911* **EVACUATE IF NECESSARY**
	The first person on scene will assume the duties of the On-Scene Incident Commander until assistance arrives in the form of a more qualified person, if needed	
	Conduct a Hazard Assessment to determine the potential for fire, explosion, and hazardous/toxic vapors as well as to define Personal Protective Equipment (PPE) needed by responders. Identify source and volume; characterize oxygen levels, explosive character, toxicity of air on scene, splash and ingestive hazards	
	Shut off ignition sources: motors, open flames, electrical circuits	
	Identify and evacuate an exclusion zone in vicinity of the emergency site until the Hazard Assessment is completed	
	Conduct a Personnel Accountability Report (PAR) to accurately determine the location and status of personnel	
	Initiate notification of management personnel	
	Request Response Team activation or escalation as appropriate	
	Initiate notification to required government agencies as promptly as possible and within the required timeframe	
	Coordinate rescue and medical response actions	
	Use explosion proof equipment in high concentration vapor areas and monitor for flammable vapors until the response operation is completed	

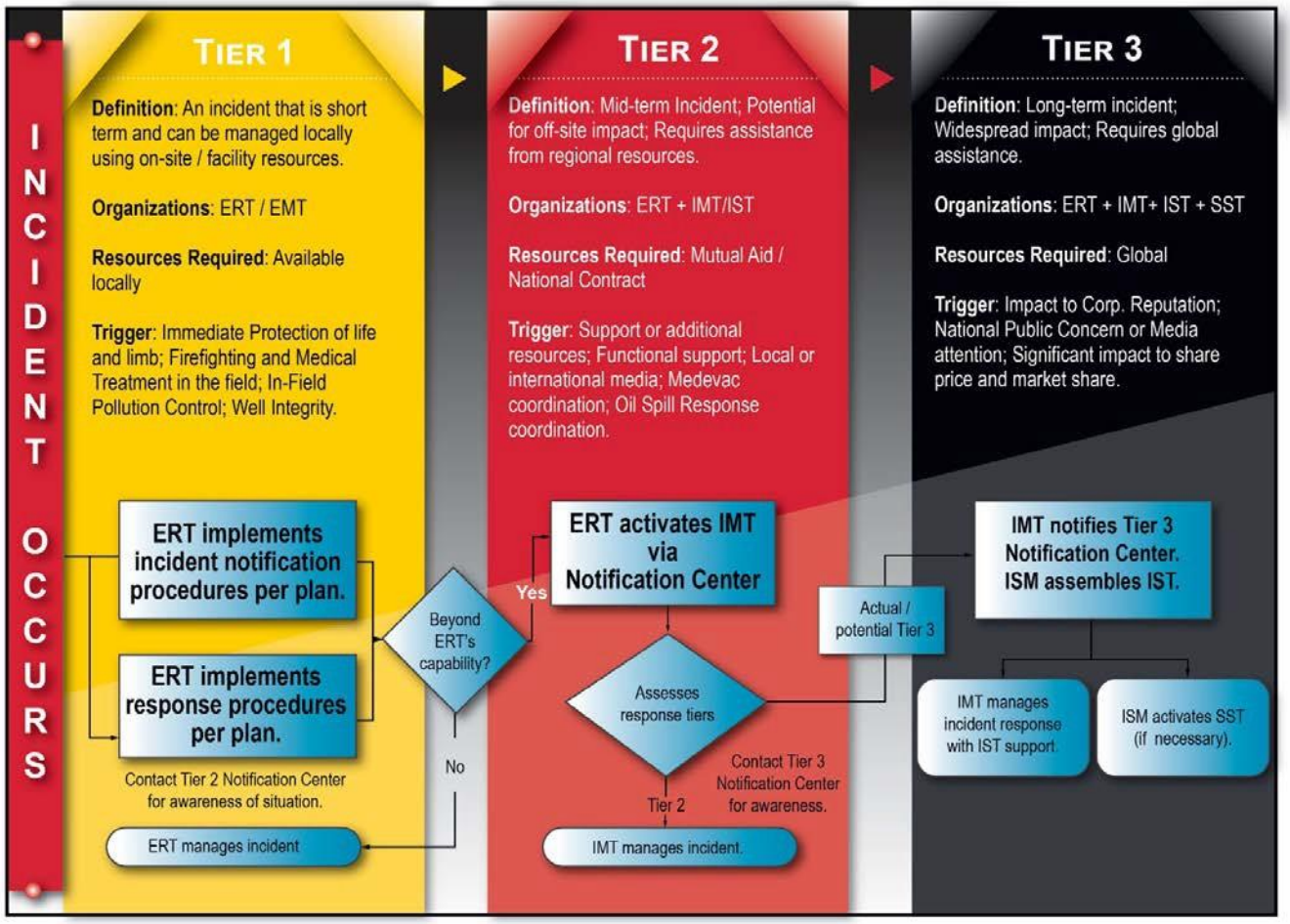
	The PEAS priorities will be utilized throughout the duration of the emergency response
	• People – ensure safety of all responders and impacted persons
	• Environment – protect the environment from further damage
	• Assets – protect non-damaged assets and minimize additional damage where possible
	• Stakeholders – reduce additional impacts and coordinate with to respond and recover effectively including:
	  ○ Effective cooperation with affected regulatory agencies
	  ○ Effective communication with Non-governmental Organizations (NGOs)
	  ○ Effective communication with other stakeholders
	  ○ Safe and effective restoration of business	

	Initiate evacuation of third parties: Contact local and state law enforcement as necessary to coordinate evacuation	
	Initiate containment if necessary and safe to do so. Contact Oil Spill Removal Organization if needed	

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INCIDENT TIER CLASSIFICATION

Incidents are classified in tiers according to their severity, either potential or realized.



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NOTIFICATION

Notifying the appropriate organizations that an incident has occurred is the first step in the initial response for all incidents

Notification efforts should include verification of the type of incident and its exact geographic location, or as close a proximity as can be readily discerned

The accountability of potentially impacted personnel is critical to determine a proper response when the health or safety of individuals are likely to occur

In no instance shall internal notifications take precedent over the safety of people or the request and mobilization of critical safety or medical resources, such as Emergency Medical, Fire, or Police assistance

Internal and external notification procedures shall be implemented immediately after discovering an incident has occurred, or as soon as it is safe to do so.

Upon discovery of or initial notification of an incident, the person in charge will attempt to identify the following information:

- The safety of the reporting party and others in the vicinity
- Name of the reporting party and contact information
- Status of any persons injured
- Accurate Personnel Accountability Report (PAR)
- Location of the incident, either address or global positioning system (GPS) location
- Time of discovery
- Incident description (source, assets involved, fire, etc.)
- Product type and estimated volume released
- Impacts to environmentally sensitive areas, population, waterways, etc.
- Immediate risks or exposures
- Current response actions
- Initial remedial actions, such as source control
- Name and contact of on-scene emergency agencies
- Weather conditions

The HSE Department will make all immediate initial incident notifications to the applicable agencies, including releases or spills, injuries, air emissions or air quality issues or permit variations. Any agency notification related to a deviation to a permit, such as drilling, will be coordinated by the various departments, such as Regulatory, HSE, and Drilling, as set forth in established procedures and are outside the scope of this process. Subsequent, follow-up, or amended notifications to external agencies, partners, joint ventures, or others outside of KMOG shall be made by the Liaison Officer function of the Incident Management Team (IMT) or similar function of the Emergency Management Team (EMT), as established.

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RESPONSE ACTIONS DEPENDING ON INCIDENT TYPE

INJURY / MEDICAL

MEDICAL EMERGENCY CHECKLIST

CONTAMINATED VICTIM

On-site emergency medical response for a contaminated patient requires the same rapid assessment of the patient as any other situation but be aware of other considerations that may affect the patient. The potential for contamination of the personnel, and equipment should be mitigated. Patient treatment should be conducted AFTER the injured party has been decontaminated.

IF	THEN
A responder requires medical attention	Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness. If the treatment needed is critical care or lifesaving treatment.
The need for full decontamination is less than the need for prompt medical treatment.	Refer to the Site Safety Plan for steps to be taken in an abbreviated decontamination for medical treatment
Medical Treatment is needed	The Incident Commander or his designee will request assistance from trained medical personnel
Transportation to a medical facility is needed	The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant.
	SDS information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.

NOTE: **Evacuation of seriously ill or injured persons should be conducted by ground or air ambulance only.** Transportation by company or private vehicle should be discouraged, unless advised to do so by medical authorities. All medical emergencies should be documented on appropriate company reports.

NON-CONTAMINATED VICTIM

Provide BASIC LIFE SUPPORT Stabilize the victim at the scene if necessary		
Maintain airway/breathing/Administer CPR	Control bleeding	Treat for shock
Activate professional medical care for the victim by: Call 911 to arrange for ground or air ambulance support.		
Provide the 911 dispatch the following information		
Your name and location and contact phone number	Type of medical emergency	
Name and location of the injured	Condition of injured	
Assess the situation and contact the Field Office or Safety Department		
Determine the level of medical attention needed - first aid or outside professional assistance.		
Administer first aid if necessary or **Transport the victim to a local hospital or physician**		

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FIRE / EXPLOSION

	FIRE / EXPLOSION CHECKLIST
	Notify the Foreman or supervisor on duty
	Shutdown/ESD facility
	Call 911 for emergency fire services
	Shutdown the Facility, evacuate personnel and move to a muster area or other safe distance to direct the fire department to the scene of the fire
	Keep other personnel and vehicles from entering the danger area
	Each person onsite should evacuate if necessary, to protect themselves from harm

HAZARDOUS SPILL

	LINE BREAK OR LEAK CHECKLIST
	Shutdown pumping and equipment
	Drain the line section, as the situation demands
	Coordinate rescue and medical response actions
	Initiate spill response and containment process
	Clean up spilled product to eliminate any possible environmental problems
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Request local authorities to establish traffic control in the area, as the situation demands
	Make all necessary repairs
	Return the line to service once repairs are completed
	STORAGE TANK LEAK
	Notify the Foreman or supervisor on duty
	Shut down all tank battery product movement operations and isolate the tank
	Initiate Confined Space Entry procedures, as applicable
	Ensure that the containment area drainage valve is closed
	If near tank bottom, consider filling the tank with water and maintain water bottom to suspend the discharge
	Block all drainage of spilled material from travelling offsite
	Request local authorities to establish traffic control in the area, as necessary
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Remove product from containment area with an explosion proof pump, oil skimmer, and/or vacuum truck with skimmer attachments
	If floating roof tank is submerged and tank must be drained, follow the facility operating procedures for landing floating roof and draining any liquids contained upon the floating roof

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VAPOR CLOUD

VAPOR CLOUD CHECKLIST	
	Sound the alarm and notify the foreman or supervisor on duty. Vacate the area.
	The only proper action in the presence of a vapor cloud is to get away from it. **Do not shut off electrical equipment.**
	All personnel should report to the muster point for roll call and further instructions.
	Contact the appropriate agencies and potentially affected neighbors.

DECONTAMINATION

Eyewash stations and safety showers provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing. Contaminated clothing should be disposed of properly. Contaminated personal protective equipment (PPE) must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

DECONTAMINATION CHECKLIST	
	Establish "Exclusion – Hot", "Decontamination – Decon", and "Support – Safe" zones to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.
	Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
	Decontamination facilities should be positioned prior to employee/contractor entrance areas where the potential for exposure to contamination exists. The appropriate Safety Data Sheets (SDS) are available to aid health professionals treating theinjured parties.
	Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
	Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

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SEVERE WEATHER

	TORNADO OR SEVERE STORMS CHECKLIST
	Upon notification by weather monitoring of impending severe weather conditions, notify the person in charge or the appropriate office of the situation Be aware of changing weather conditions: • *Tornado watch* – conditions are right for the formation of a tornado. • *Tornado warning* – a tornado has been seen in area or is imminent. Take cover immediately.
	Personnel will be instructed to shut down all nonessential activities and take shelter where available until the storm has passed.
	Immediately bring personnel off tanks, pipe racks, and other elevated work areas. Suspend product loading operations and close all tank openings.
	Take shelter in a low-level area away from glass until the storm has passed.
	Stay in the shelter until "ALL CLEAR" has been issued.

EVACUATION

The decision to evacuate should always be based upon a prudent analysis of the risks involved in any incident, and/or a response to an incident.

EVACUATION PROCEDURES

Depending upon the hazard, personnel will evacuate either via the access road and meet at muster points.

In case of emergency, the primary command center will be established at the IOC at the Platteville Office. The Denver Office may be used as an alternate command center if necessary.

If determined necessary, local response personnel (fire, police, etc.) would coordinate all community evacuation procedures utilizing existing community evacuation plans.

	EVAUATION PROCEDURES CHECKLIST
	Sound an alarm or give verbal alarm
	Call 911
	Shut down loading/unloading and pipeline operations
	Evacuate trucks from the location
	Divert incoming trucks to a safe distance away
	Evacuate all personnel to designated staging areas

TRAINING AND COORDINATION WITH LOCAL GOVERNMENT AND RESPONDERS

KMOG is a member of the CPRN (Colorado Preparedness Response Network), an industry collaboration with local responders working to enhance emergency preparedness and response. KMOG is committed to preparedness and minimizing impacts of incidents requiring emergency response should they occur. KMOG recognizes the importance of knowledge sharing within the industry and with emergency responders through drills and exercises.

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Trainings and drills will be offered and facilitated regularly through CPRN as well as KMOG will facilitate internal exercises and extend invites to emergency responders annually, at minimum, but often more frequently.

If KMOG staff or contractors are contacted by the OEM or a Fire Protection District, they will provide the necessary information to assess the hazards onsite and coordinate with first responders during all phases of development of the site.

In the event of an emergency requiring first responders, Unified Command will be established between the KMOG appointed company man on location and first responders present.

Address: 7274 Grant Avenue

KerrMcGee

COLUMBINE 4-29HZ

Weld County, Colorado
Firestone, Colorado

GPS Coordinates: NAD 83

Pad Site: LAT: 40.114092° LONG:-104.915717°

Access Road: LAT: 40.116598° LONG:-104.918317°

All Emergencies will be reported through 911

NOTIFICATIONS

1. National Response Center: 800-424-8802
2. Kerr McGee/Emergency Response Coordinator
   - Integrated Operations Center (IOC) 970-515-1500
3. COGCC: 719-343-0130, 970-573-1277
4. EPA Region VIII: 303-312-6312
5. Carbon Valley Emergency Management Agency: 303-319-1008
6. Frederick/Firestone Fire Protection District: 303-833-2742

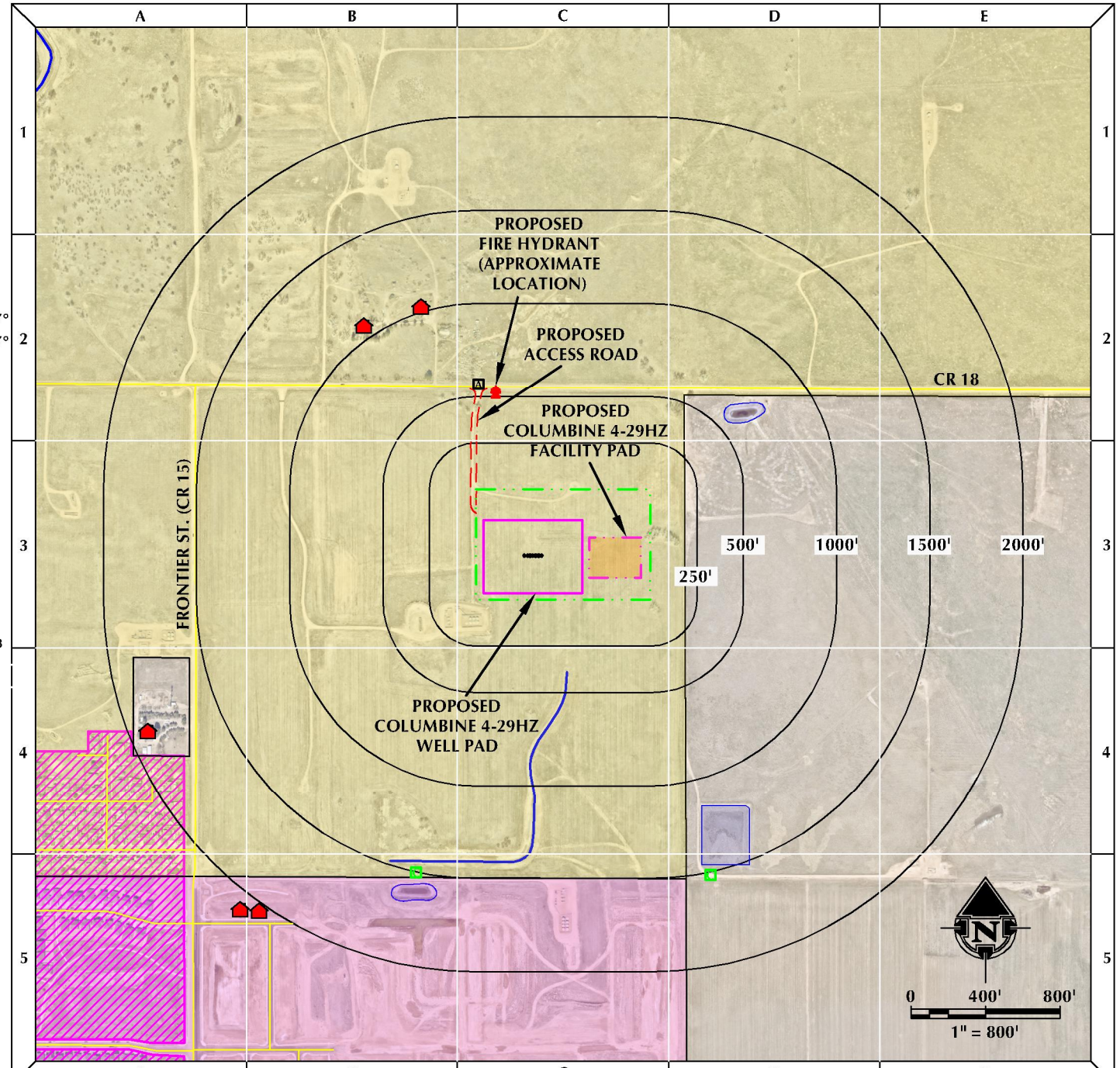
RESPONSE OBJECTIVES

Minimize the impact to the environment and local community. Contain and recover released product to the extent possible

CRITICAL RECEPTORS

1. DRAINAGE SWALE/DIVERTING OFFSITE FLOWS
2. SURROUNDING RESIDENTIAL PROPERTIES
3. N/A
4. N/A

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.



LEGEND:
- PROPOSED WELL
- DISTURBANCE AREA
- DISTURBANCE AREA BUFFERS
- PROPOSED WELL PAD
- PROPOSED FACILITY PAD
- NEIGHBORHOOD
- BUSINESS
- RESIDENTIAL BUILDING UNIT
- SCHOOL
- EXISTING CULVERT
- POND
- DELINEATED WETLAND
- DITCH/CANAL/RIVER/DRAINAGE
- RAILROAD TRACKS
- PUBLIC ROADS
- PROPOSED ACCESS ROAD
- SITE ACCESS
- TOWN OF FIRESTONE
- TOWN OF FREDERICK
- PROPOSED FIRE HYDRANT

609 CONSULTING, LLC
SHERIDAN OFFICE 1095 Saberton Avenue Sheridan, Wyoming 82801 Phone 307-674-0609
LOVELAND OFFICE 6706 North Franklin Avenue Loveland, Colorado 80538 Phone 970-776-4331

SCALE:	1" = 800ft	NAD83 CO-Nft	
DRAWN:	GLK	DATE:	6/24/21
REVISED:	SRS	DATE:	9/23/21

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TACTICAL RESPONSE CHECKLIST

After assessing the incident level and contacting the appropriate parties, the following steps will need to be taken for the tactical response:

1. Implement National Incident Management System (NIMS) Incident Command System (ICS)
2. Assess hazards to site, workers, and public
3. Safety Officer should complete form ICS 208 – Safety Message/Plan
4. Conduct Job Safety Briefing
5. Assess property and environmental impacts
6. Develop ICS 201 Incident Briefing and ICS 202 – Incident Objectives
7. Implement response actions:
   a) Confine spills to tanks/vessels
   b) Locate leading edge of spilled material
   c) Contain spills on ground and any surrounding drainage ways
   d) Recover spilled materials
   e) Dispose of recovered materials properly
8. Document site conditions and activities
9. Document impacts to natural, economic, and cultural resources
10. Document site restoration/remediation activities

See the KMG/Emergency Response Plan for the full list of NIMS ICS Forms.

PAD Name and PAD STATS

FLOW STATS – 30 DAY AVERAGE IP

GAS (MCF/D)	OIL (BBL/D)	WATER (BBL/D)
TBD	TBD	TBD

WELL PAD CONTAINTMENT STORAGE

QTY.	TYPE	SIZE (BBL)
2	Water Tanks	285 barrel
1	Condensate Tank	285 barrell

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.

RESPONSE RESOURCE CONTACT INFORMATION

Name	Main Phone
Kerr McGee Oil & Gas OnShore LP Integrated Operations Center (IOC)	970- 515-1500

STATE, FEDERAL, MUNICIPAL EMERGENCY RESPONDERS

Name	24-Hour Phone
Carbon Valley Emergency Management Agency	303-319-1008
Weld County Sheriff	970-356-4015
Firestone Police Department	303-833-0811
Frederick/Firestone Fire Protection District	303-833-2742
National Response Center	800-424-8802
Colorado Dept of Natural Resources	303-866-3311
EPA Region 8	303-312-6312
Department of Transportation	855-368-4200

RESPONSE CONTRACTORS

Contractor Name	Office #	Alternative #
Emergency Response Contractors		
EnviroServe	800-488-0910	720-450-1316
EHA-Environmental HAZMAT Services	720-225-9252	303-525-3111
Wild Well Control	281-784-4700	
Boots & Coots	281-931-8884	
Cudd Pressure Control	800-990-2833	307-382-6650 713-849-2769
Support - Incident Management Team Consultant		
CTEH	2501-801-8500	317-473-0688
The Response Group	281-880-5000	
Oil Spill Clean Up Services -Wildlife Rehabilitation		
Birds of Prey Foundation	303-460-0674	
Greenwood Wildlife Rehab Ctr.	303-823-8455	303-545-5849
Rocky Mountain Raptor Program	970-484-7756	970-222-0322
Support - Consultants		
AECOM/ENSR	970-493-8878	720-210-7924
LT Environmental	303-962-5504	
GHD First (Fast Incident Response Services Team)(24hr hotline)		866-812-9565
Tasman Geoscience		303-507-8869

RESPONSE OBJECTIVES CHECKLIST

SAFETY – PROTECT LIFE

❖Evaluate and account for all personnel
❖Isolate all potential ignition sources
❖Initiate emergency services immediately, as needed (911, Fire, LEPC)
❖Identify hazard(s) of emitted material (obtain SDS)
❖Establish site control (safe perimeter and evacuation routes)
❖Monitor air in impacted areas
❖Develop Site Safety Plan (ICS 208) and Medical Plan
❖Continually assess site hazards and risks

RESPONSE – INCIDENT STABILIZATION

❖Conduct notifications to external agencies and internal personnel
❖Identify and implement staging areas to support response operations
❖Activate response company for equipment and manpower as needed
❖Activate response tactics to contain and recover product/material
❖Establish command post and field communications
❖Establish flight traffic restriction if required
❖Provide personnel and equipment support as required
❖Implement waste handling and disposal procedures as required
❖Initiate decontamination and demobilization procedures when appropriate

ENVIRONMENTAL – PROTECT THE ENVIRONMENT

❖Identify, prioritize, and protect environmentally sensitive areas
❖Establish wildlife rescue rehabilitation operations if required
❖Verify release if waters are impacted
❖Conduct visual assessments (spill tracking and surveillance)

Revised: 6/2020

Section 5

Phase III Drainage Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Phase III Drainage Report
for
Columbine 4-29HZ

Prepared for:

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

Submitted to:

Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

October 2021
Revised December 2021

609 Consulting, LLC

Engineering, Surveying, Consulting & Design

Sheridan Office
1095 Saberton Avenue
Sheridan, Wyoming 82801
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Loveland, Colorado 80538
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Letter of Transmittal

To: Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

cc: Mr. Matt Wiederspahn, PE, Town of Firestone
Mr. Josh Evans, PE, Town of Firestone
Ms. Shayelyn Marshall, Kerr-McGee Oil & Gas Onshore L.P.
Mr. Brian Venn, PE, 609 Consulting

From: Mr. Tyler French, PE
609 Consulting
1095 Saberton Avenue
Sheridan, Wyoming 82801

Date: December 10, 2021

Subject: Columbine 4-29HZ - Phase III Drainage Report - Revised

To the Town of Firestone:

On behalf of Kerr-McGee Oil & Gas Onshore L.P., we are pleased to submit the revised Phase III Drainage Report for Columbine 4-29HZ. The purpose of this report is to discuss and summarize the stormwater drainage analysis and design performed for Columbine 4-29HZ. The proposed project will be located in the northwest quarter of Section 29 in Township 2 North, Range 67 West in Firestone, Colorado.

The drainage analysis and design were prepared using the Town of Firestone Design Standards & Construction Specifications for Public Improvements as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual. The Town of Firestone provided comments and redlines for the Preliminary Phase III Drainage Report for Columbine 4-29HZ in September of 2021. These redlines were incorporated into the Phase III Drainage Report. The Town of Firestone provided additional comments in December of 2021. This revised Phase III Drainage Report has addressed and incorporated all of the comments and redlines provided by Firestone thus far. We believe the analysis and design satisfy all Town of Firestone drainage requirements.

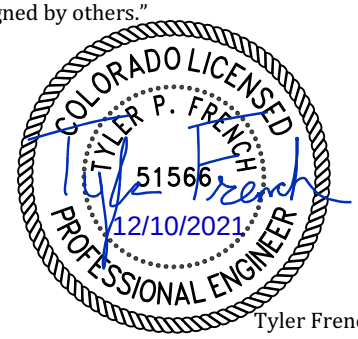
We greatly appreciate your time and consideration in reviewing this submittal. Please contact us with any questions you may have.

Respectfully,

Tyler French, PE

Certification of Engineering

"I hereby attest that this final report for the drainage design of Columbine 4-29HZ was prepared by me, or under my direct supervision, in accordance with the provisions of the Town of Firestone Storm Drainage Criteria for the responsible parties thereof. I understand that the Town of Firestone does not and shall not assume liability of drainage facilities designed by others."



Tyler French
Registered Professional Engineer
State of Colorado No. 51566

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APPENDICES

Appendix A: Drainage and Erosion Control Plan
Appendix B: NRCS Web Soil Survey – Soils Report
Appendix C: FEMA Flood Insurance Rate Map FIRMette
Appendix D: NOAA Atlas 14 Point Precipitation Frequency Estimates
Appendix E: UD-Rational Spreadsheet Inputs and Results
Appendix F: MHFD-Detention Spreadsheet Calculations
Appendix G: Pipe Buoyancy Calculations
Appendix H: MHFD-Culvert Spreadsheet Calculations for Culvert Design
Appendix I: Conveyance Calculations for Diversion Ditch Design
Appendix J: Sediment Trap Sizing Calculations

1.0 PROJECT OVERVIEW

Kerr-McGee Oil & Gas Onshore L.P. is proposing the construction and development of an oil/gas well pad and production facility, Columbine 4-29HZ, located in the northwest quarter of Section 29 in Township 2 North, Range 67 West in Firestone, Colorado. Per the requirements outlined in the Town of Firestone Municipal Code, and through a direct request from the Town of Firestone, this report was prepared to discuss the analysis and design for stormwater drainage at the proposed project site. The Drainage and Erosion Control Plan, found in Appendix A, was developed in conjunction with this report.

1.1 Project Description

The proposed project consists of the construction and operation of the Columbine 4-29HZ well pad and the Columbine 4-29HZ production facility containing infrastructure and operations for seven oil/gas wells. Combined, the well pad and facility will have a Colorado Oil & Gas Conservation Commission (COGCC) 2A disturbance boundary area of 12.66 acres during the construction phase which includes topsoil stripping and pad earthwork, well drilling and hydraulic fracturing, installation of permanent pipelines and facilities, and setup of temporary equipment. Construction phase grading and layout for the well pad and facility can be found in the Drainage and Erosion Control Plan found in Appendix A.

Once all wells have been drilled and completed, the temporary equipment area and portions of the well pad and facility will be reclaimed back to existing grade for the production phase. The remaining operational area during the production phase will be approximately 2.73 acres. Production phase grading and layout for the well pad and facility can be found in the Drainage and Erosion Control Plan found in Appendix A.

1.2 Project Location

The proposed Columbine 4-29HZ project is located on property owned by Anadarko E & P Onshore LLC (Parcel 131129200002). The project area is approximately 0.1 miles south of County Road 18 and 0.3 miles east of County Road 15 within the Town of Firestone jurisdictional boundary. A proposed access road running south from County Road 18 will provide access to the project site. Figure 1 shows the location of Columbine 4-29HZ.

Soils data for the project area were taken from NRCS Soil Data Viewer. The project area is comprised of Olney loamy sand (1 to 3 percent slopes) with a Hydrologic Soil Group (HSG) classification of Group B soils and Vona loamy sand (3 to 5 percent slopes) with a HSG classification of Group A soils. The soils report for the project area can be found in Appendix B. The proposed project will be constructed on undeveloped agricultural land. According to National Land Cover Database (NLCD 2016), the project area is classified as a combination of cultivated crops, herbaceous, and hay/pasture.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 08123C2081E, Effective Date: 1/20/2016), the proposed project is in an area of minimal flood hazard (Zone X) and is therefore determined to be outside the 500-year floodplain. The corresponding FIRMette displaying the flood zone classification at the project site can be found in Appendix C.

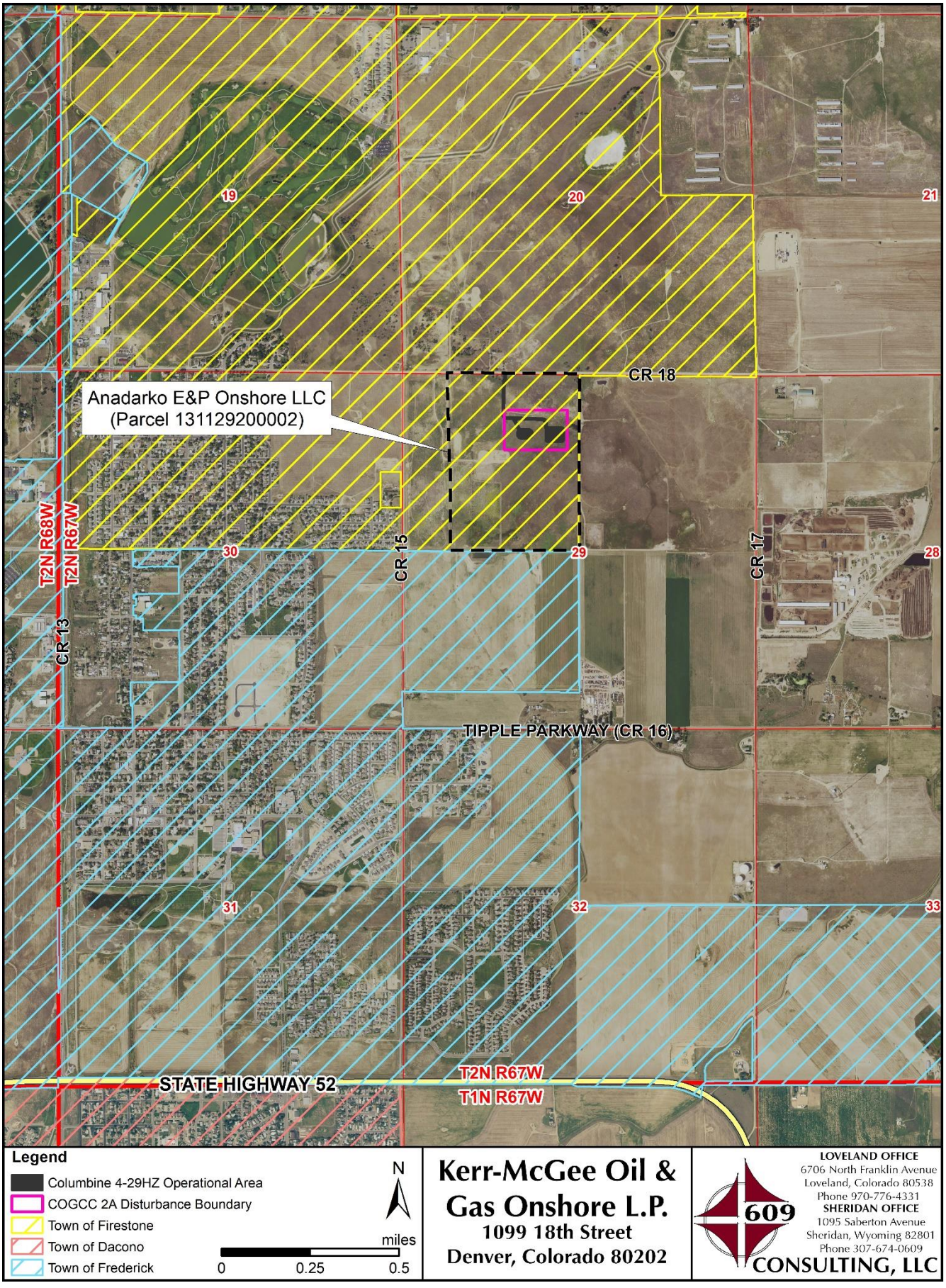


Figure 1. Project Location

1.3 Drainage Summary

The proposed Columbine 4-29HZ project lies within the Firestone Lake – Saint Vrain Creek Hydrologic Unit Code Level 12 (HUC 12): 101900050707. The HUC 12, approximately 69.5 square miles in area, consists of a mixture of agricultural lands and urban development via subdivisions, acreages, and transportation infrastructure and drains to Saint Vrain Creek.

Local drainage to and around the project site generally flows southwest to northeast. Both on-site and off-site runoff drains east under an existing private road through an existing 18-inch corrugated metal pipe (CMP) culvert. The Hidden Creek Development, just south of the project parcel in Frederick, Colorado, has recently constructed a drainage swale on the project parcel which runs south to north. The swale will drain stormwater outflows from a detention pond(s) used to capture and treat stormwater from the new development. Drainage from the swale is expected to have no negative impacts on the operations at the proposed Columbine 4-29HZ project site.

The project site lies within the study area of the *Sump Basin Master Drainage Plan*, published in May of 2010 (Colorado Civil Group, Inc.). According to the report, the Sump Basin has well-drained soil with poorly defined drainageways with most runoff conveyed via shallow overland flow or sheet flow. Historically, stormwater within the basin generally flows from south to north. Though the Sump Basin contains several existing sumps, there are no sumps located near the proposed project site.

2.0 HYDROLOGIC ANALYSIS

The following sections outline the methods used and corresponding results for the hydrologic analysis of the project site and drainage design including historic runoff, design flow, and stormwater volume.

2.1 Historic Runoff

Historic runoff, calculated assuming the site is undeveloped with a 2.0 percent imperviousness, was calculated for the proposed project site. The rational method was chosen to estimate historic peak flows. As discussed in the Mile High Flood District (MHFD) manual *Urban Storm Drainage Criteria Manual Volume I* (USDCM VI), it is acceptable to use the rational method for design storm analysis of catchments that are not complex and are 90 acres or less in size.

The MHFD spreadsheet model, *Peak Runoff Prediction by the Rational Method, V 2.00* (UD-Rational), was used to calculate peak flows. One-hour point rainfall data were obtained from NOAA Atlas 14 Point Precipitation Frequency Estimates using coordinates for the project site. One-hour point rainfall data are summarized in Table 1 and a copy of the point precipitation frequency estimates obtained from NOAA can be found in Appendix D.

Table 1. Point Rainfall Data (NOAA Atlas 14 Point Precipitation Frequency Estimates)

Storm Event Frequency	One-Hour Point Rainfall, in
2-year	0.822
5-year	1.11
10-year	1.39
25-year	1.84
50-year	2.24
100-year	2.69
500-year	3.94

The COGCC 2A disturbance boundary was used to define the drainage area. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery. HSG was derived from an area-weighted average using NRCS Soil Data Viewer. HSG and soils data for the project area can be found in Appendix B. USDCM VI was referenced for the recommended conveyance factor (K). Computed Time of Concentration (Tc) was used since historic conditions have an imperviousness of less than 20 percent. Historic peak flow estimates calculated using the rational method are summarized in Table 2 and spreadsheet model inputs and results can be found in Appendix E.

Table 2. Historic Peak Flow Estimates Using the Rational Method

Storm Event Frequency	Historic Peak Flow, cfs
2-year	0.1
5-year	0.2
10-year	1.2
25-year	5.7
50-year	9.5
100-year	15.9
500-year	32.1

2.2 Design Flow

Design flows for Columbine 4-29HZ were calculated for stormwater derived within the project disturbance area (on-site) as well as the broader drainage to and around the project area. Both the construction phase and the production phase were analyzed and used to aid in the hydraulic design.

The rational method was chosen to estimate design-specific peak flows for the proposed culvert and ditch outlets (sediment traps). Drainage area delineations for the culvert and sediment traps during the construction phase are shown in Figure 2 and drainage area delineations for the culvert and stormwater storage during the production phase are shown in Figure 3. Locations for peak flow calculations are summarized in Table 3.

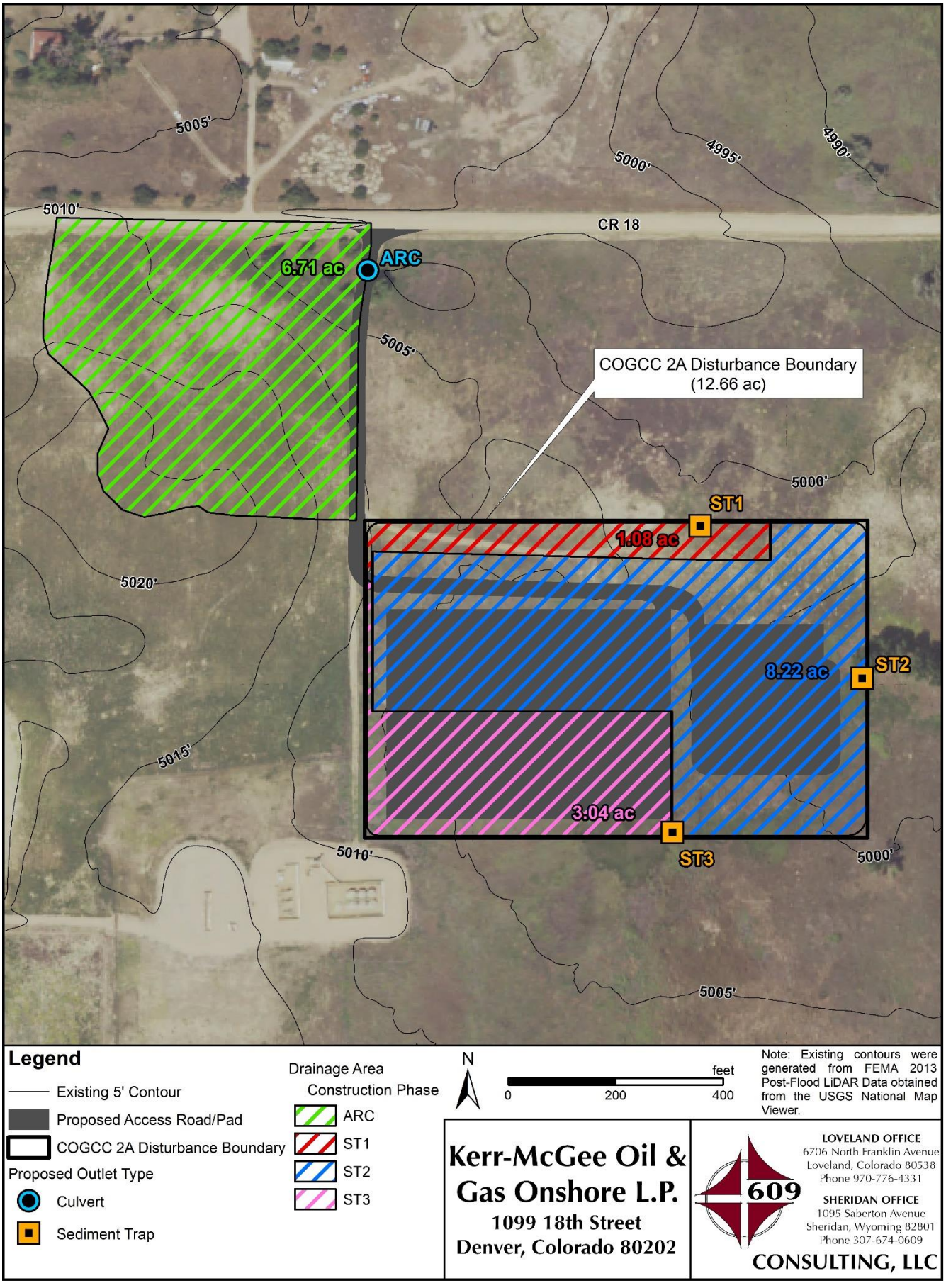


Figure 2. Drainage Area for the Construction Phase

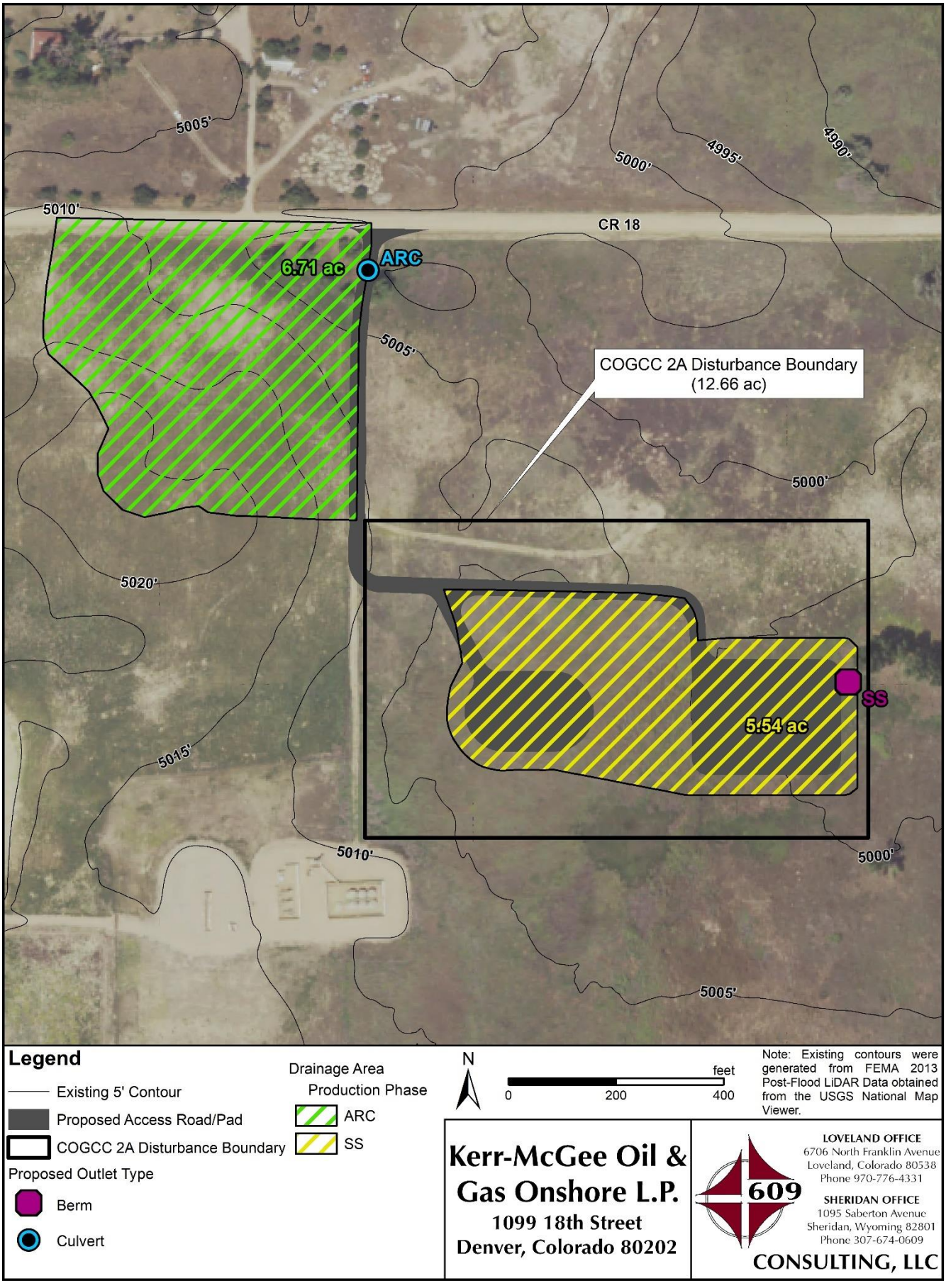


Figure 3. Drainage Area for the Production Phase

Table 3. Summary of Outlets and Drainage Areas

Outlet	Name	Description	Total Drainage Area, acre	
			Construction Phase	Production Phase
ARC	Access Road Culvert	Access road culvert conveying off-site stormwater	6.71	6.71
ST1	Sediment Trap #1	Diversion ditch conveying on-site stormwater to a sediment trap	1.08	-
ST2	Sediment Trap #2	Diversion ditch conveying on-site stormwater to a sediment trap	8.22	-
ST3	Sediment Trap #3	Diversion ditch conveying on-site stormwater to a sediment trap	3.04	-
SS	Stormwater Storage	Berm and ditch on facility used for stormwater storage	-	5.54

One-hour point rainfall data for the project area (Table 1) and the Denver Area Intensity Equation were used for inputs to UD-Rational. Field survey, LiDAR, and site design characteristics were used to delineate the drainage area for the access road culvert (ARC). Drainage areas for the sediment traps and stormwater storage were delineated using the on-site drainage design and grading found in Appendix A. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, proposed grading, LiDAR, and imagery.

HSG was derived from an area-weighted average using NRCS Soil Data Viewer. Due to the presence of both Type A and Type B soils, HSG and imperviousness were used within UD-Rational to calculate area-weighted runoff coefficients (C-values) which were used to override the default runoff coefficients. HSG and soils data for the project area can be found in Appendix B and area-weighted runoff coefficient calculations can be found in Appendix E.

USDCM VI was referenced for recommended imperviousness and conveyance factor (K). Computed T_c was used for outlets with imperviousness less than 20 percent. Drainage areas were evaluated for non-contributing area. During both the construction and production phases, facility tanks and separators are bermed to contain spills. This area is considered ineffective and non-contributing area. Calculations for area-weighted averages of percent imperviousness along with effective area are found in Table 4. Peak flow estimates calculated using the rational method are summarized in Table 5 and complete spreadsheet model inputs and results can be found in Appendix E.

Table 4. Imperviousness and Effective Area

Outlet	Phase	Total Area, acre	Ineffective Area, acre	Effective Area, acre	Open (2% Imperv), acre	Gravel (40% Imperv), acre	Weighted Imperviousness	
							acre	%
ARC	Both	6.71	0.00	6.71	6.23	0.48	0.32	4.7
ST1	Construction	1.08	0.00	1.08	1.07	0.01	0.03	2.4
ST2	Construction	8.22	0.13	8.09	3.72	4.37	1.82	22.5
ST3	Construction	3.04	0.00	3.04	0.61	2.43	0.98	32.4
SS	Production	5.54	0.13	5.41	3.18	2.23	0.96	17.7

Table 5. Peak Flow Estimates Using the Rational Method

Outlet	Phase	Peak Flow, cfs						
		2-year	5-year	10-year	25-year	50-year	100-year	500-year
ARC	Both	0.2	0.3	0.4	0.7	1.6	4.4	12.4
ST1	Construction	<0.1	<0.1	<0.1	0.1	0.2	0.7	2.1
ST2	Construction	1.4	2.0	3.2	6.2	9.3	13.6	25.1
ST3	Construction	1.0	1.5	2.3	4.3	5.8	8.0	13.2
SS	Production	0.6	0.9	1.7	3.8	5.6	8.1	14.2

2.3 Stormwater Volume

In accordance with Town of Firestone Municipal Code requirements, stormwater falling on the project area will be detained and released at reduced flow rates. The MHFD spreadsheet model *Detention Basin Design Workbook Version 4.03* (MHFD-Detention) was used to calculate storm runoff volumes. One-hour point rainfall data for the project area (Table 1) were used within MHFD-Detention. Watershed parameters including area, length, and slope as well as imperviousness and soil type were calculated based on the site design and site characteristics. Table 6 shows storm runoff volumes calculated for the stormwater storage area. MHFD-Detention inputs and results can be found in Appendix F.

Table 6. Calculated Storm Runoff Volumes

Outlet	Phase	Storm Runoff Volume, acre-ft								
		WQCV	EURV	2-year	5-year	10-year	25-year	50-year	100-year	500-year
SS	Production	0.048	0.093	0.039	0.068	0.134	0.343	0.508	0.735	1.295

3.0 HYDRAULIC ANALYSIS AND DRAINAGE DESIGN

Criteria presented in MHFD's Urban Storm Drainage Criteria Manual outline the capacity, velocity, and slope requirements involved with drainage design and stormwater conveyance. The following sections describe the design recommendations for conveyance during the construction phase and production phase. The recommended drainage design can be found in the Drainage and Erosion Control Plan found in Appendix A.

3.1 Stormwater Storage

During the production phase, the well pad and facility will drain east to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the pad. During the 10-year event, stormwater will back up out of the ditch onto the facility and will pond to a maximum depth of 0.1 feet above the ditch covering the eastern 25 feet of the facility. During the 100-year event, stormwater will pond to a maximum depth of 0.6 feet above the ditch covering the eastern 120 feet of the facility creating a stored volume of 0.339 acre-feet.

The outlet through the stormwater storage berm consists of a 10-inch diameter high-density polyethylene (HDPE) pipe with an orifice cap to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (3/4 inch orifice diameter) at the invert of the outlet pipe and a second orifice (2 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 4.0 feet, 4:1 side slopes, and a crest invert at 1.5 feet above the ditch/outlet pipe invert (0.1 feet above above the edge of the facility). It will take approximately 40 hours to drain 99 percent of the water quality capture volume (WQCV) with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 42 hours to drain 99 percent of the inflow with peak flow release of 5.3 cubic feet per second (cfs). Buoyancy calculations were performed for the outlet pipe. Using a factor safety of 1.5, it was found that a minimum cover of 0.8 feet is needed to anchor the 10-inch outlet pipe during fully saturated conditions. Buoyancy calculations can be found in Appendix G. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the stormwater storage berm, overlapping the weir. The spillway was designed with a crest length of 8.0 feet, 4:1 side slopes, and a crest invert at 2.0 feet above the ditch/outlet pipe invert (0.6 feet above the edge of the facility) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.5 feet. A berm height of 1.6 feet will provide 1.0 feet of freeboard above the spillway and 0.5 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater storage volumes, outlet sizing, and spillway design details can be found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

3.2 Culverts

One proposed culvert location will ensure proper off-site drainage. MHFD's *Culvert Hydraulics Version 4.00* (MHFD-Culvert) was used to calculate conveyance, sizing, and performance characteristics for the recommended culvert design. Peak flows used for the culvert design are found in Table 5 and MHFD-Culvert spreadsheet calculations can be found in Appendix H.

The Access Road Culvert (ARC) will convey off-site runoff from the western side of the access road under the access road and to the east during both the construction phase (Figure 2) and the production phase (Figure 3). One 15-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC are found in Table 7. The maximum design conveyance before overtopping the access road is 6.1 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow (4.4 cfs). Due to the existing site grade and the higher pipe roughness coefficient associated with CMP culverts, the 10-year peak flow velocity is below 3.0 feet per second (fps). Routine maintenance may be required to ensure sedimentation does not occur.

Table 7. Culvert Performance Characteristics for Recommended Culvert Design

Site	Culvert Size and Material	10-year Peak Flow			Full Barrel Flow			Max Conveyance		
		Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D
ARC	15-inch CMP	0.4	1.8	0.2	3.9	3.2	1.0	6.1	5.0	1.8

3.3 Ditching

Temporary diversion ditches and berms will be used to collect and direct on-site stormwater to outlets while also deflecting and redirecting off-site flows around the disturbance area during the construction phase. All temporary diversion ditches were designed with slopes between 0.5 percent and 1.5 percent as dictated by existing topography. Temporary diversion ditch slopes are identified in the Drainage and Erosion Control Plan found in Appendix A.

Manning's equation was used to calculate conveyance based on typical temporary diversion ditch design. Using a ditch slope of 0.5 percent (lowest proposed ditch slope for the project), the typical design was found to convey 5.6 cfs at a depth of 1.0 feet and 16.5 cfs at a depth of 1.5 feet (maximum capacity assuming 2:1 ditch slope is carried onto pad). The typical design at a depth of 1.0 feet will convey more than the largest 10-year peak flow (ST2, 3.2 cfs) and the typical design at a depth of 1.5 feet will convey more than the largest 100-year peak flow (ST2, 13.6 cfs). Manning's calculations for typical temporary diversion ditch conveyance can be found in Appendix I.

3.4 Sediment Traps

Sediment traps and outlets will be installed at the end of temporary diversion ditches. Sediment traps were sized according to the Kerr-McGee BMP Manual which uses modified MHFD typicals. Total ditch length draining the fill portion of the pad and ditch length along topsoil stockpiles were added together for the ditch length design parameter. The results of the sediment trap sizing are found in Table 8. In order to provide additional capture volume and treatment, sediment traps are designed to be oversized when possible. Sediment trap sizing calculations can be found in Appendix J and typical sediment trap details are included with the Drainage and Erosion Control Plan found in Appendix A.

Table 8. Sediment Trap Sizing Design

Outlet	Minimum Design Area, ft^2	Recommended Design Size
ST1	200	15 ft x 15 ft (225 ft^2)
ST2	230	20 ft x 15 ft (300 ft^2)
ST3	100	15 ft x 15 ft (225 ft^2)

4.0 SITE MAINTENANCE AND UPKEEP

Kerr-McGee's site monitoring program ensures site conditions stay in compliance. Sedimentation, culvert and access road condition, vegetation health, and several other safety and maintenance items are routinely monitored and evaluated to ensure the site is in workable and drainable order.

In addition to monitoring during regular operations, a formal monitoring plan has been developed for the project site. During the construction phase, the site will be inspected a minimum of every 14 calendar days as well as following any rain or snowmelt events that are able to cause surface erosion. After the construction phase, areas not needed for production operations within the disturbance area will be reclaimed and site inspections will occur at a minimum of every 30 calendar days until the site is fully stabilized. Once the site is stabilized and has achieved interim reclamation standards, inspections will occur annually. More frequent, informal inspections will continue to occur during routine operations.

Routine maintenance and required repairs of the culvert, access roads, ditches, berms, and the berm outlet structure will be handled by the operations team. Cleaning and removal of sediment and debris from the culvert, ditches, and the berm outlet, as well as vegetation maintenance and specific manufacturer maintenance, will also be handled by the operations team during regular operations and maintenance checks.

5.0 CONCLUSION

The information and analysis presented in this report display the adequacy and effectiveness of the design and planning associated with the Columbine 4-29HZ Drainage and Erosion Control Plan. The design protects public health, safety, and general welfare and has no adverse impacts on public rights-of-way or off-site properties. Furthermore, the report demonstrates that the design adheres to the Town of Firestone Municipal Code as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual.

6.0 REFERENCES

Culvert Hydraulics Workbook Version 4.00 (MHFD-Culvert). May 2020. Mile High Flood District. https://mhfd.org/resources/software

Detention Basin Design Workbook Version 4.03 (MHFD-Detention). May 2020. Mile High Flood District. https://mhfd.org/resources/software

National Flood Hazard Layer FIRMette. Federal Emergency Management Agency (FEMA). https://msc.fema.gov/portal/home

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Sump Basin Master Drainage Plan. May 2010. Colorado Civil Group, Inc.

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Urban Storm Drainage Criteria Manual: Volume 2 - Structures, Storage, and Recreation. September 1969. Revised September 2017. Mile High Flood District. https://mhfd.org/resources/criteria-manual

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Web Soil Survey. Natural Resources Conservation Service. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Weld County Property Portal. Weld County, Colorado. https://www.co.weld.co.us/maps/propertyportal

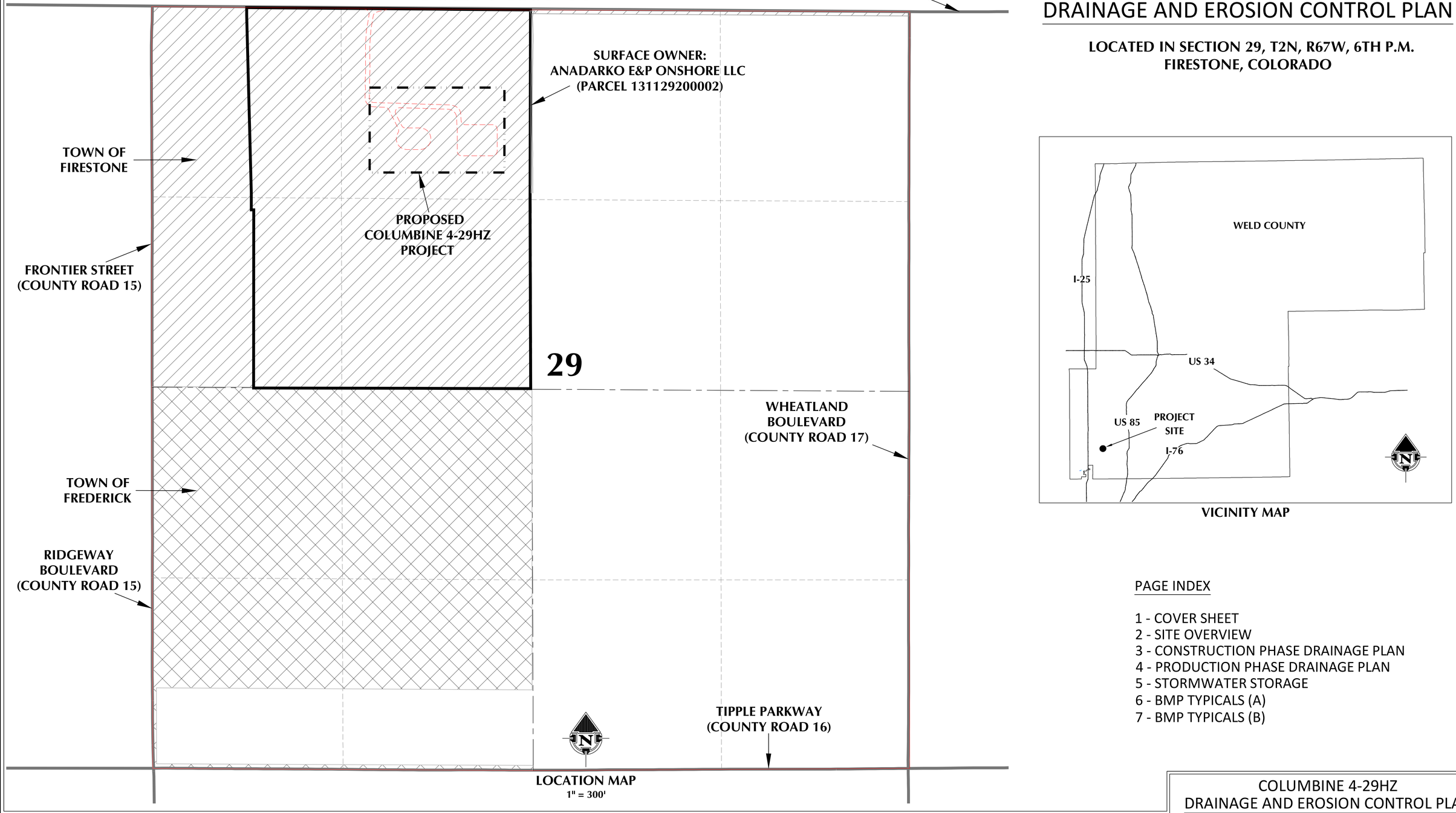
APPENDICES

Appendix A:

Drainage and Erosion Control Plan

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'

VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - STORMWATER STORAGE
6 - BMP TYPICALS (A)
7 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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ACCESS ROAD CULVERT (ARC)

COUNTY ROAD 18

PROPOSED FIRE HYDRANT

PROPOSED PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD (TO BE IMPROVED)

EXISTING PRIVATE ROAD

EXISTING CULVERT

PROPOSED COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

COUNTY ROAD 15

WELD COUNTY

FIRESTONE
WELD COUNTY

FIRESTONE
FREDERICK

5000 5010 5020 5030 4990

N

0 150' 300'

1" = 150'

5' CONTOURS

LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- EXISTING WATER LINE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

15' X 15' X 3' SEDIMENT TRAP (ST1)

EXISTING PRIVATE ROAD

EXISTING CULVERT

TOPSOIL STOCKPILE

COLUMBINE 4-29HZ WELL PAD

FLAT GRADED ELEVATION = 5002.0'

COLUMBINE 4-29HZ FACILITY

TEMPORARY EQUIPMENT AREA

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

20' X 15' X 3' SEDIMENT TRAP (ST2)

15' X 15' X 3' SEDIMENT TRAP (ST3)

PAD TRENCH

0.8% DITCH SLOPE

1.0% DITCH SLOPE

1.5% DITCH SLOPE

0.9% DITCH SLOPE

1.2% DITCH SLOPE

0.5% DITCH SLOPE

0.5% SLOPE

0.4% SLOPE

0.6% SLOPE

CUT

FILL

5000

5005

5010

5015

5020

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EPL EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- SP PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 50'	PAGE:	3 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD

EXISTING CULVERT

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

OFF-SITE FLOW DEFLECTION

OUTLET PIPE

COLUMBINE 4-29HZ FACILITY

COLUMBINE 4-29HZ WELL PAD

WELL ELEVATION = 5002.0'

0.2% SLOPE

0.2% SLOPE

CUT

FILL

0.4% SLOPE

0.6% SLOPE

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

WEIR & SPILLWAY

STORAGE BERM

STORAGE DITCH ALONG PAD TOE

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

5020

5015

5010

5005

5000

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

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2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

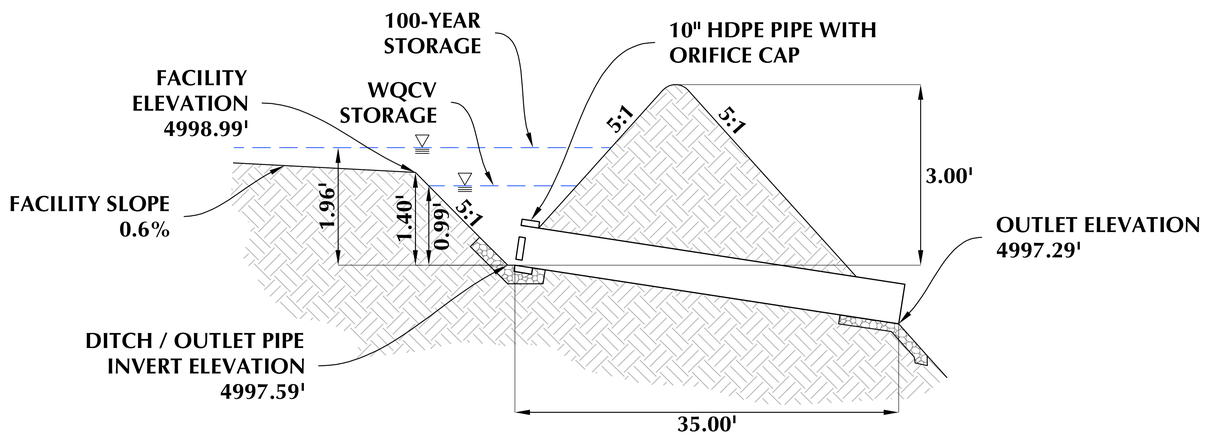
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STORAGE BERM & DITCH - PRODUCTION PHASE

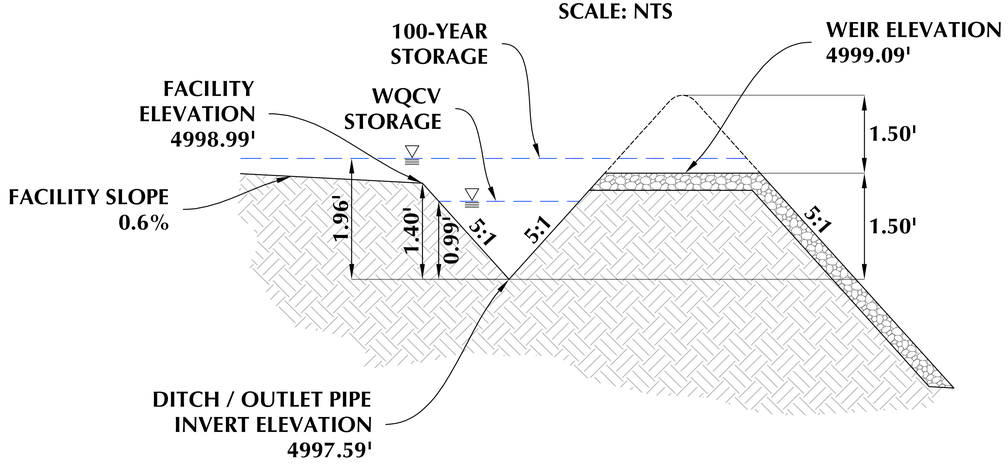
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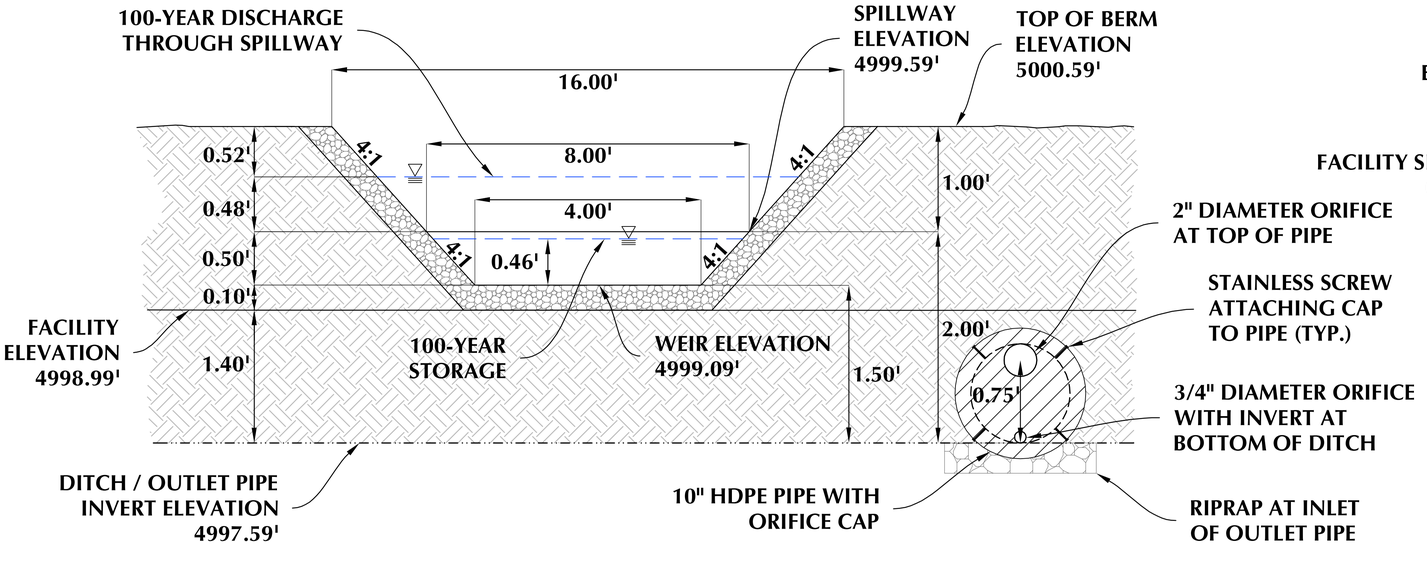
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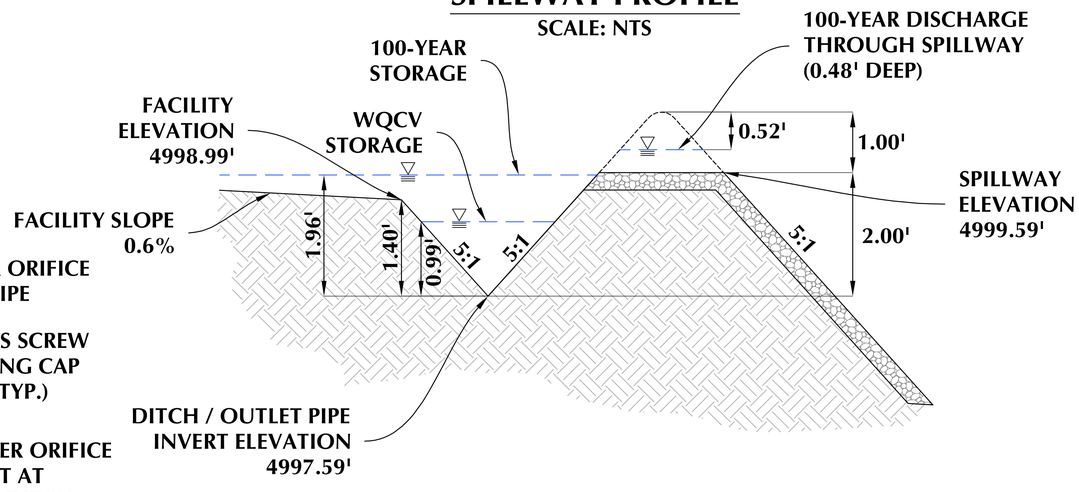
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SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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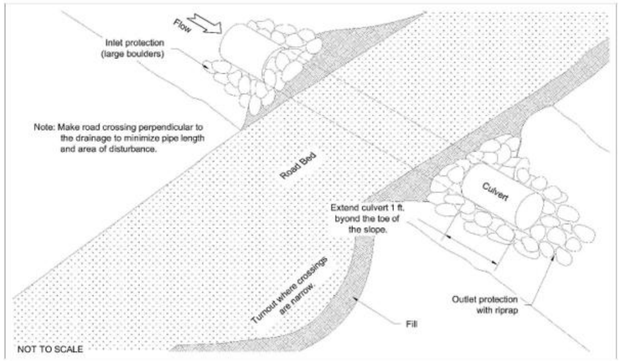
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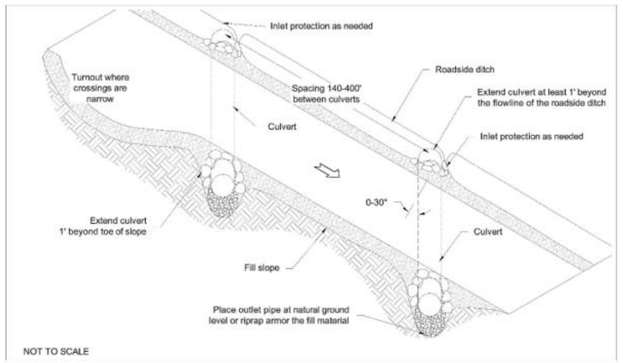
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
STORMWATER STORAGE

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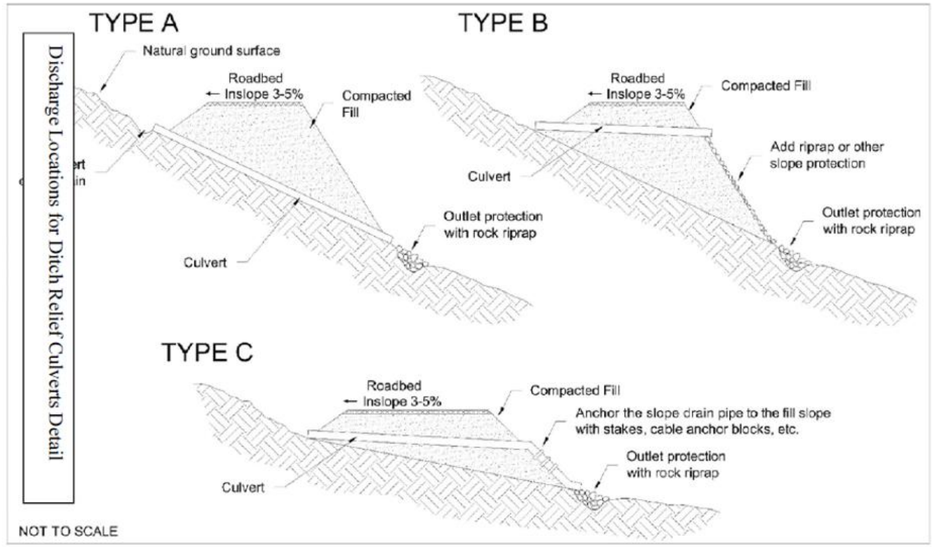
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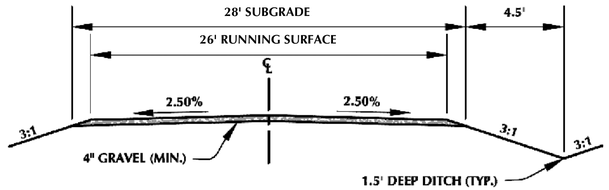
Culvert





Culvert

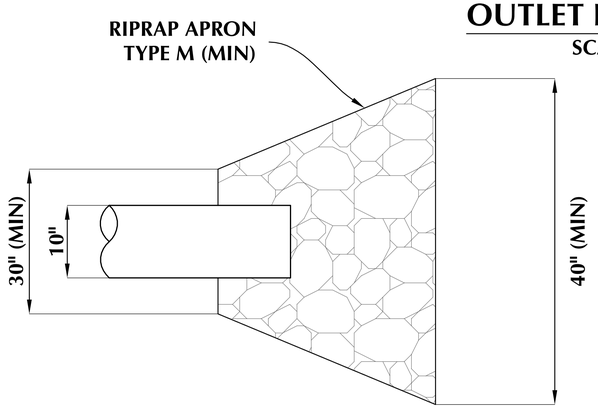


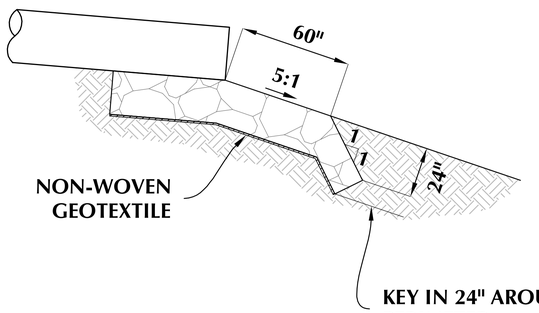


ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

SCALE: NTS

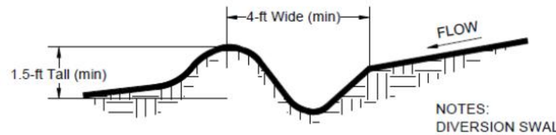




Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

GENERAL NOTES:

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

SCALE:	VARIES	PAGE:	6 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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Sediment Trap

ST

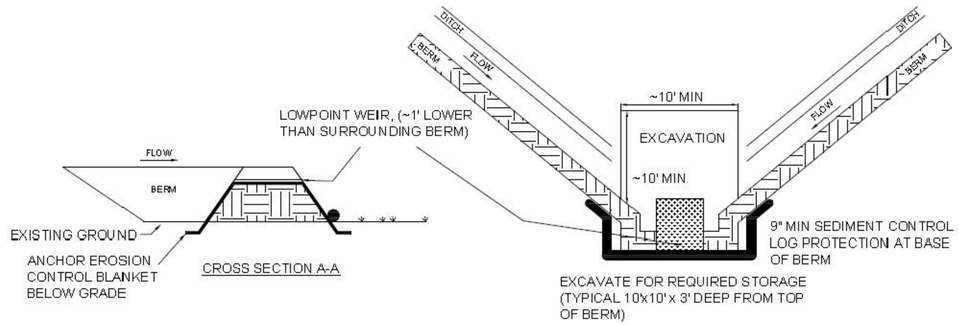
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

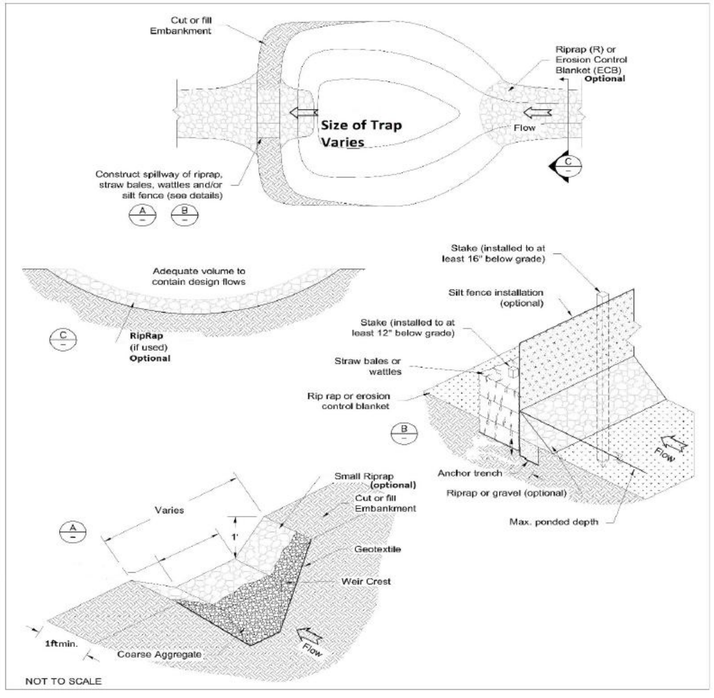
Sediment Trap

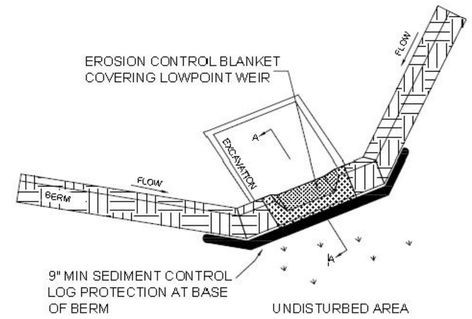
ST



Sediment Trap

ST





GENERAL NOTES:

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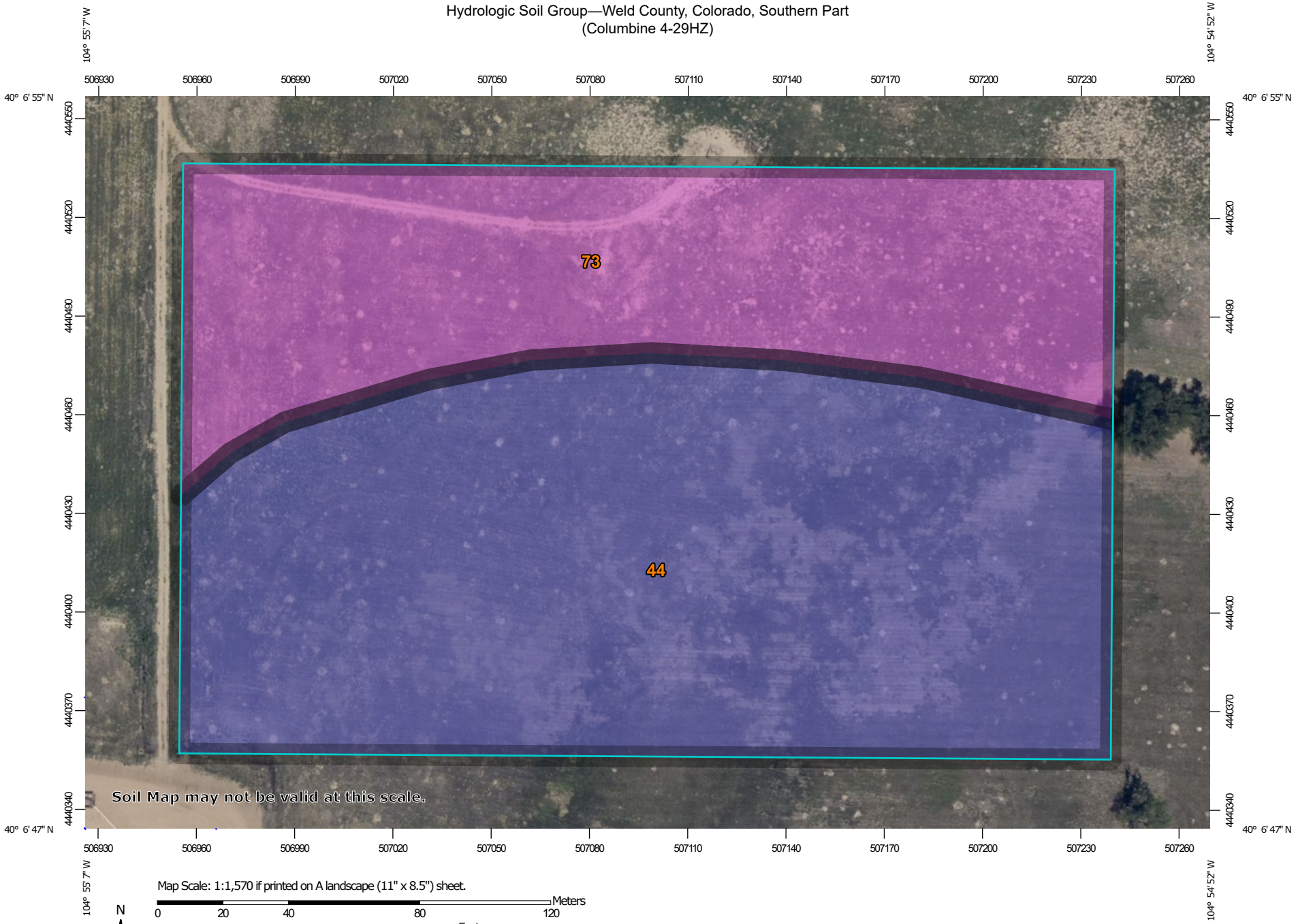
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (B)

SCALE:	VARIES	PAGE:	7 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DRAINAGE STUDY\DWG - DRAINAGE PLAN\COLUMBINE_COMBINED.dwg, 10/6/2021 3:15:03 PM, katy

Appendix B:

NRCS Web Soil Survey – Soils Report



Map Scale: 1:1,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 18, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
44	Olney loamy sand, 1 to 3 percent slopes	B	7.9	62.7%
73	Vona loamy sand, 3 to 5 percent slopes	A	4.7	37.3%
Totals for Area of Interest			**12.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

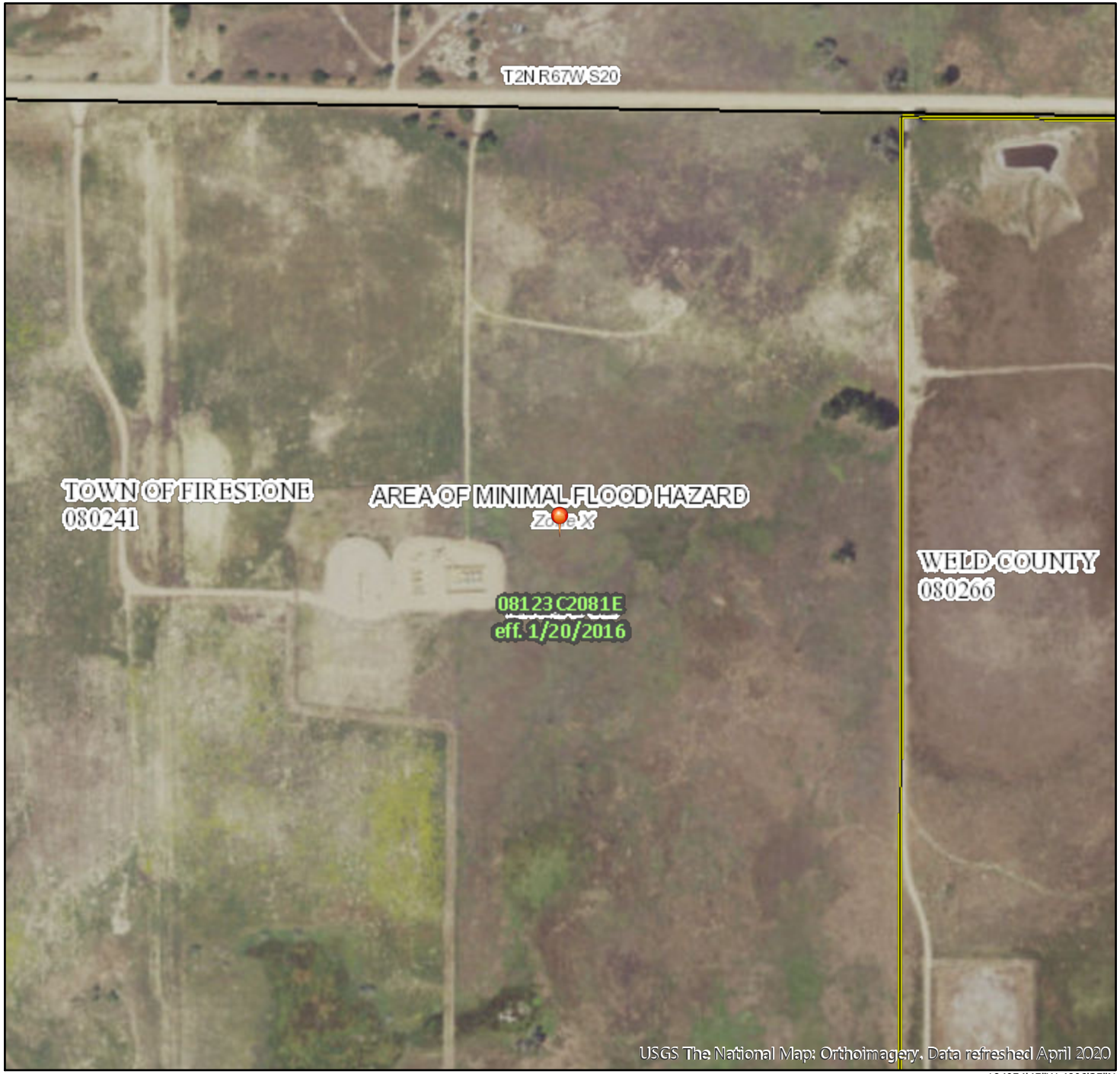
Appendix C:

FEMA Flood Insurance Rate Map FIRMette

National Flood Hazard Layer FIRMette

FEMA

104°55'22"W 40°7'2"N



104°54'45"W 40°6'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/24/2020 at 6:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D:

NOAA Atlas 14 Point Precipitation Frequency Estimates

NOAA Atlas 14, Volume 8, Version 2
Location name: Firestone, Colorado, USA*
Latitude: 40.1142°, Longitude: -104.9171°
Elevation: 5003.11 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.229** (0.176-0.297)	**0.278** (0.214-0.362)	**0.375** (0.288-0.488)	**0.470** (0.358-0.615)	**0.622** (0.470-0.874)	**0.757** (0.555-1.07)	**0.907** (0.642-1.31)	**1.08** (0.731-1.60)	**1.32** (0.864-2.02)	**1.53** (0.965-2.33)
10-min	**0.335** (0.258-0.435)	**0.408** (0.314-0.530)	**0.549** (0.421-0.715)	**0.688** (0.525-0.901)	**0.911** (0.689-1.28)	**1.11** (0.812-1.57)	**1.33** (0.941-1.92)	**1.57** (1.07-2.34)	**1.93** (1.27-2.95)	**2.23** (1.41-3.42)
15-min	**0.409** (0.315-0.531)	**0.497** (0.383-0.646)	**0.669** (0.513-0.872)	**0.839** (0.640-1.10)	**1.11** (0.840-1.56)	**1.35** (0.991-1.91)	**1.62** (1.15-2.35)	**1.92** (1.31-2.86)	**2.36** (1.54-3.60)	**2.72** (1.72-4.17)
30-min	**0.556** (0.428-0.721)	**0.673** (0.518-0.875)	**0.903** (0.693-1.18)	**1.13** (0.863-1.48)	**1.50** (1.13-2.10)	**1.82** (1.34-2.58)	**2.18** (1.55-3.16)	**2.59** (1.76-3.85)	**3.18** (2.08-4.86)	**3.68** (2.33-5.63)
60-min	**0.679** (0.523-0.881)	**0.822** (0.633-1.07)	**1.11** (0.848-1.44)	**1.39** (1.06-1.82)	**1.84** (1.39-2.59)	**2.24** (1.65-3.17)	**2.69** (1.91-3.90)	**3.20** (2.18-4.76)	**3.94** (2.58-6.02)	**4.55** (2.88-6.97)
2-hr	**0.802** (0.625-1.03)	**0.971** (0.756-1.25)	**1.31** (1.01-1.68)	**1.64** (1.27-2.12)	**2.18** (1.67-3.03)	**2.66** (1.98-3.72)	**3.20** (2.29-4.58)	**3.81** (2.62-5.59)	**4.69** (3.11-7.07)	**5.43** (3.47-8.19)
3-hr	**0.869** (0.682-1.11)	**1.05** (0.823-1.34)	**1.41** (1.10-1.80)	**1.77** (1.37-2.27)	**2.35** (1.81-3.24)	**2.87** (2.14-3.98)	**3.45** (2.49-4.89)	**4.10** (2.84-5.97)	**5.05** (3.36-7.54)	**5.84** (3.76-8.74)
6-hr	**1.03** (0.817-1.30)	**1.23** (0.976-1.55)	**1.63** (1.29-2.06)	**2.02** (1.59-2.56)	**2.66** (2.07-3.61)	**3.22** (2.43-4.40)	**3.85** (2.80-5.38)	**4.55** (3.18-6.53)	**5.58** (3.76-8.22)	**6.44** (4.19-9.49)
12-hr	**1.27** (1.01-1.57)	**1.49** (1.20-1.86)	**1.93** (1.54-2.40)	**2.35** (1.87-2.94)	**3.02** (2.37-4.03)	**3.61** (2.75-4.84)	**4.26** (3.13-5.85)	**4.98** (3.52-7.03)	**6.04** (4.10-8.73)	**6.91** (4.54-10.0)
24-hr	**1.51** (1.22-1.85)	**1.80** (1.46-2.21)	**2.32** (1.87-2.85)	**2.79** (2.24-3.45)	**3.51** (2.76-4.56)	**4.12** (3.16-5.41)	**4.77** (3.53-6.42)	**5.48** (3.90-7.57)	**6.48** (4.44-9.20)	**7.30** (4.85-10.4)
2-day	**1.72** (1.41-2.08)	**2.10** (1.72-2.54)	**2.74** (2.24-3.32)	**3.29** (2.67-4.01)	**4.07** (3.21-5.16)	**4.70** (3.62-6.03)	**5.35** (3.99-7.04)	**6.03** (4.32-8.15)	**6.96** (4.80-9.67)	**7.69** (5.17-10.8)
3-day	**1.88** (1.55-2.25)	**2.26** (1.87-2.72)	**2.91** (2.40-3.51)	**3.47** (2.84-4.20)	**4.27** (3.39-5.36)	**4.91** (3.81-6.24)	**5.56** (4.17-7.25)	**6.25** (4.51-8.37)	**7.19** (4.99-9.89)	**7.92** (5.36-11.0)
4-day	**2.01** (1.67-2.39)	**2.39** (1.98-2.85)	**3.04** (2.51-3.63)	**3.59** (2.95-4.32)	**4.39** (3.51-5.49)	**5.03** (3.92-6.37)	**5.70** (4.30-7.38)	**6.39** (4.63-8.51)	**7.34** (5.12-10.0)	**8.09** (5.50-11.2)
7-day	**2.30** (1.93-2.72)	**2.70** (2.26-3.19)	**3.37** (2.81-3.99)	**3.94** (3.27-4.69)	**4.76** (3.83-5.86)	**5.41** (4.26-6.76)	**6.08** (4.63-7.78)	**6.78** (4.96-8.91)	**7.74** (5.45-10.4)	**8.48** (5.82-11.6)
10-day	**2.56** (2.15-3.00)	**2.97** (2.50-3.49)	**3.67** (3.08-4.32)	**4.26** (3.56-5.03)	**5.10** (4.13-6.23)	**5.76** (4.56-7.13)	**6.44** (4.93-8.16)	**7.14** (5.25-9.30)	**8.09** (5.73-10.8)	**8.83** (6.09-12.0)
20-day	**3.27** (2.79-3.78)	**3.75** (3.20-4.34)	**4.54** (3.85-5.26)	**5.19** (4.39-6.05)	**6.10** (4.99-7.32)	**6.81** (5.44-8.28)	**7.52** (5.81-9.36)	**8.24** (6.12-10.5)	**9.20** (6.58-12.1)	**9.94** (6.93-13.3)
30-day	**3.84** (3.30-4.40)	**4.39** (3.76-5.03)	**5.27** (4.51-6.07)	**6.00** (5.11-6.94)	**7.00** (5.76-8.31)	**7.77** (6.25-9.34)	**8.52** (6.63-10.5)	**9.29** (6.94-11.7)	**10.3** (7.40-13.4)	**11.0** (7.75-14.6)
45-day	**4.52** (3.91-5.14)	**5.18** (4.48-5.89)	**6.23** (5.37-7.11)	**7.08** (6.07-8.11)	**8.23** (6.80-9.65)	**9.09** (7.35-10.8)	**9.93** (7.77-12.1)	**10.8** (8.09-13.5)	**11.8** (8.57-15.2)	**12.6** (8.93-16.5)
60-day	**5.08** (4.42-5.74)	**5.84** (5.08-6.61)	**7.06** (6.11-8.01)	**8.04** (6.92-9.15)	**9.33** (7.74-10.9)	**10.3** (8.36-12.2)	**11.2** (8.82-13.6)	**12.1** (9.15-15.1)	**13.3** (9.65-16.9)	**14.1** (10.0-18.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

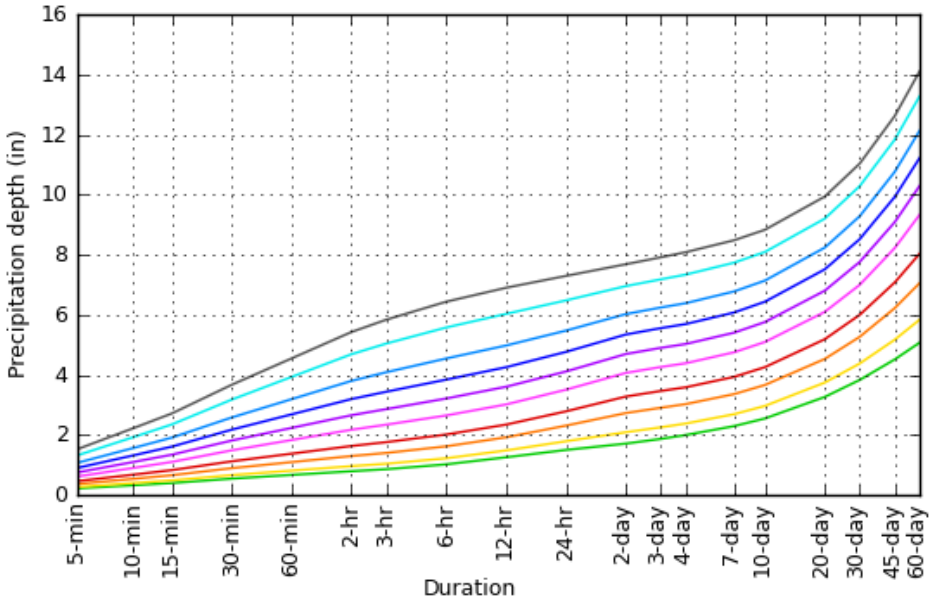
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

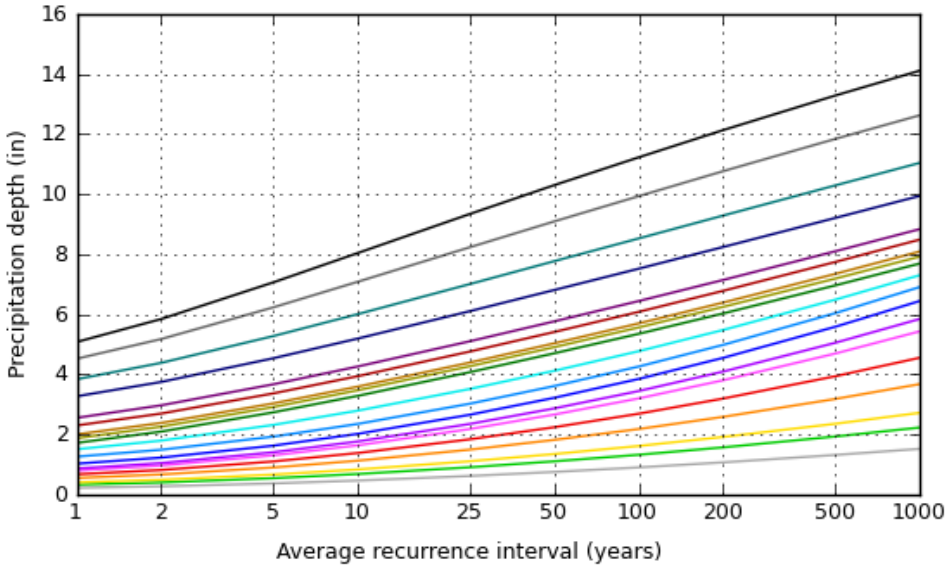
Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.1142°, Longitude: -104.9171°





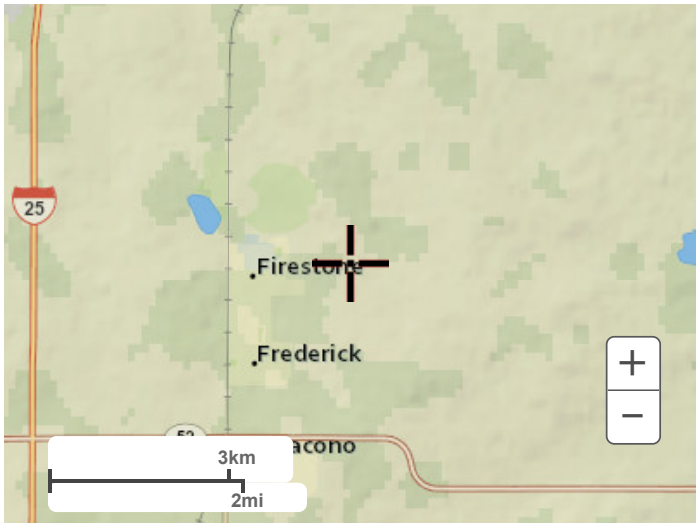
NOAA Atlas 14, Volume 8, Version 2

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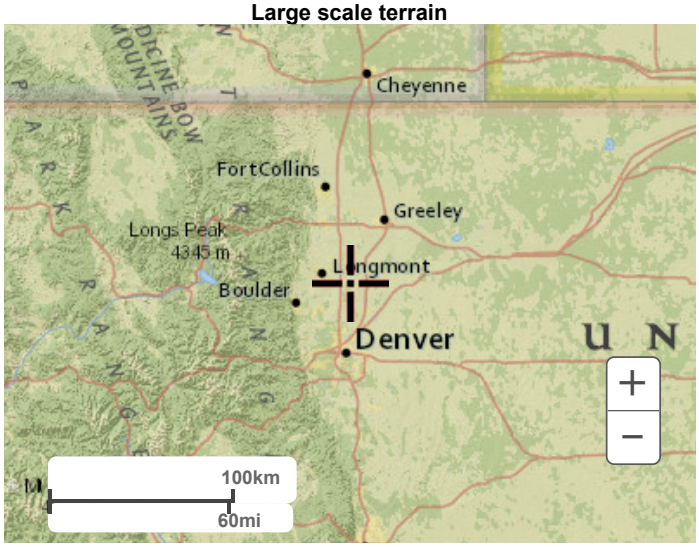
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Maps & aerials

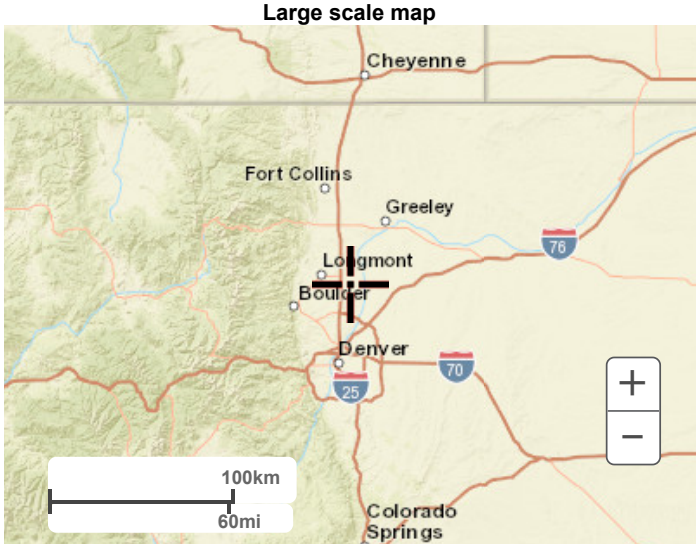
Small scale terrain



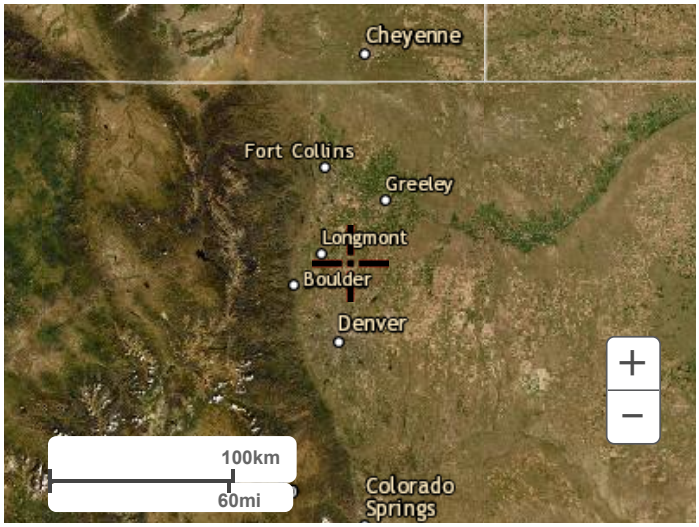
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix E:

UD-Rational Spreadsheet Inputs and Results

Calculation of Peak Runoff using Rational Method

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO

Version 2.00 released May 2017

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Cells of this color are for optional override values
Cells of this color are for calculated results based on overr

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$= 5 (urban)
$t_{minimum}$= 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.822	1.11	1.39	1.84	2.24	2.69	3.94

Rainfall Intensity Equation Coefficients =	a	b	c
	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

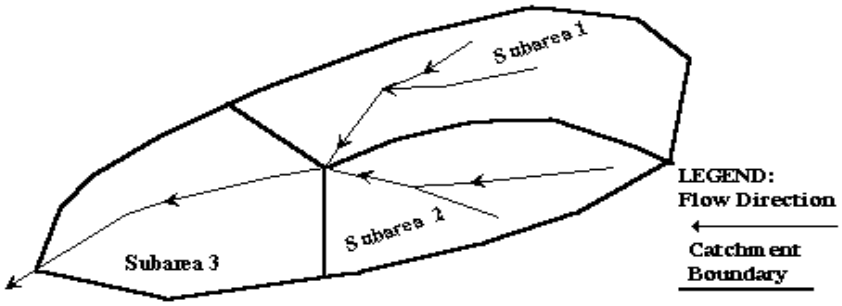
$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Disturbance Boundary - Historcial	12.66	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54	350			0.013	33.70	0			0.013	7	0.80	0.00	33.70	25.66	25.66	1.41	1.91	2.39	3.16	3.85	4.62	6.77	0.2	0.3	2.2	10.5	16.5	25.5	46.5
				0.01	0.01	0.05	0.17	0.23	0.32	0.44					33.77								33.77		33.77	1.20	1.62	2.03	2.69	3.27	3.93	5.76	0.1	0.2	1.2	5.7	9.5	15.9	32.1
ARC - Both	6.71	A	4.7	0.02	0.02	0.02	0.03	0.07	0.15	0.28	270			0.044	19.70	410			0.015	7	0.86	7.97	27.67	30.98	27.67	1.35	1.83	2.29	3.03	3.68	4.42	6.48	0.1	0.2	0.3	0.6	1.6	4.4	12.4
				0.02	0.02	0.03	0.03	0.07	0.15	0.28					19.57								27.54		27.54	1.36	1.83	2.29	3.03	3.69	4.44	6.50	0.2	0.3	0.4	0.7	1.6	4.4	12.4
ST1 - Construction	1.08	A	2.4	0.01	0.01	0.01	0.01	0.05	0.13	0.27	60			0.025	11.29	570			0.008	10	0.89	10.62	21.91	36.97	21.91	1.54	2.08	2.60	3.45	4.20	5.04	7.38	0.0	0.0	0.0	0.0	0.2	0.7	2.1
				0.01	0.01	0.01	0.01	0.05	0.13	0.27					11.28								21.91		21.91	1.54	2.08	2.61	3.45	4.20	5.04	7.38	0.0	0.0	0.0	0.1	0.2	0.7	2.1
ST2 - Construction	8.09	A	22.5	0.12	0.13	0.14	0.17	0.22	0.29	0.40	300			0.005	38.20	560			0.010	10	1.00	9.33	47.53	29.86	29.86	1.29	1.75	2.19	2.90	3.52	4.23	6.20	1.3	1.8	2.5	3.9	6.2	9.8	20.0
				0.13	0.14	0.18	0.27	0.33	0.40	0.50					37.55								46.89											1.4	2.0	3.2	6.2	9.3	13.6	25.1
ST3 - Construction	3.04	B	32.4	0.22	0.25	0.32	0.45	0.51	0.58	0.65	230			0.005	29.21	530			0.012	10	1.10	8.06	37.27	26.45	26.45	1.39	1.87	2.35	3.11	3.78	4.54	6.65	0.9	1.4	2.3	4.3	5.8	8.0	13.2
				0.23	0.26	0.32	0.45	0.51	0.58	0.65					29.08								37.14											1.0	1.5	2.3	4.3	5.8	8.0	13.2
Stormwater Storage - Production	5.41	B	17.7	0.11	0.13	0.20	0.36	0.43	0.51	0.60	500			0.008	42.14	200			0.008	7	0.63	5.32	47.47	26.24	26.24	1.39	1.88	2.36	3.12	3.80	4.56	6.68	0.8	1.3	2.5	6.1	8.8	12.5	21.7
				0.11	0.13	0.19	0.33	0.39	0.47	0.57					42.31								47.64		47.64	0.97	1.31	1.64	2.17	2.64	3.17	4.64	0.6	0.9	1.7	3.8	5.6	8.1	14.2

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Cells of this color are for calculated results based on overrides

Subcatchment Name
Disturbance Boundary - Historcial

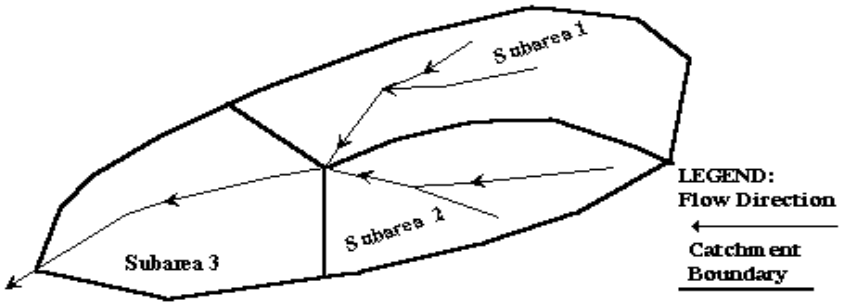
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	7.93	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
73	4.73	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**12.66**		**Area-Weighted C**	**0.01**	**0.01**	**0.05**	**0.17**	**0.23**	**0.32**	**0.44**
			Area-Weighted Override C	**0.01**	**0.01**	**0.05**	**0.17**	**0.23**	**0.32**	**0.44**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ARC - Both

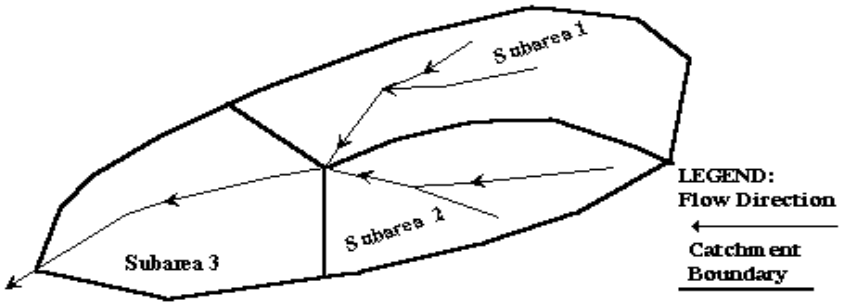
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
73	0.48	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
73	6.23	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**6.71**		**Area-Weighted C**	**0.02**	**0.02**	**0.03**	**0.03**	**0.07**	**0.15**	**0.28**
			Area-Weighted Override C	**0.02**	**0.02**	**0.03**	**0.03**	**0.07**	**0.15**	**0.28**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ST1 - Construction

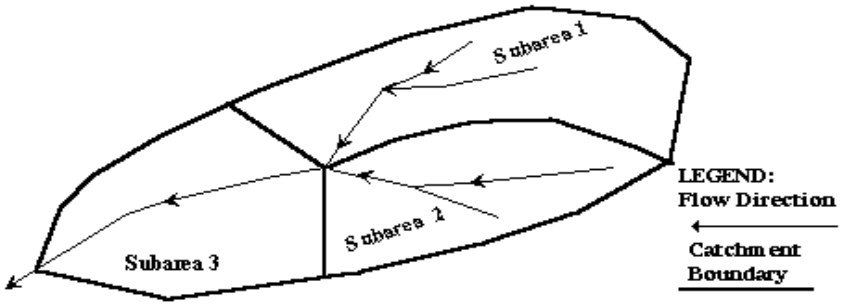
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
73	0.01	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
73	1.07	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**1.08**		**Area-Weighted C**	**0.01**	**0.01**	**0.01**	**0.01**	**0.05**	**0.13**	**0.27**
			Area-Weighted Override C	**0.01**	**0.01**	**0.01**	**0.01**	**0.05**	**0.13**	**0.27**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ST2 - Construction

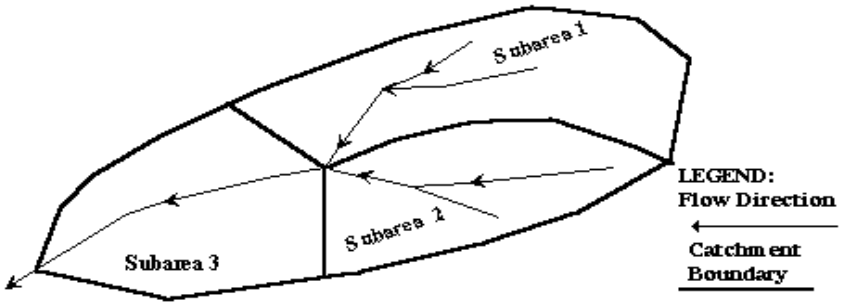
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	3.46	B	17.0	0.11	0.12	0.19	0.36	0.42	0.51	0.60
73	4.63	A	26.7	0.15	0.16	0.17	0.20	0.25	0.32	0.43
Total Area (ac)	**8.09**		**Area-Weighted C**	**0.13**	**0.14**	**0.18**	**0.27**	**0.33**	**0.40**	**0.50**
			Area-Weighted Override C	**0.13**	**0.14**	**0.18**	**0.27**	**0.33**	**0.40**	**0.50**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Cells of this color are for calculated results based on overrides

Subcatchment Name
ST3 - Construction

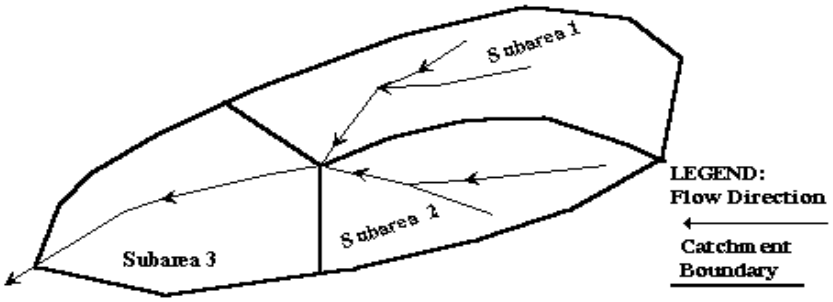
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	2.43	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
44	0.61	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	**3.04**		**Area-Weighted C**	**0.23**	**0.26**	**0.32**	**0.45**	**0.51**	**0.58**	**0.65**
			Area-Weighted Override C	**0.23**	**0.26**	**0.32**	**0.45**	**0.51**	**0.58**	**0.65**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

Subcatchment Name
Stormwater Storage - Production

See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	4.68	B	18.5	0.12	0.14	0.21	0.37	0.43	0.51	0.60
73	0.73	A	12.4	0.06	0.06	0.07	0.08	0.13	0.21	0.33
Total Area (ac)	**5.41**		**Area-Weighted C**	**0.11**	**0.13**	**0.19**	**0.33**	**0.39**	**0.47**	**0.57**
			Area-Weighted Override C	**0.11**	**0.13**	**0.19**	**0.33**	**0.39**	**0.47**	**0.57**

Appendix F:

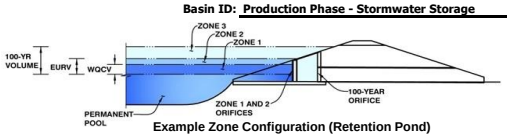
MHFD-Detention Spreadsheet Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Columbine 4-29HZ

Basin ID: Production Phase - Stormwater Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	5.41	acres
Watershed Length =	700	ft
Watershed Length to Centroid =	175	ft
Watershed Slope =	0.008	ft/ft
Watershed Imperviousness =	17.70%	percent
Percentage Hydrologic Soil Group A =	13.4%	percent
Percentage Hydrologic Soil Group B =	86.6%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.048	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.093	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.039	acre-feet	0.822	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	0.068	acre-feet	1.11	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.134	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.343	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	0.508	acre-feet	2.24	inches
100-yr Runoff Volume (P1 = 2.69 in.) =	0.735	acre-feet	2.69	inches
500-yr Runoff Volume (P1 = 3.94 in.) =	1.295	acre-feet	3.94	inches
Approximate 2-yr Detention Volume =	0.043	acre-feet		
Approximate 5-yr Detention Volume =	0.068	acre-feet		
Approximate 10-yr Detention Volume =	0.119	acre-feet		
Approximate 25-yr Detention Volume =	0.175	acre-feet		
Approximate 50-yr Detention Volume =	0.203	acre-feet		
Approximate 100-yr Detention Volume =	0.273	acre-feet		

Define Zones and Basin Geometry

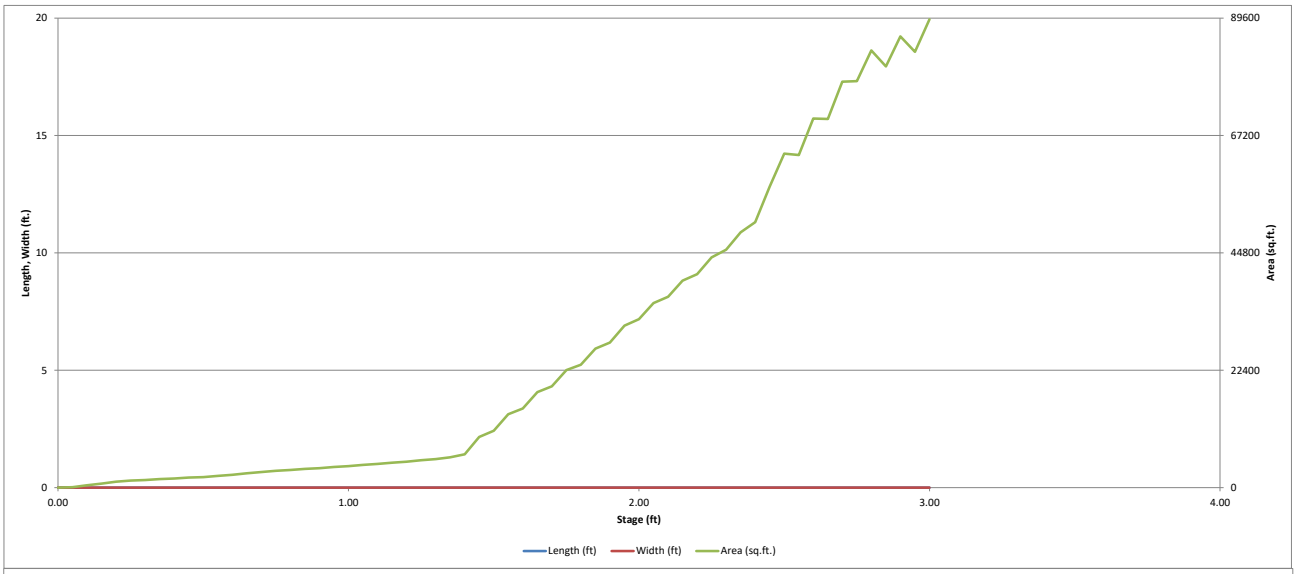
Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

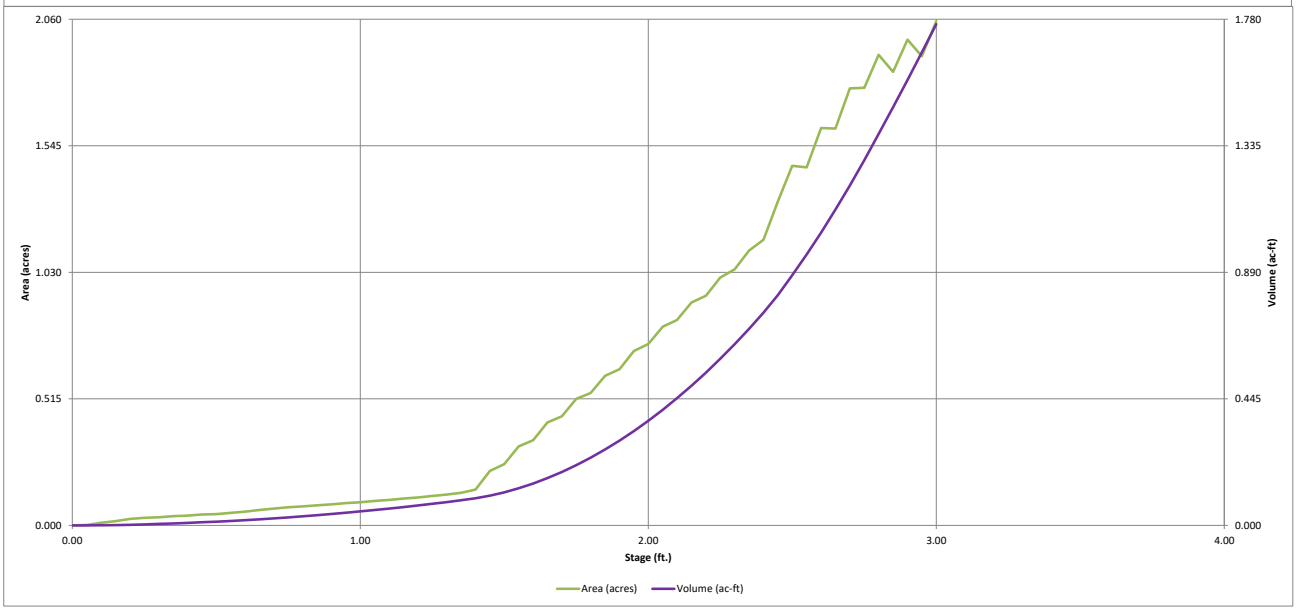
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	79	0.002	2	0.000
	--	0.10	--	--	--	464	0.011	15	0.000
	--	0.15	--	--	--	768	0.018	46	0.001
	--	0.20	--	--	--	1,143	0.026	94	0.002
	--	0.25	--	--	--	1,352	0.031	156	0.004
	--	0.30	--	--	--	1,446	0.033	226	0.005
	--	0.35	--	--	--	1,640	0.038	303	0.007
	--	0.40	--	--	--	1,743	0.040	388	0.009
	--	0.45	--	--	--	1,916	0.044	480	0.011
	--	0.50	--	--	--	1,993	0.046	577	0.013
	--	0.55	--	--	--	2,229	0.051	683	0.016
	--	0.60	--	--	--	2,446	0.056	800	0.018
	--	0.65	--	--	--	2,743	0.063	929	0.021
	--	0.70	--	--	--	2,986	0.069	1,073	0.025
	--	0.75	--	--	--	3,216	0.074	1,228	0.028
	--	0.80	--	--	--	3,358	0.077	1,392	0.032
	--	0.85	--	--	--	3,569	0.082	1,565	0.036
	--	0.90	--	--	--	3,721	0.085	1,747	0.040
	--	0.95	--	--	--	3,942	0.090	1,939	0.045
	--	1.00	--	--	--	4,104	0.094	2,140	0.049
	--	1.05	--	--	--	4,335	0.100	2,351	0.054
	--	1.10	--	--	--	4,512	0.104	2,572	0.059
	--	1.15	--	--	--	4,761	0.109	2,804	0.064
	--	1.20	--	--	--	4,957	0.114	3,047	0.070
	--	1.25	--	--	--	5,225	0.120	3,302	0.076
	--	1.30	--	--	--	5,453	0.125	3,569	0.082
	--	1.35	--	--	--	5,790	0.133	3,850	0.088
Edge of Facility	--	1.40	--	--	--	6,351	0.146	4,153	0.095
	--	1.45	--	--	--	9,663	0.222	4,553	0.105
	--	1.50	--	--	--	10,845	0.249	5,066	0.116
	--	1.55	--	--	--	14,001	0.321	5,687	0.131
	--	1.60	--	--	--	15,101	0.347	6,415	0.147
	--	1.65	--	--	--	18,245	0.419	7,248	0.166
	--	1.70	--	--	--	19,342	0.444	8,188	0.188
	--	1.75	--	--	--	22,442	0.515	9,233	0.212
	--	1.80	--	--	--	23,456	0.538	10,380	0.238
	--	1.85	--	--	--	26,521	0.609	11,629	0.267
	--	1.90	--	--	--	27,686	0.636	12,985	0.298
	--	1.95	--	--	--	30,905	0.709	14,449	0.332
	--	2.00	--	--	--	32,141	0.738	16,025	0.368
	--	2.05	--	--	--	35,221	0.809	17,709	0.407
	--	2.10	--	--	--	36,428	0.836	19,501	0.448
	--	2.15	--	--	--	39,510	0.907	21,399	0.491
	--	2.20	--	--	--	40,725	0.935	23,405	0.537
	--	2.25	--	--	--	43,942	1.009	25,522	0.586
	--	2.30	--	--	--	45,404	1.042	27,755	0.637
	--	2.35	--	--	--	48,711	1.118	30,108	0.691
	--	2.40	--	--	--	50,655	1.163	32,592	0.748
	--	2.45	--	--	--	57,447	1.319	35,295	0.810
	--	2.50	--	--	--	63,731	1.463	38,324	0.880
	--	2.55	--	--	--	63,477	1.457	41,504	0.953
	--	2.60	--	--	--	70,441	1.617	44,852	1.030
	--	2.65	--	--	--	70,357	1.615	48,372	1.110
	--	2.70	--	--	--	77,466	1.778	52,068	1.195
	--	2.75	--	--	--	77,573	1.781	55,944	1.284
	--	2.80	--	--	--	83,441	1.916	59,969	1.377
	--	2.85	--	--	--	80,401	1.846	64,065	1.471
	--	2.90	--	--	--	86,117	1.977	68,228	1.566
	--	2.95	--	--	--	83,186	1.910	72,461	1.663
	--	3.00	--	--	--	89,373	2.052	76,774	1.762

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



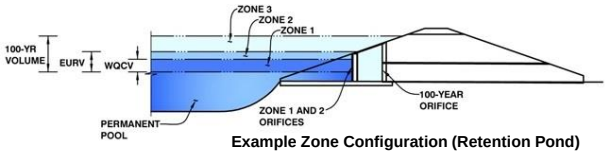


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: **Columbine 4-29HZ**

Basin ID: **Production Phase - Stormwater Storage**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1	#N/A		Orifice Plate
Zone 2			Weir (No Pipe)
Zone 3			
Total (all zones)			

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.75						
Orifice Area (sq. inches)	0.442	3.142						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.50		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	4.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	2.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	8.00	feet	Stage at Top of Freeboard =	3.00	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.05	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	1.76	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

Calculated Parameters for Spillway

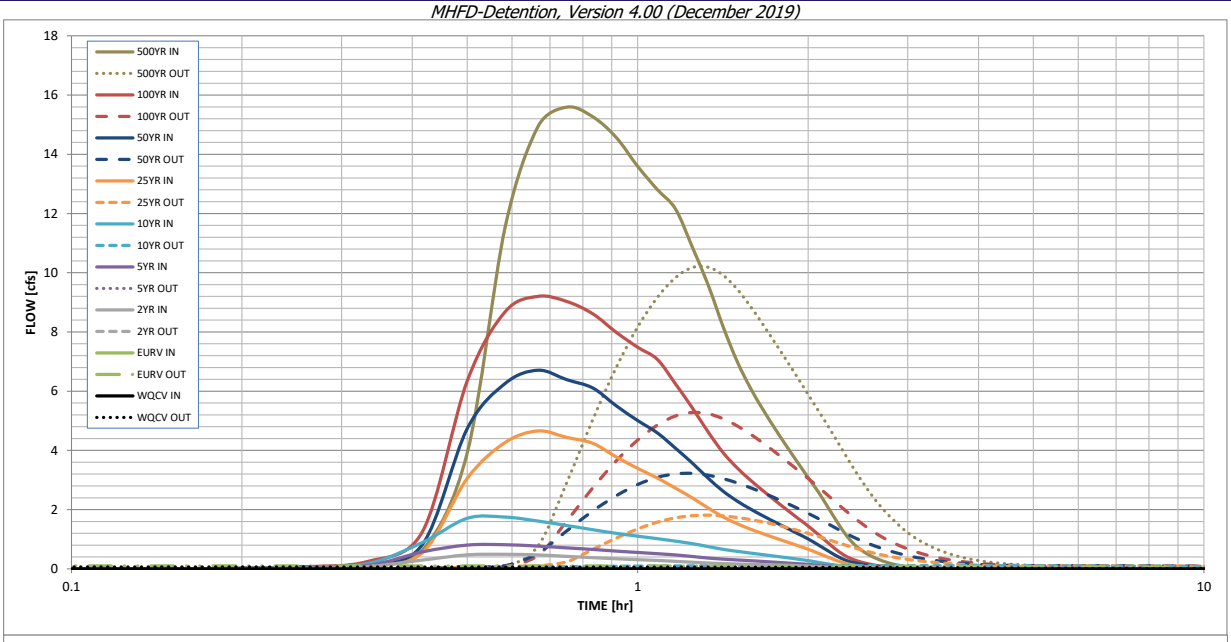
Routed Hydrograph Results

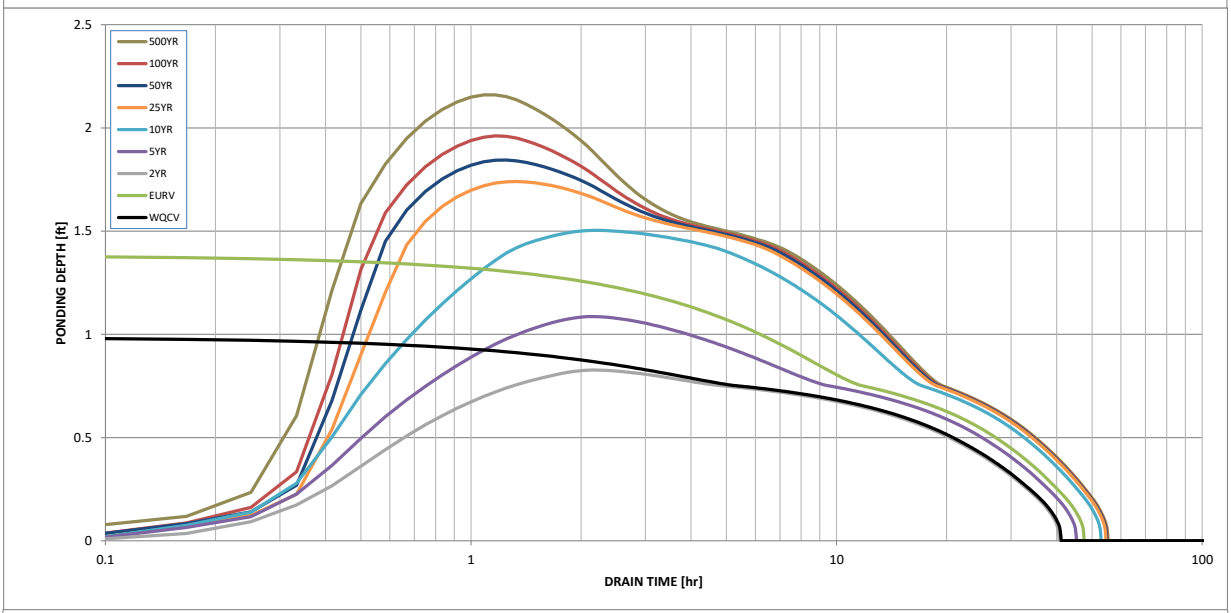
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

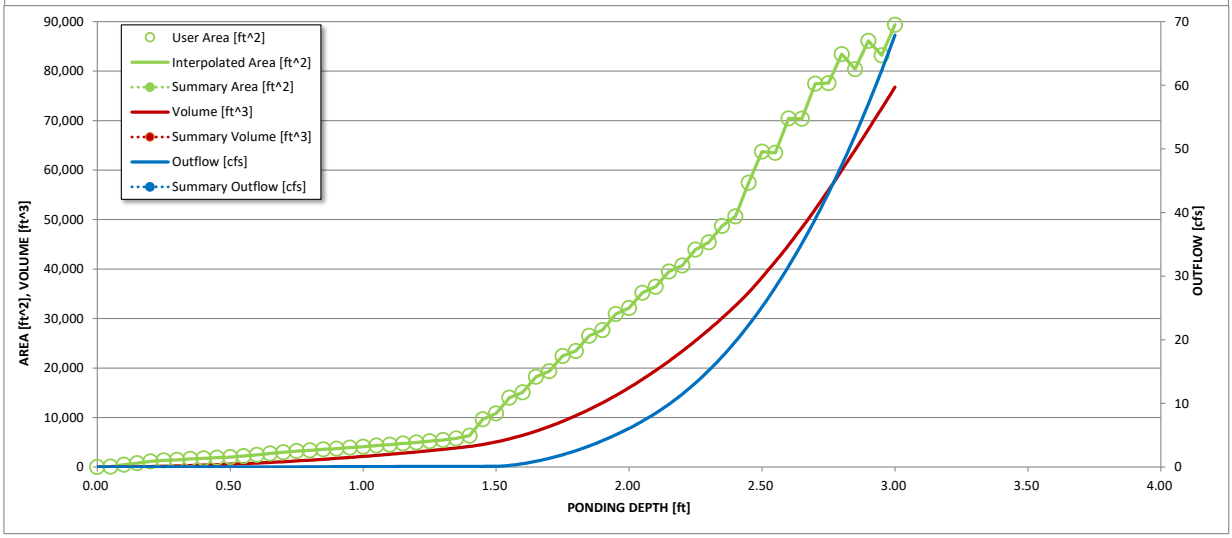
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.11	1.39	1.84	2.24	2.69	3.94
CUHP Runoff Volume (acre-ft) =	0.048	0.093	0.039	0.068	0.134	0.343	0.508	0.735	1.295
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.039	0.068	0.134	0.343	0.508	0.735	1.295
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.9	3.7	5.7	8.1	14.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.02	0.17	0.69	1.05	1.50	2.63
Peak Inflow Q (cfs) =	N/A	N/A	0.5	0.8	1.7	4.7	6.7	9.2	15.6
Peak Outflow Q (cfs) =	0.1	0.1	0.0	0.08	0.1	1.8	3.2	5.3	10.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.9	0.1	0.5	0.6	0.7	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	42	38	41	45	38	32	25	16
Time to Drain 99% of Inflow Volume (hours) =	**40**	45	40	43	50	48	45	42	35
Maximum Ponding Depth (ft) =	0.99	1.39	0.83	1.09	1.50	1.74	1.84	1.96	2.16
Area at Maximum Ponding Depth (acres) =	0.09	0.14	0.08	0.10	0.25	0.50	0.59	0.72	0.91
Maximum Volume Stored (acre-ft) =	0.048	0.094	0.034	0.057	0.116	0.207	0.261	0.339	0.500

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Appendix G:

Pipe Buoyancy Calculations

Buoyancy Calculations for Outlet Pipes
10" HDPE Pipe

$Ww = (\pi \div 4)*(Bc^2)*\gamma$

0.90 Bc = outside pipe diameter (feet)
62.42 γ = unit weight of fresh water (pounds per cubic foot)

39.71 Ww = weight of displaced water (pounds per linear foot)

$Wt = Ww - Wp$

4.73 Wp = weight of pipe (pounds per linear foot)

34.98 Wt = resultant buoyant force of the submerged pipe (pounds per linear foot)

$Hi = (FS*Wt \div Wi*Bc) - (0.1073*Bc)$

68.0 Wi = average unit weight of inundated backfill (pounds per cubic foot)
1.5 FS = factor of safety

0.76 Hi = minimum depth of inundated backfill required above top of pipe (feet)

INPUT
CALCULATED
** Assumes all backfill is inundated*
** Does not account for added weight from anti-seep collars*

Appendix H:

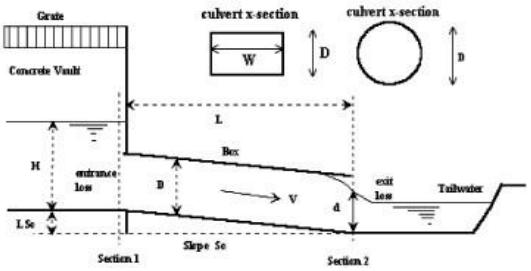
MHFD-Culvert Spreadsheet Calculations for Culvert Design

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: Columbine 4-29HZ

ID: Access Road Culvert (ARC)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	15	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	5002.7	ft
	Outlet Elevation **OR** Slope	Elev OUT =	5002.3	ft
	Culvert Length	L =	35	ft
	Manning's Roughness	n =	0.024	**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	2.76
Sum of All Loss Coefficients	K_s =	3.96
Minimum Energy Condition Coefficient	KE_{low} =	0.0400
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

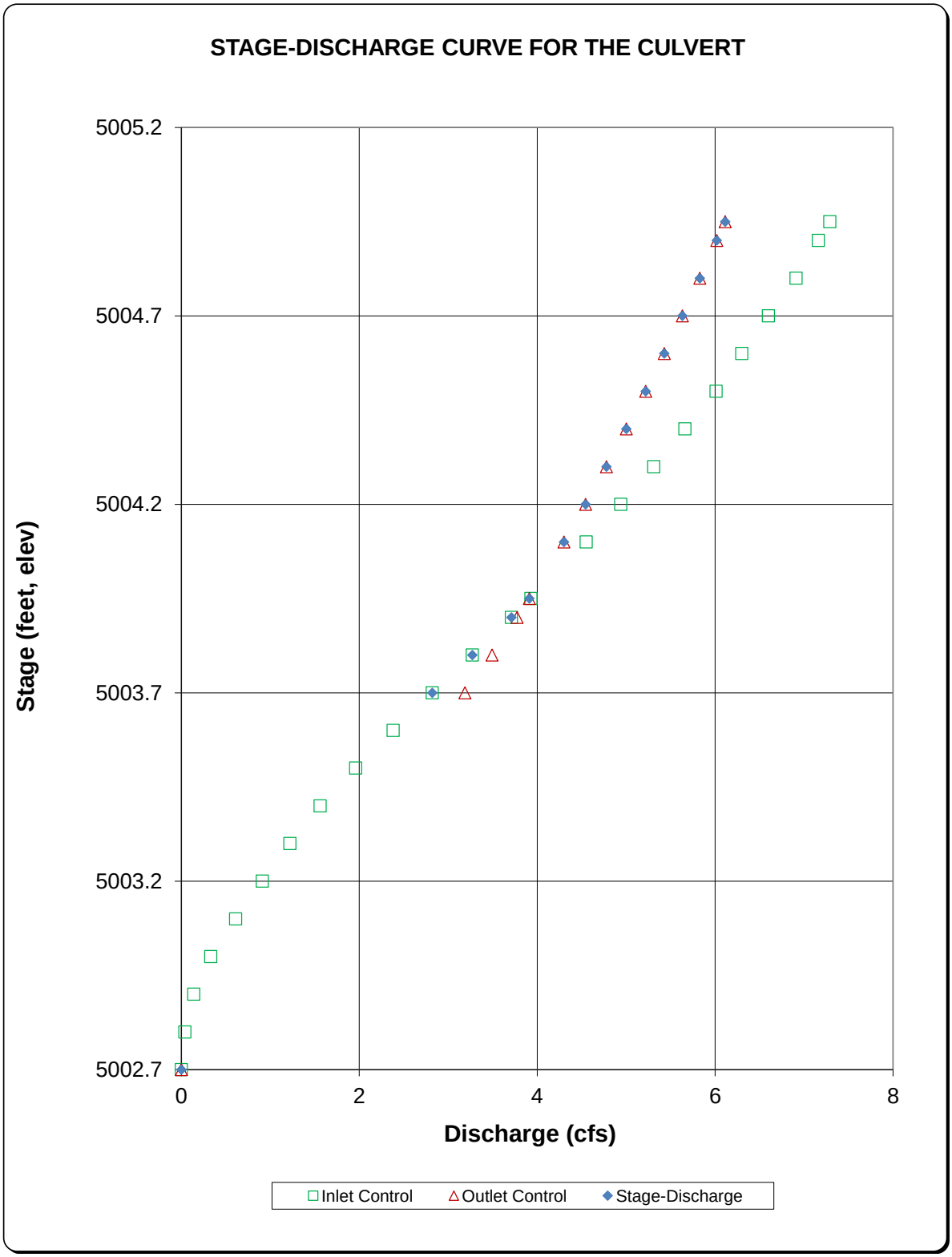
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
5002.70		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
5002.80		Min. Energy. Eqn.	0.04	#N/A	#N/A	#N/A
5002.90		Min. Energy. Eqn.	0.14	#N/A	#N/A	#N/A
5003.00		Min. Energy. Eqn.	0.33	#N/A	#N/A	#N/A
5003.10		Min. Energy. Eqn.	0.61	#N/A	#N/A	#N/A
5003.20		Min. Energy. Eqn.	0.91	#N/A	#N/A	#N/A
5003.30		Min. Energy. Eqn.	1.22	#N/A	#N/A	#N/A
5003.40		Regression Eqn.	1.56	#N/A	#N/A	#N/A
5003.50		Regression Eqn.	1.96	#N/A	#N/A	#N/A
5003.60		Regression Eqn.	2.38	#N/A	#N/A	#N/A
5003.70		Regression Eqn.	2.82	3.19	**2.82**	INLET
5003.80		Regression Eqn.	3.27	3.49	**3.27**	INLET
5003.90		Regression Eqn.	3.71	3.77	**3.71**	INLET
5003.95		Regression Eqn.	3.93	3.91	**3.91**	OUTLET
5004.10		Regression Eqn.	4.55	4.30	**4.30**	OUTLET
5004.20		Regression Eqn.	4.94	4.54	**4.54**	OUTLET
5004.30		Regression Eqn.	5.31	4.78	**4.78**	OUTLET
5004.40		Regression Eqn.	5.66	5.00	**5.00**	OUTLET
5004.50		Regression Eqn.	6.01	5.22	**5.22**	OUTLET
5004.60		Regression Eqn.	6.30	5.43	**5.43**	OUTLET
5004.70		Regression Eqn.	6.60	5.63	**5.63**	OUTLET
5004.80		Regression Eqn.	6.91	5.83	**5.83**	OUTLET
5004.90		Regression Eqn.	7.16	6.02	**6.02**	OUTLET
5004.95		Regression Eqn.	7.29	6.11	**6.11**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: **Columbine 4-29HZ**

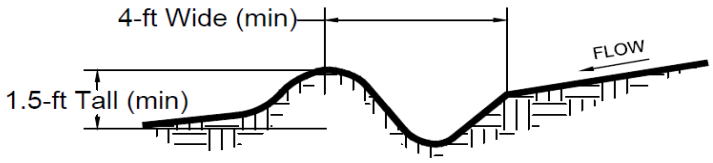
ID: **Access Road Culvert (ARC)**



Appendix I:

Conveyance Calculations for Diversion Ditch Design

Temporary Diversion Ditch Design (Typical)



INSTALLATION NOTES:

1. DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.
2. ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.
3. BERM HEIGHT SHALL BE A MINIMUM OF 18"
4. TEMPORARY DIVERSION SWALE SIDE SLOPES SHALL BE ~2:1 OR FLATTER

Estimated Capacity of Temporary Diversion Ditch Design (Typical)

Depth of 1ft*

n=	0.022	
A=	2	ft^2
P=	4.5	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 5.6 cfs

Calculated V= 2.8 fps

Depth of 1.5ft*

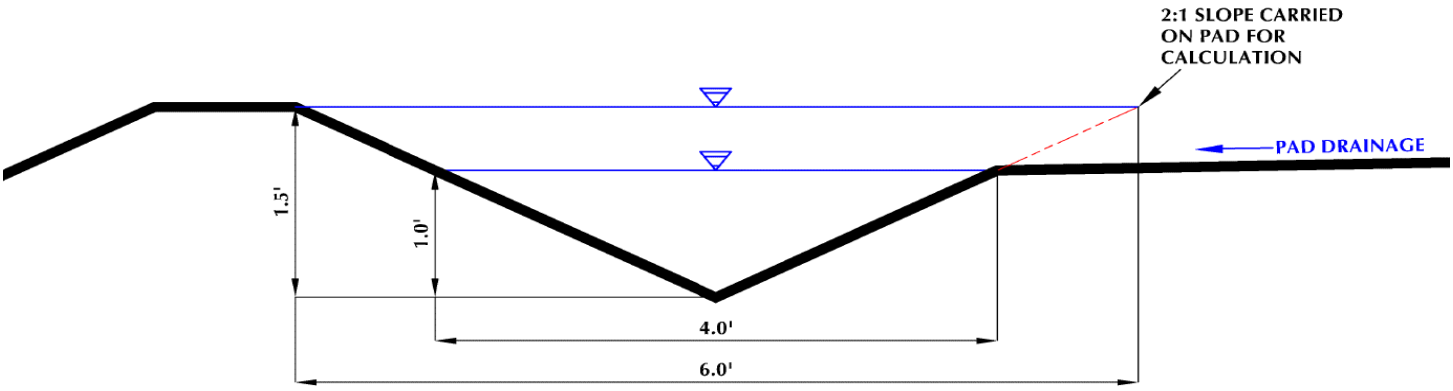
n=	0.022	
A=	4.5	ft^2
P=	6.7	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 16.5 cfs

Calculated V= 3.7 fps

* channel shape simplified to triangular geometry for conservative calculations



Appendix J:

Sediment Trap Sizing Calculations

Sediment Trap Sizing Calculations

Outlet	Ditch Length			Approximate Pad Fill Height				Minimum Design Area, ft^2	Recommended Design Size
	Total, ft	Along Fill and Soil Piles, ft	Used for Sizing, ft	Top of Pad Fill, ft NAVD 88	Sediment Trap Invert, ft NAVD 88	Calculated Pad Fill Height, ft	Used for Sizing, ft		
ST1	790	790	**800**	5006.5	5002.6	3.9	**4**	200	15'x15' (225 ft^2)
ST2	1,040	565	**600**	5001.9	4997.1	4.8	**6**	230	20'x15' (300 ft^2)
ST3	990	140	**200**	5002.0	5000.2	1.8	**2**	100	15'x15' (225 ft^2)

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Section 6

Stormwater Management Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Stormwater Management Plan

Columbine 4-29HZ Well Pad and Facility
NENW Sec 29, T2N, R67W

Firestone, Colorado

Revised October 2021

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APPENDICES

APPENDIX A CDPS STORMWATER GENERAL PERMIT CERTIFICATION
APPENDIX B GRADING PLAN(S) AND DRAINAGE REPORT
APPENDIX C CONTROL MEASURE / BMP SPECIFICATIONS

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has prepared this site-specific Stormwater Management Plan (SWMP) for construction activities in Weld County, Colorado. The SWMP is intended to ensure construction activities adhere to good engineering, hydrologic, and pollution control practices, and to ensure erosion, sediment and stormwater control measures are selected, installed, implemented, and maintained to protect state waters, and minimize site erosion or degradation. This facility is a part of Kerr-McGee's Area 2 operations and is covered under CDPS Permit COR402541.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	Columbine 4-29HZ Well Pad and Facility
Location:	Sec 29, T2N, R67W / Firestone, Colorado
Total Area of Project:	12.66 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is seasonal winter wheat; primary land use is agriculture.
Percentage of Existing Vegetation Cover:	Vegetative cover on the subject location is 100%, with exception to seasonal planting/harvest and crop rotation. Method for determination: National Resource Conversation Service (NRCS) soil survey data, and on-site assessment at the time of pit excavation for planning and permitting purposes.
Soil Type(s):	44 - Olney loamy sand, 1-3% slopes 73 - Vona loamy sand, 3-5% slopes
Primary Receiving Water:	Unnamed freshwater emergent wetland approximately 0.11 miles northeast of location.
Operator ID:	47120
CDPS Permit:	COR402541
Stormwater Manager:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation Office: (720) 929-6317
SWMP Administrator & Inspector:	Austin Lee, HSE Advisor Occidental Petroleum Corporation Office: (605) 920-0675
Emergency Contact:	Name: Integrated Operation Center (IOC) Office: (970) 506-5980

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

☒ Delineation of Disturbance Limits	☒ Access Road Construction	☒ Perimeter /Control Measures Installation	☒ Grading, stripping, excavation, earthwork	☒ Well drilling & Completions
☒ Facility Construction	☒ Pipeline & Flowline Installation	☒ Disturbance Reduction	☒ Interim & Final Reclamation	☒ Return to Agriculture

All construction and development shall be in accordance with the Colorado Department of Public Health and Environment's CDPS General Permit for Stormwater Discharges Associated with Construction Activity, and the Colorado Oil and Gas Conservation Commission (COGCC) 304.c.15 and 1002.f rules and requirements.

4.0 POTENTIAL POLLUTANT SOURCES

Potential pollution sources shall be placed within the project construction boundary, designated staging area(s), working surface, contained by general or sized secondary containment, and stormwater perimeter controls. Anticipated pollution sources which will be managed by appropriate BMP fact sheets or operational best management standard operating procedures include, but are not limited to:

☒ Disturbed and stored soils	☒ Vehicle/equipment maintenance and fueling	☐ Non-industrial waste
☒ Vehicle tracking of sediments	☒ Dust generating processes	☒ Potential Spills
☐ Management of contaminated soils	☒ Routine maintenance activities	☐ Spill prevention and response
☒ Loading/unloading ops	☒ On-site waste management	
☒ Outdoor storage activities	☐ Concrete truck washing	

No dedicated concrete or asphalt batch plants will be at the project location. Safety Data Sheets (SDS) for materials to be used are maintained by Kerr-McGee. Pollutants shall be managed in accordance with waste regulations administered by COGCC 900 series rules.

5.0 STORMWATER, EROSION & SEDIMENT CONTROL MEASURES / BMPS

Measures for stormwater, erosion and sediment control will be accomplished through a combination of construction techniques, structural and non-structural controls, vegetation and re-vegetation, administrative controls and good housekeeping practices. Control measures will be implemented and adjusted with changing site conditions, as well as phases of construction. All control measures deployed throughout construction, shall be identified on site specific stormwater management plan as-built maps.

The following list of control measures will be implemented during all phases of construction on the Project. Installation and detail specifications can be found in Appendix C:

BMP / Control Measure	Intended Use/Purpose	Installation Timing	Removal Timing
Limits of Construction (LOC)	*To establish a perimeter for which construction activities are managed within.*	Prior to construction	Interim / Final Reclamation
Vehicle Tracking Controls (VOC)	*Provide a stabilized construction site access to reduce off-site tracking.*	Prior to construction	Interim Reclamation
Diversion Ditch (DD)	*To divert and effectively manage run-on/run-off from the project.*	Prior to Construction	Interim Reclamation
Sediment Control Log (SCL)	*Provide a sediment barrier to intercept sheet flow run-off from disturbed areas, or as a perimeter control.*	During Construction	Interim Reclamation
Check Dams (CD)	*Slow the velocity of concentrated flow, thus reducing erosion.*	During Construction	Interim Reclamation
Sediment Basin (SB)	*Collect stormwater and provide detention and settling time of stormwater run-off.*	During Construction	Interim Reclamation or As Permitted
Culverts (C)	*Divert water under a crossing, or to direct flow to a designated point.*	During Construction	Interim Reclamation
Inlet Protection (IP)	*Reduce erosion and sediment loading into a designated culvert or inlet.*	During Construction	Interim Reclamation
Outlet Protection (OP)	*Reduce velocity and erosion from a designated culvert or outlet.*	During Construction	Interim Reclamation
Seed & Mulch (SM)	*Stabilize disturbed areas no longer in use or intended for construction and development (including stockpiles)*	Construction and Interim Reclamation	N/A

6.0 MATERIALS HANDLING AND SPILL PREVENTION

Discharges of hazardous substances or oil resulting from spills or construction operations are not authorized under the Construction General Permit or this plan. Spills or leaks will be managed by Kerr-McGee personnel or their designee, and according to the Kerr-McGee *Wattenberg Field, Colorado Spill Prevention, Control and Countermeasure (SPCC)* Plan. Kerr-McGee personnel and designees are trained to prevent, mitigate, evaluate, and respond to spills and releases. In the event of a spill, notify the Stormwater Manager, after taking emergency and internal procedures for notification. Depending on the nature of the spill and material involved, the Colorado Department of Public Health and Environment 24-hour spill reporting line (877-518-5608) will be contacted and/or downstream water users notified, as necessary.

7.0 NON-STORMWATER DISCHARGES

Sources of non-stormwater discharges include emergency fire-fighting activities or a fire hydrant, uncontaminated springs which do not originate from an area of land disturbance, and construction dewatering. In the event of construction dewatering, control measures shall be implemented and Low Risk Discharge Guidance for Uncontaminated Groundwater to Land (WQP27) shall be followed.

8.0 FINAL STABILIZATION

All soil horizons segregated for the purpose of construction shall be replaced to their original relative positions and contour for reclamation and final stabilization. Following topsoil re-distribution, the reclamation area shall be cross ripped to alleviate compaction. Soil amendments will be determined and applied as necessary, and incorporated by disking, harrowing or cultiplacking during seedbed preparation.

Seed used for reclamation will be determined based on Surface Owner consultation, and consider soil type, land use, and adjacent reference area(s) vegetation. The approved seed mix, in combination with certified weed-free mulch, shall be installed when seasonal or weather conditions are most favorable to take advantage of moisture, such as early spring or late fall, and never during windy or frozen conditions.

The Colorado Department of Health and Environment (CDPHE) defines final stabilization as, “finally stabilized means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, and the vegetation cover is capable of providing erosion control equivalent to pre-existing conditions, or equivalent permanent, physical erosion reduction methods have been employed.” Stabilized unpaved surfaces, such as gravel access roads or working surfaces, necessary for the operation of the facility or nearby facilities, also qualifies as “final stabilized”.

9.0 POST-CONSTRUCTION STORMWATER

Following final stabilization, and pursuant of COGCC rule 1002.f and rule 1004, BMPs shall be maintained under Kerr-McGee’s Post-Construction Stormwater Program, and evaluated for Tier 1 / Non-Tier 1 status as applicable and per COGCC 100 series definitions, until the facility is abandoned, and final reclamation is achieved.

10.0 INSPECTION AND MAINTENANCE PROCEDURES

10.1 Inspections

Inspections will be conducted to document the status of construction activities, stormwater control measure placement, maintenance needs, and effectiveness, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Stormwater Manager and SWMP Administrator and conducted by their designated representative(s). Inspection forms will document non-compliance conditions, including any release of sediment or other contaminants, additional control measures that are needed, or repair and maintenance work orders.

During construction, inspections shall be conducted every 14 days, and after a major precipitation or melt event, which has the potential to cause surface runoff.

For sites earthwork and construction is completed, but final stabilization is not achieved due to vegetative cover, inspections shall be conducted every 30 days and exclude precipitation or melt event response. Inspections will continue until all reclaimed areas have achieved a cover of 70% the pre-construction reference vegetation (i.e. final stabilization).

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection. All inspection records are stored for a minimum of three years after the location has achieved final stabilization.

10.2 Maintenance

For maintenance items discovered at active construction locations, action and documentation towards completing repairs identified at the time of inspection, shall be made within 24 hours of discovery.

Maintenance items discovered post-construction will be documented and coordinate with production personnel.

Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for actions requiring ground disturbance / earthwork.

APPENDIX A

CDPS STORMWATER GENERAL PERMIT CERTIFICATION

COLORADO
Department of Public Health & Environment

CERTIFICATION TO DISCHARGE
UNDER
CDPS GENERAL PERMIT COR400000
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

Certification Number: **COR402541**

This Certification to Discharge specifically authorizes:

Owner Kerr McGee Oil and Gas Onshore LP
Operator Kerr McGee Oil and Gas Onshore LP

to discharge stormwater from the facility identified as

Kerr Area 2

To the waters of the State of Colorado, including, but not limited to:

to Boulder Creek to South Platte River

Facility Activity :	Oil & Gas Field Development
Disturbed Acres:	>5 acres
Facility Located at:	See Map in File Denver & Boulder & Broomfield CO 80229 Adams County Latitude 40.081 Longitude -104.717000
Specific Information (if applicable):	

Certification is issued 4/1/2019

Certification is effective 4/1/2019

Expiration date of general permit : 3/31/2024

This certification under the permit requires that specific actions be performed at designated times. The certification holder is legally obligated to comply with all terms and conditions of the permit.

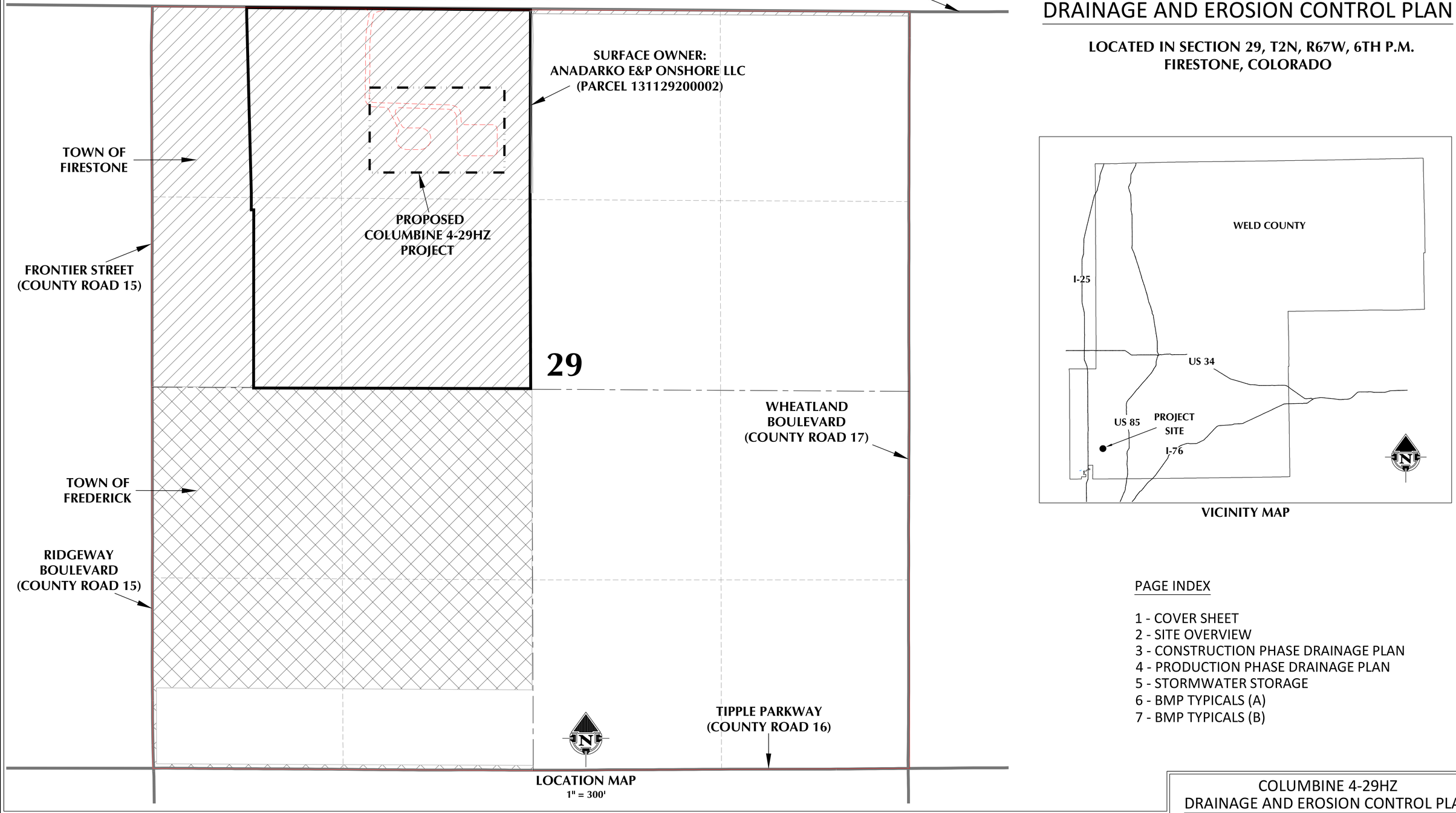
This certification was approved by:
Meg Parish, Unit Manager
Permits Section
Water Quality Control Division

APPENDIX B

GRADING PLANS AND DRAINAGE REPORT

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'

VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - STORMWATER STORAGE
6 - BMP TYPICALS (A)
7 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

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Kerr-McGee Oil & Gas Onshore L.P.
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Denver, Colorado 80202

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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ACCESS ROAD CULVERT (ARC)

COUNTY ROAD 18

PROPOSED FIRE HYDRANT

PROPOSED PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD (TO BE IMPROVED)

EXISTING PRIVATE ROAD

EXISTING CULVERT

PROPOSED COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

COUNTY ROAD 15

WELD COUNTY

FIRESTONE
WELD COUNTY

FIRESTONE
FREDERICK

5000 5010 5020 5030 4990

N

0 150' 300'

1" = 150'

5' CONTOURS

LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- EXISTING WATER LINE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

15' X 15' X 3' SEDIMENT TRAP (ST1)

EXISTING PRIVATE ROAD

EXISTING CULVERT

TOPSOIL STOCKPILE

COLUMBINE 4-29HZ WELL PAD

FLAT GRADED ELEVATION = 5002.0'

COLUMBINE 4-29HZ FACILITY

TEMPORARY EQUIPMENT AREA

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

20' X 15' X 3' SEDIMENT TRAP (ST2)

15' X 15' X 3' SEDIMENT TRAP (ST3)

PAD TRENCH

0.8% DITCH SLOPE

1.0% DITCH SLOPE

1.5% DITCH SLOPE

0.9% DITCH SLOPE

1.2% DITCH SLOPE

0.5% DITCH SLOPE

0.5% SLOPE

0.4% SLOPE

0.6% SLOPE

CUT

FILL

5000

5005

5010

5015

5020

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EPL EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- SP PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 50'	PAGE:	3 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD

EXISTING CULVERT

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

OFF-SITE FLOW DEFLECTION

OUTLET PIPE

COLUMBINE 4-29HZ FACILITY

COLUMBINE 4-29HZ WELL PAD

WELL ELEVATION = 5002.0'

0.2% SLOPE

0.2% SLOPE

CUT

FILL

0.4% SLOPE

0.6% SLOPE

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

WEIR & SPILLWAY

STORAGE BERM

STORAGE DITCH ALONG PAD TOE

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

5020

5015

5010

5005

5000

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

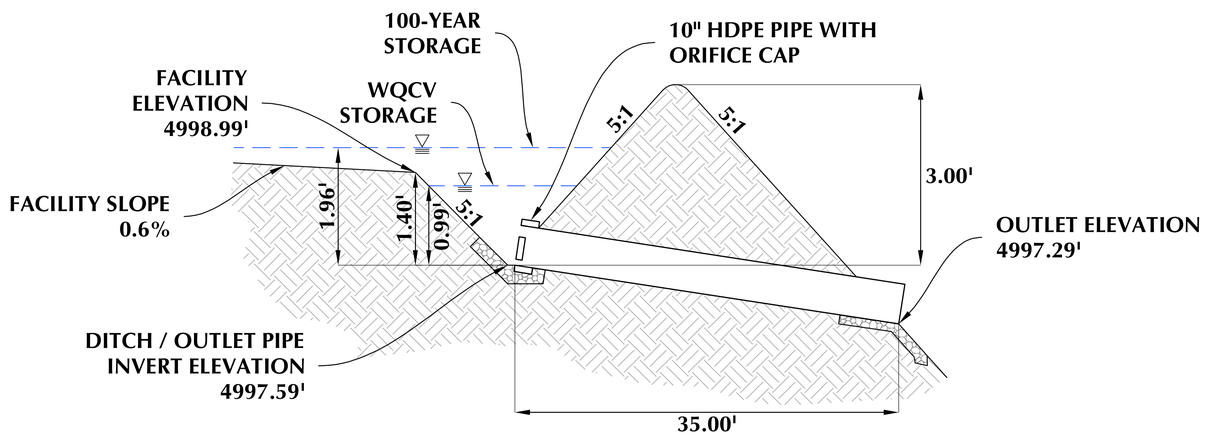
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STORAGE BERM & DITCH - PRODUCTION PHASE

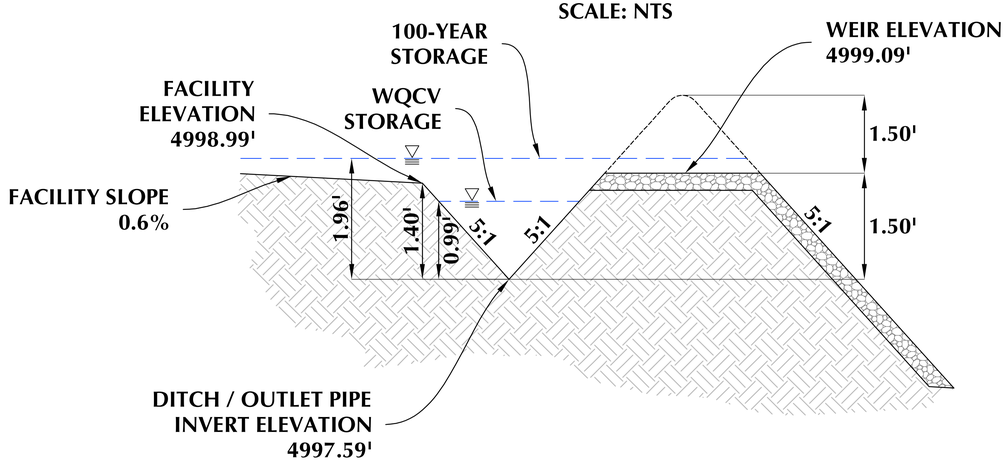
OUTLET PROFILE

SCALE: NTS



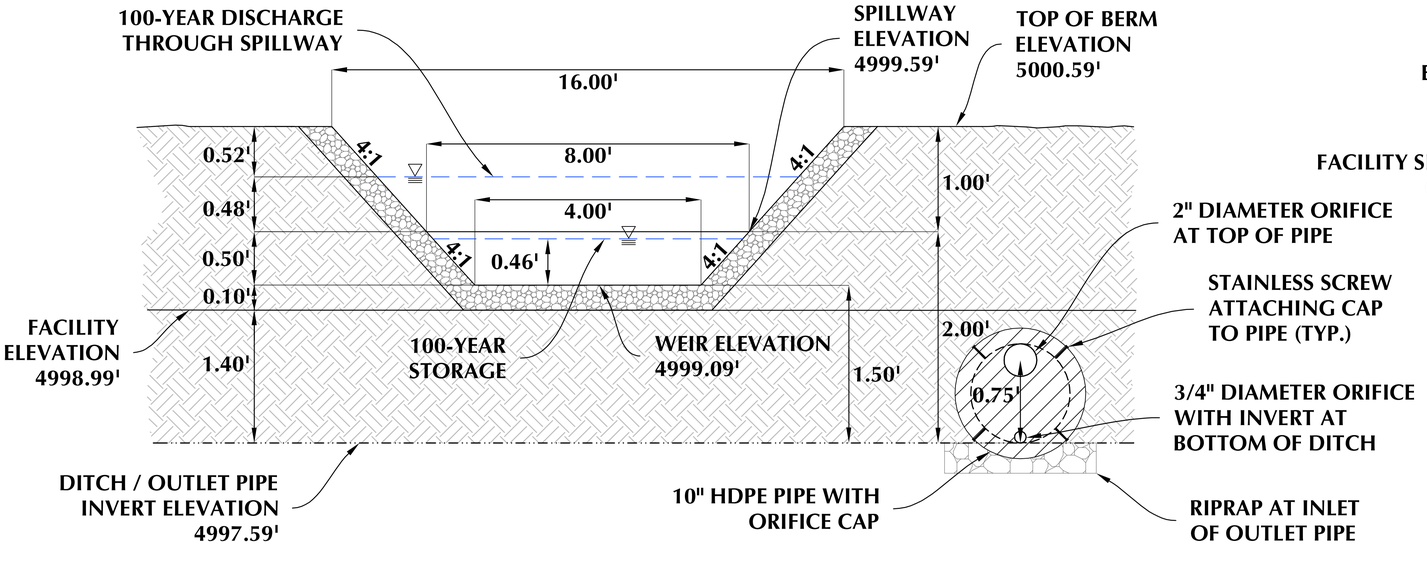
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SCALE: NTS



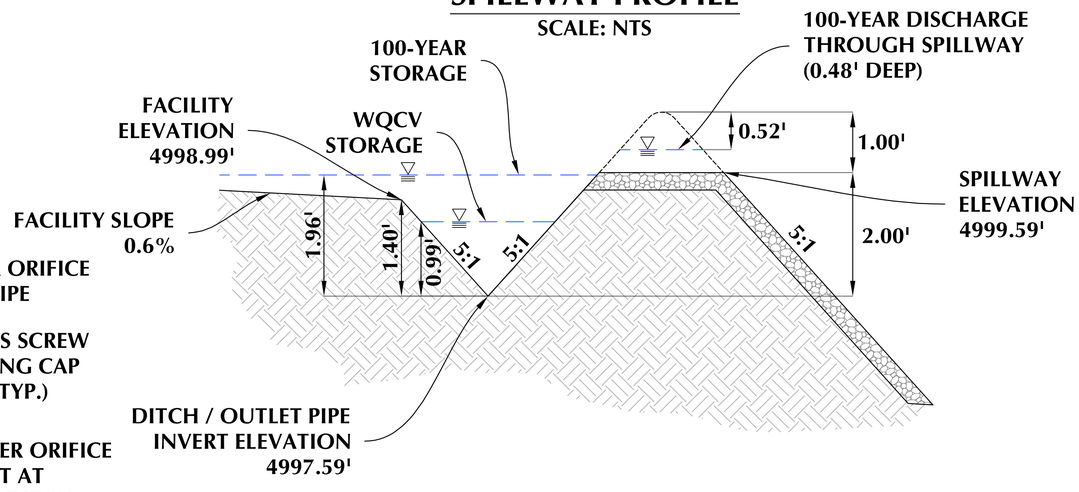
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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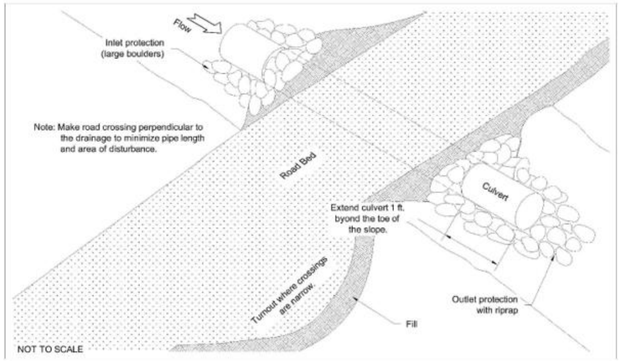
Kerr-McGee Oil & Gas Onshore L.P.
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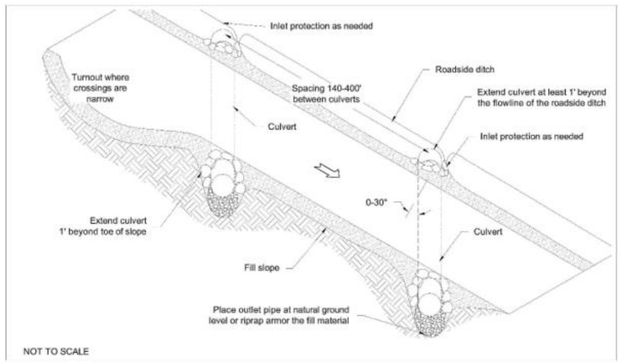
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
STORMWATER STORAGE

SCALE:	VARIES	PAGE:	5 OF 7
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DRAFTED BY:	HJL	REVISED:	

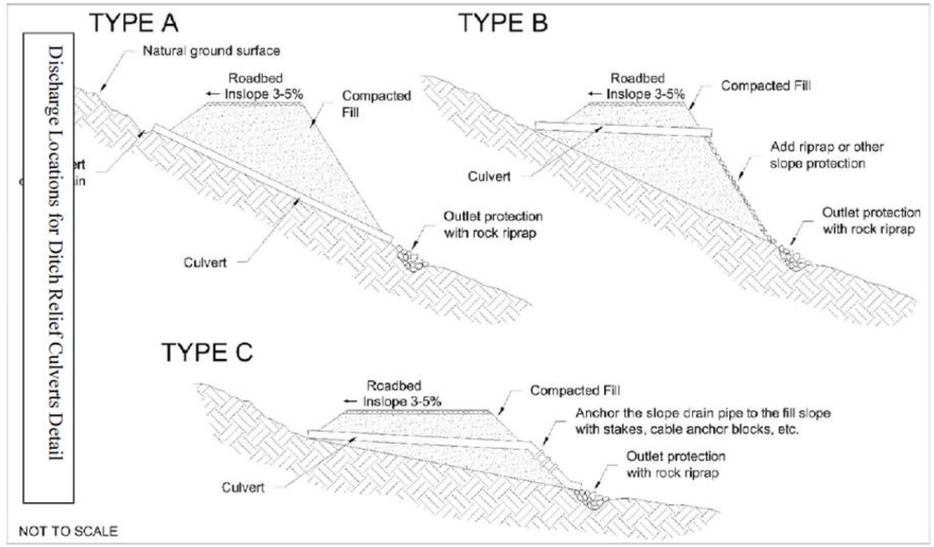
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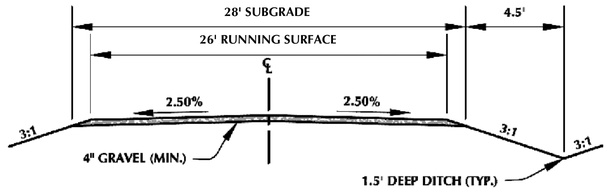
Culvert





Culvert

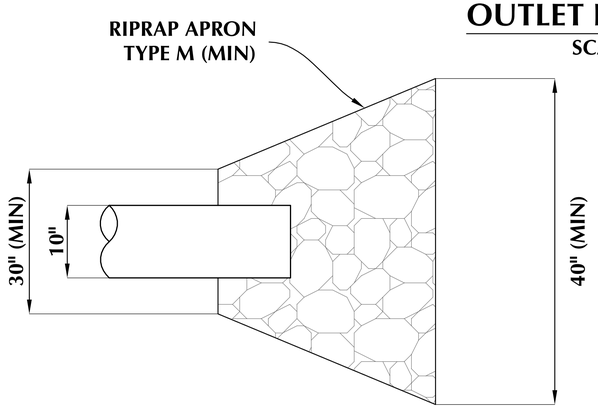


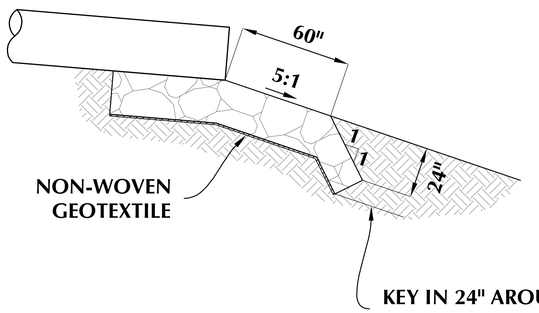


ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

SCALE: NTS

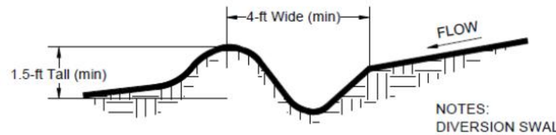




Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

SCALE:	VARIES	PAGE:	6 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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Sediment Trap

ST

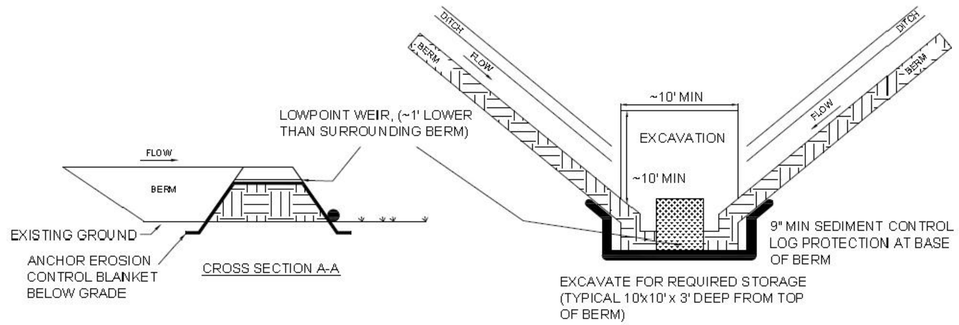
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

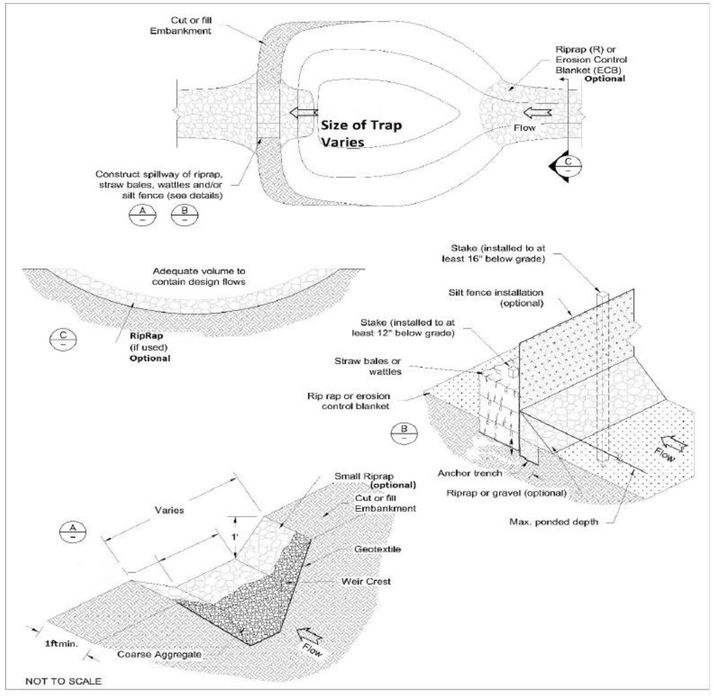
Sediment Trap

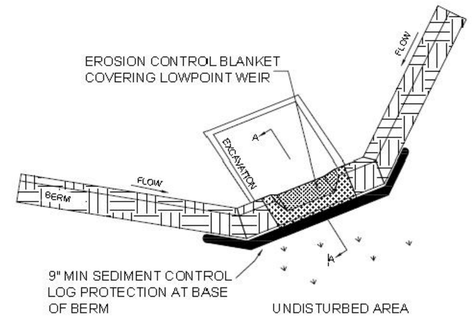
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Sediment Trap

ST





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DRAINAGE AND EROSION CONTROL PLAN
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APPENDIX C

CONTROL MEASURE / BMP SPECIFICATIONS

Construction Phasing/Sequencing (CP)

CP

Description



Source: UDFCD BMP Fact Sheet

Effective construction site management to minimize erosion and sediment transport includes attention to construction phasing, scheduling, and sequencing of land disturbing activities. On most construction projects, erosion and sediment controls will need to be adjusted as the project progresses and should be documented in the SWMP. Construction phasing refers to disturbing only part of a site at a time to limit the potential for erosion from dormant parts of a site. Grading activities and construction are completed and soils are effectively stabilized on one part of a site before grading and construction begins on another portion of the site. Construction sequencing or scheduling refers to a specified work schedule that coordinates the timing of land disturbing activities and the installation of erosion and sediment control practices.

Appropriate Uses

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance. Larger projects and linear construction projects may benefit most from construction sequencing or phasing, but even small projects can benefit from construction sequencing that minimizes the duration of disturbance. Typically, erosion and sediment controls needed at a site will change as a site progresses through the major phases of construction. Erosion and sediment control practices corresponding to each phase of construction must be documented in the SWMP.

Design and Installation

BMPs appropriate to the major phases of development should be identified on construction drawings. In some cases, it will be necessary to provide several drawings showing construction-phase BMPs placed according to stages of development (e.g., clearing and grading, utility installation, active construction, final stabilization). Some municipalities in the Denver area set maximum sizes for disturbed area associated with phases of a construction project. Additionally, requirements for phased construction drawings vary among local governments within the UDFCD boundary. Some local governments require separate erosion and sediment control drawings for initial BMPs, interim conditions (in active construction), and final stabilization.

Construction Phasing/Sequencing (CP)

CP

Construction Scheduling	
Functions	
Erosion Control	Moderate
Sediment Control	Moderate
Site/Material Management	Yes

Typical construction phasing BMPs include:

- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.

- If there is carryover of stockpiled material from one phase to the next, position carryover material in a location easily accessible for the pending phase that will not require disturbance of stabilized areas to access the stockpile. Particularly with regard to efforts to balance cut and fill at a site, careful planning for location of stockpiles is important.

Typical construction sequencing BMPs include:

- Sequence construction activities to minimize duration of soil disturbance and exposure. For example, when multiple utilities will occupy the same trench, schedule installation so that the trench does not have to be closed and opened multiple times.

- Schedule site stabilization activities (e.g., landscaping, seeding and mulching, installation of erosion control blankets) as soon as feasible following grading.

- Install initial erosion and sediment control practices before construction begins. Promptly install additional BMPs for inlet protection, stabilization, etc., as construction activities are completed. Table CP-1 provides typical sequencing of construction activities and associated BMPs.

Maintenance and Removal

When the construction schedule is altered, erosion and sediment control measures in the SWMP and construction drawings should be appropriately adjusted to reflect actual "on the ground" conditions at the construction site. Be aware that changes in construction schedules can have significant implications for site stabilization, particularly with regard to establishment of vegetative cover.

Construction Phasing/Sequencing (CP)

CP

Table CP-1. Typical Phased BMP Installation for Construction Projects

Project Phase	BMPs
Pre-disturbance, Site Access	▪ Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection). ▪ Establish vehicle tracking control at entrances to paved streets. Fence as needed. ▪ Use construction fencing to define the boundaries of the project and limit access to areas of the site that are not to be disturbed. **Note: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.**
Site Clearing and Grubbing	▪ Install perimeter controls as needed on downgradient perimeter of site (silt fence, wattles, etc). ▪ Limit disturbance to those areas planned for disturbance and protect undisturbed areas within the site (construction fence, flagging, etc). ▪ Preserve vegetative buffer at site perimeter. ▪ Create stabilized staging area. ▪ Locate portable toilets on flat surfaces away from drainage paths. Stake in areas susceptible to high winds. ▪ Construct concrete washout area and provide signage. ▪ Establish waste disposal areas. ▪ Install sediment basins. ▪ Create dirt perimeter berms and/or brush barriers during grubbing and clearing. ▪ Separate and stockpile topsoil, leave roughened and/or cover. ▪ Protect stockpiles with perimeter control BMPs. Stockpiles should be located away from drainage paths and should be accessed from the upgradient side so that perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period. ▪ Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but that will be inactive for an extended period. ▪ Water to minimize dust but not to the point that watering creates runoff.

Construction Phasing/Sequencing (CP)

CP

Project Phase	BMPs
Utility And Infrastructure Installation	**In Addition to the Above BMPs:** ▪ Close trench as soon as possible (generally at the end of the day). ▪ Use rough-cut street control or apply road base for streets that will not be promptly paved. ▪ Provide inlet protection as streets are paved and inlets are constructed. ▪ Protect and repair BMPs, as necessary. ▪ Perform street sweeping as needed.
Building Construction	**In Addition to the Above BMPs:** ▪ Implement materials management and good housekeeping practices for home building activities. ▪ Use perimeter controls for temporary stockpiles from foundation excavations. ▪ For lots adjacent to streets, lot-line perimeter controls may be necessary at the back of curb.
Final Grading	**In Addition to the Above BMPs:** ▪ Remove excess or waste materials. ▪ Remove stored materials.
Final Stabilization	**In Addition to the Above BMPs:** ▪ Seed and mulch/tackify. ▪ Seed and install blankets on steep slopes. ▪ Remove all temporary BMPs when site has reached final stabilization.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Description

Vehicle tracking controls provide a stabilized construction site access where vehicles merge onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface. There are a number of different types of vehicle tracking controls. Rock pads are the most common and effective, but other forms include cattle guards and mud mats.



Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking. Source: UDFCD BMP Fact Sheet

Applicability

Typically, vehicle tracking controls are installed at locations where construction traffic leaves or enters an existing paved road.

Limitations

- Although installing vehicle tracking control is a good way to help reduce the amount of sediment leaving a site, some soil may still be deposited from vehicle tires onto paved surfaces. To further reduce the chance of these sediments polluting stormwater runoff, sweeping of the paved area adjacent to the access is recommended.
- Heavy traffic and wet conditions will result in more frequent maintenance.
- May not be needed when access points are off unpaved roads.

Construction Specifications

Aggregate Vehicle Tracking Control (VTC)

This is a coarse-aggregate surfaced pad. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires. Typically, a geotextile should be placed between the rock and the soil surface. If the aggregate surfaced pad is not anticipated to be in use for a long duration and/or if it has limited traffic, the geotextile may be omitted.

Cattle Guard (CG)

A prefabricated rack, such as a cattle guard, may be used to reduce the amount of sediment that leaves the site on vehicle tires.

Mud Mat or TRM (MM)

This type of control may be appropriate for access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove significant sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Maintenance and Removal

Inspect the area for degradation and replace the aggregate or material used for a stabilized entrance/exit as needed. If the area becomes clogged and ponds water, remove and dispose of excess sediment or replace material with a fresh layer of aggregate as necessary.

With aggregate vehicle tracking controls, ensure rock and debris from this area do not enter the public right-of-way.

Remove sediment that is tracked onto the public right of way daily or more frequently as needed. Excess sediment in the roadway indicates that the stabilized construction entrance requires maintenance.

Ensure that drainage ditches at the entrance/exit area remain clear.

A stabilized entrance should be removed only when the potential for off-site vehicle tracking no longer exists. This is typically after the site has been stabilized.

When wheel wash equipment is used, be sure that the wash water is discharged to a sediment trap prior to discharge. Also inspect channels conveying the water from the wash area to the sediment trap, and stabilize areas that may be eroding or have the potential to erode.

When a construction entrance/exit is removed, excess sediment from the aggregate should be removed and disposed of appropriately. The entrance should be promptly stabilized with a permanent surface following removal, typically by paving.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

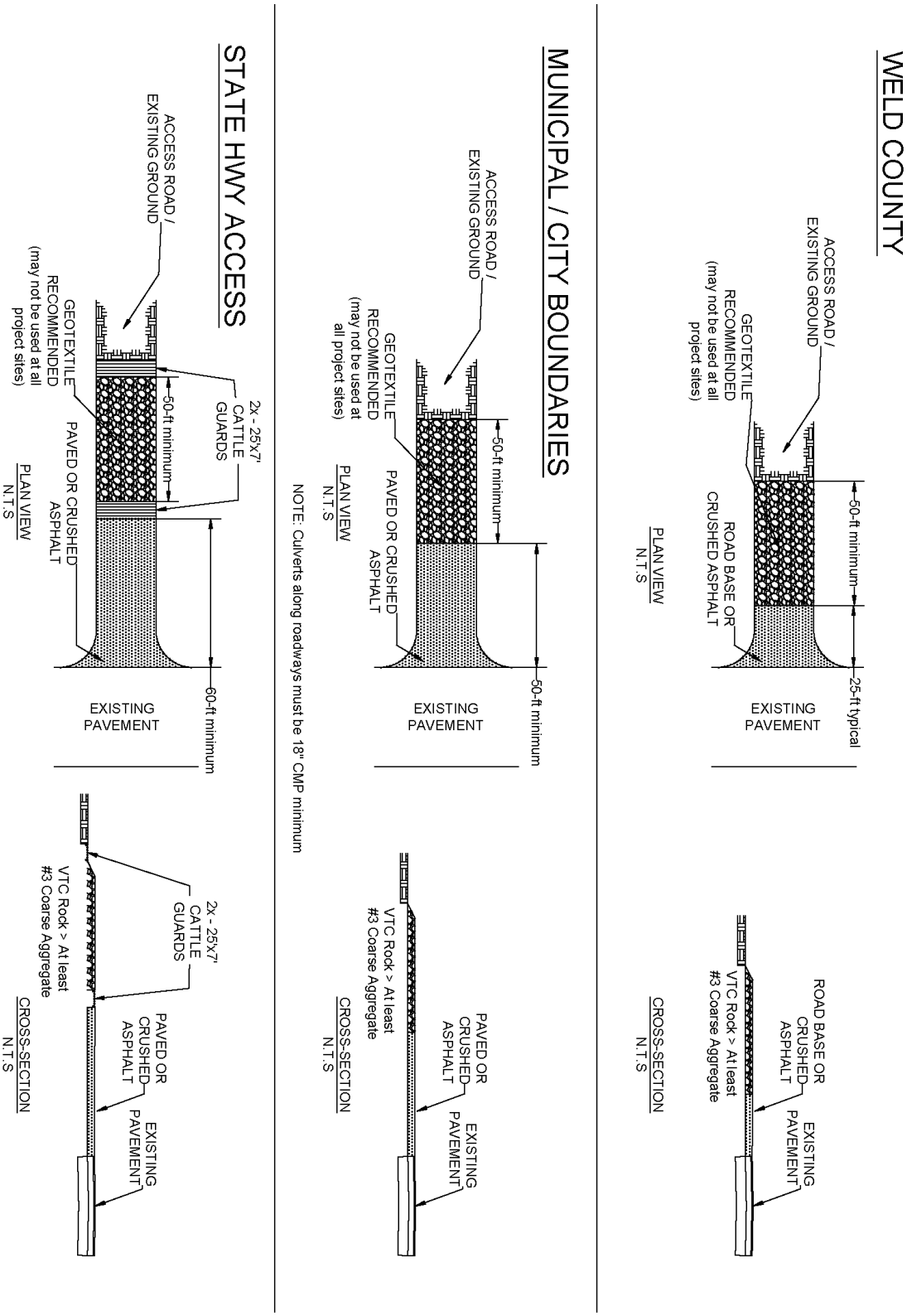
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Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

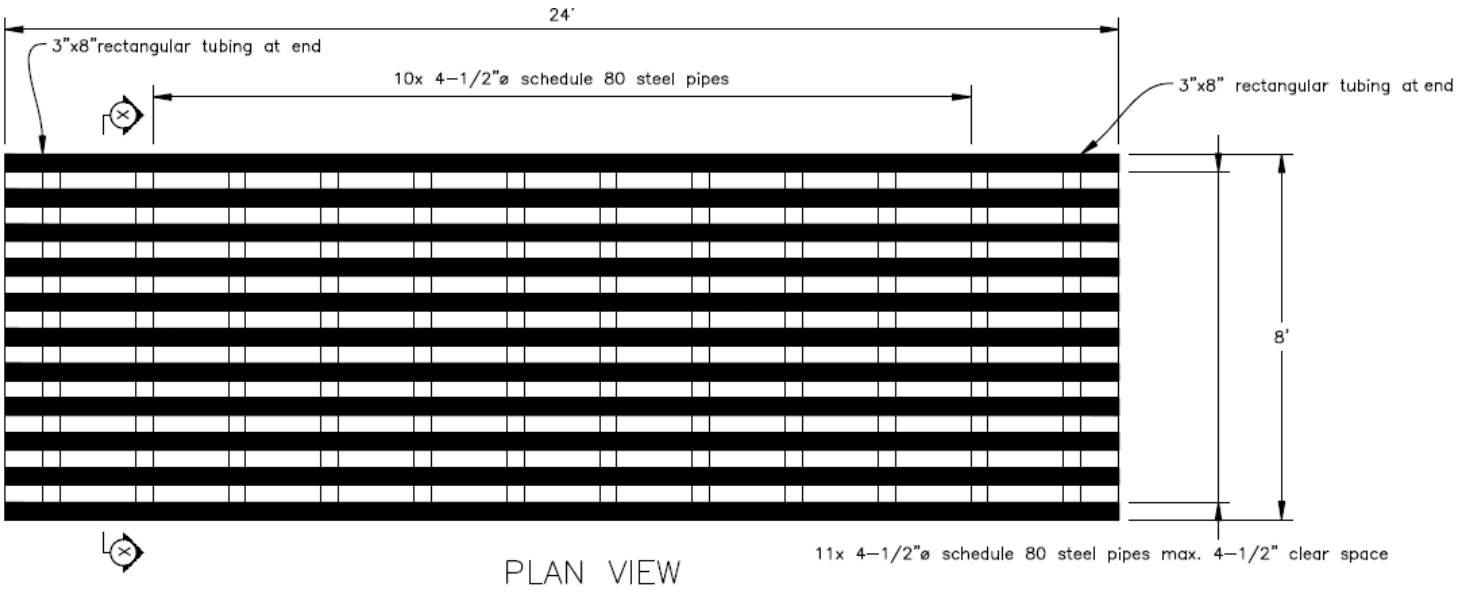
VTC/CG/MM

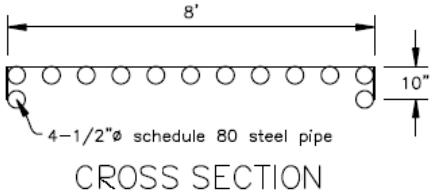


AGGREGATE VEHICLE TRACKING CONTROL DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM





These are typical dimensions for cattle guards; however, variations can be made per landowner agreements.

Typically 4- or 4½-inch pipe is used on the top but can be less if requested by landowner.

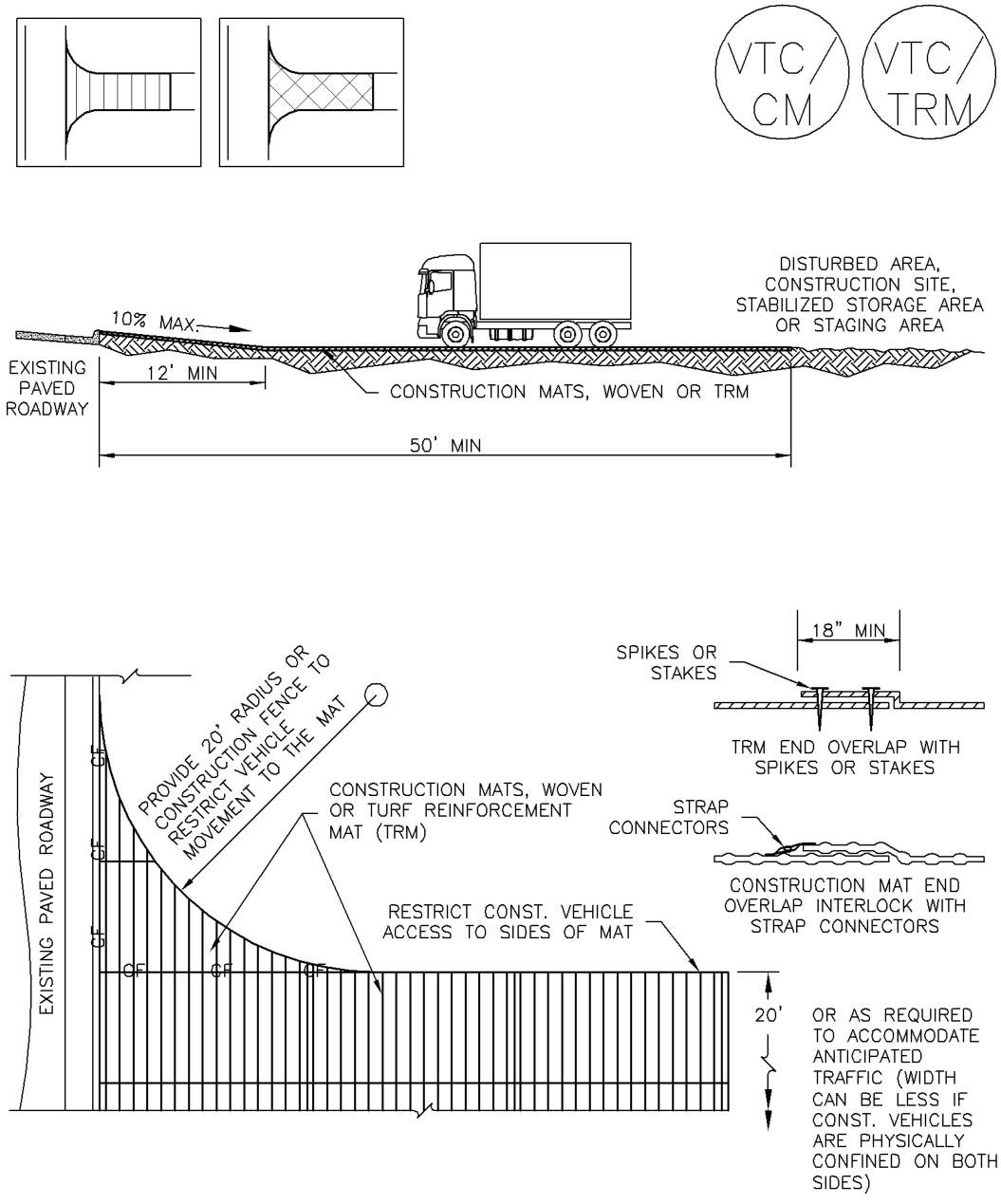




CATTLE GUARD DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM



VTC–3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM)

MUD MAT OR TRM DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S).
   –TYPE OF CONSTRUCTION ENTRANCE(S)/EXITS(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).

2. CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.

3. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT–OF–WAYS.

4. STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

5. A NON–WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.

6. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.

5. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

Diversion Ditch and Berm

DD

Definition



A ditch and berm is a drainage swale with a parabolic or trapezoidal cross-section and a supporting ridge on the lower side that is constructed across the slope. The purpose of a ditch and berm diversion is to prevent off-site stormwater runoff from entering a disturbed area, to prevent sediment laden storm runoff from leaving the construction site or disturbed area, and to direct sediment laden runoff to a sediment control feature.

Applicability

Ditch and berms may be designed for temporary or permanent use. The maximum drainage area for a temporary ditch and berm is ten acres. For undisturbed drainage areas larger than ten acres, a permanent earthen dike / berm may be designed or used for larger flows. Ditch and berms may be used for:

- The upslope of cut or fill slopes to convey or divert flows away from disturbed areas;
- The downslope of cut or fill slopes to divert on-site runoff to a stabilized outlet or sediment control feature;
- The outer edge of a well pad to ensure that runoff remains on the pad and is diverted to a sediment pond or trap, if available;
- Where runoff from higher areas has the potential for causing erosion, or for interfering with and/or preventing the establishment of vegetation on lower areas;
- Where the length of slopes need to be reduced so soil loss will be kept to a minimum; and
- The perimeter of a site or disturbed area.

Limitations

- The area around the ditch and berm that is disturbed during its construction shall be stabilized (typically by maintaining existing vegetation).
- To effectively manage erosion, ditch and berms must be directed into a stabilized outlet, well-vegetated area, or to alternative sediment control measures.
- Temporary ditch and berms should be designed to avoid crossing vehicle pathways.
- Ditch and berms should be used with caution on soils subject to slippage.

Design Criteria

For a temporary ditch and berm (drainage less than 10 acres), no formal design is necessary.

Location

Ditch and berms are usually located above or below cut or fill slopes. Exact ditch and berm location(s) shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, and the development layout. Whenever possible, preserve existing vegetation between the edge of the cut or fill slope and the ditch and berm.

Diversion Ditch and Berm

DD

Capacity

For a permanent design, constructed ditch and berm features shall have the capacity to carry, at a minimum, the peak discharge from a 10-year frequency rainfall event with freeboard of no less than 0.3 feet.

Cross section See Figure DD-1 for details.

The ditch and berm shall be parabolic or trapezoidal in shape, if possible. The ditch and berm shall have compacted, stable, side slopes. The side slopes shall be flat enough to ensure ease of maintenance of the ditch and berm.

Velocity and grade

The permissible velocity for the specific soil type will determine the maximum grade. The maximum permissible velocity for sand and silt channels is 3 feet per second, and 5 feet per second for clay vegetated channels. Ditch and berms are usually not applicable below high sediment producing areas unless structural measures, designed to prevent accumulations of sediment within the channel, are installed within the ditch and berm.

Construction Specifications

General

- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the ditch and berm.
- All ditch and berms shall have uninterrupted positive grade to an outlet.
- Diverted runoff from a disturbed area shall be conveyed to a sediment control measure.
- Diverted runoff from an undisturbed area shall outlet to a sediment control measure or into an undisturbed stabilized area at non-erosive velocities.

Temporary diversion ditch and berm (typically at edge of disturbance) See figure DD-1

- The ditch and berm shall be excavated or shaped to line, grade, and cross section as required to meet the site-specific criteria. **The ditch and berm must be compacted.**
- This is accomplished by excavation of a U-shaped or trapezoidal trench or ditch, and compaction of the fill on the downslope side of the cut.
- Stabilization with vegetation is not required, so long as adequate sediment traps or other sediment control devices are provided at outlets.
- Inspect the ditch for adequate capacity, erosion, or damage. If there is reoccurring erosion, consider installing check dams or lining the channel.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Channels should be cleared of sediment and repairs made when necessary. Maintain ditch and berm capacity, ridge height, especially if high-sediment yielding areas are in the

drainage area above the ditch and berm. Redistribute the sediment as necessary to maintain the capacity of the ditch and berm.

Removal

Temporary ditch and berms shall remain in place only until the disturbed areas are re-graded and prepared for permanent stabilization. Permanent ditch and berms shall remain in place.

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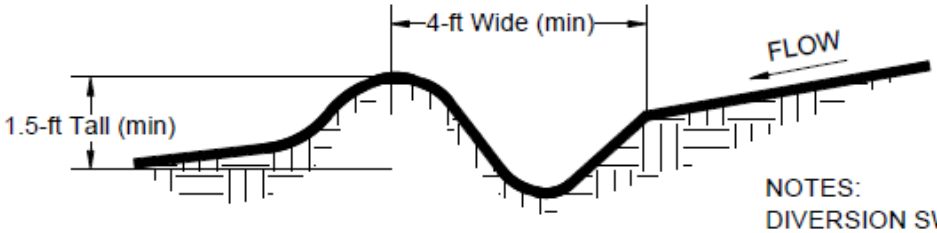
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Colorado Department of Transportation, *M-208-1 Temporary Erosion Control.* 2012. https://www.codot.gov/business/designsupport/standard-plans/2012-m-standards-plans/2012-m-standards-pdfs/10-temproary-erosion-control/m-208-1-temp-erosion-control

Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

References: Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011.

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control*. 2012.

Sediment Control Log (SCL)

SCL

Description

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.





Photographs SCL-1 and SCL-2. Sediment control logs used as 1) a perimeter control around a soil stockpile; and, 2) as a "J-hook" perimeter control at the corner of a construction site.
Source: UDFCD BMP Fact Sheet

Appropriate Uses

Sediment control logs can be used in the following applications to trap sediment:

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

Design and Installation

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

Sediment Control Log	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	No

Sediment Control Log (SCL)

SCL

Although sediment control logs initially allow runoff to flow through the BMP, they can quickly become a barrier and should be installed is if they are impermeable.

Design details and notes for sediment control logs are provided in Detail SCL-1. Sediment logs must be properly trenched and staked into the ground to prevent undercutting, bypassing and displacement. When installed on slopes, sediment control logs should be installed along the contours (i.e., perpendicular to flow).

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

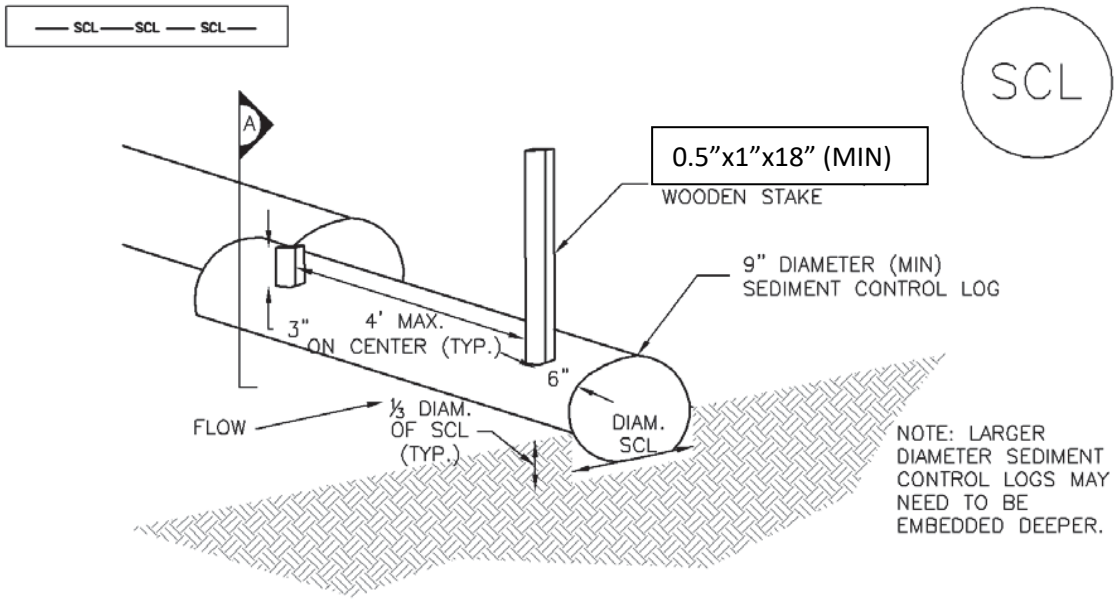
Maintenance and Removal

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

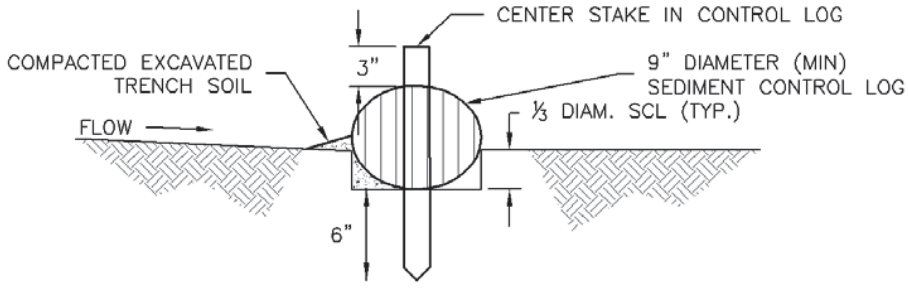
Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

Sediment Control Log (SCL)

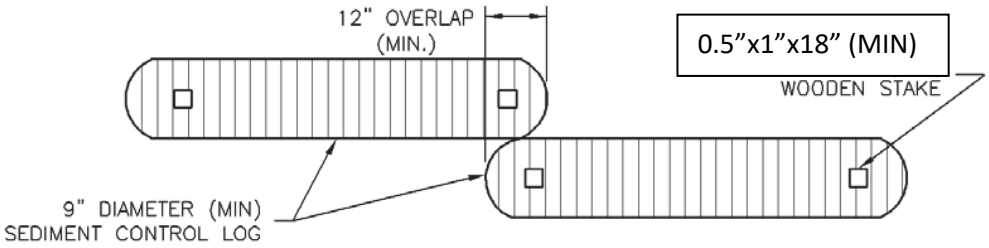
SCL



SEDIMENT CONTROL LOG



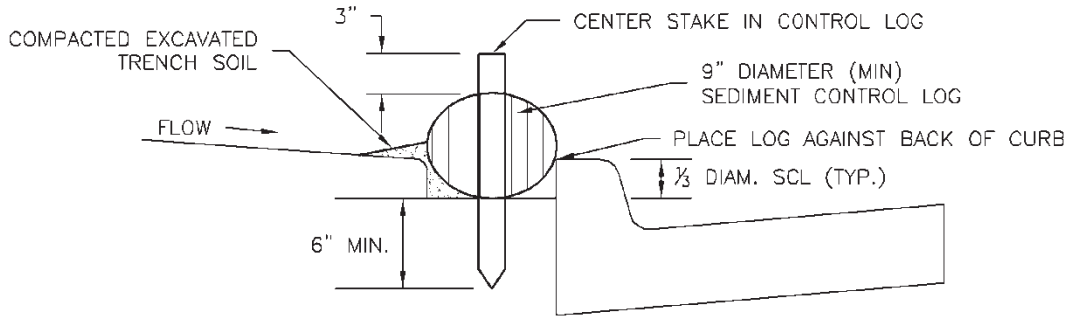
SECTION A



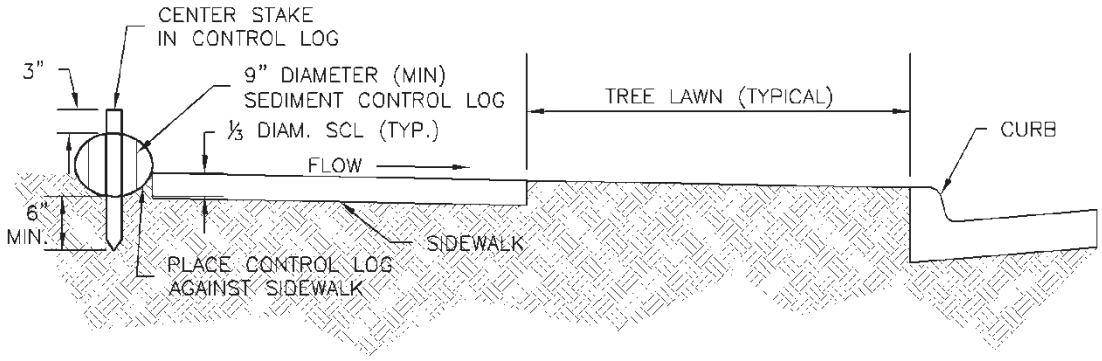
SEDIMENT CONTROL LOG JOINTS

SCL–1. SEDIMENT CONTROL LOG

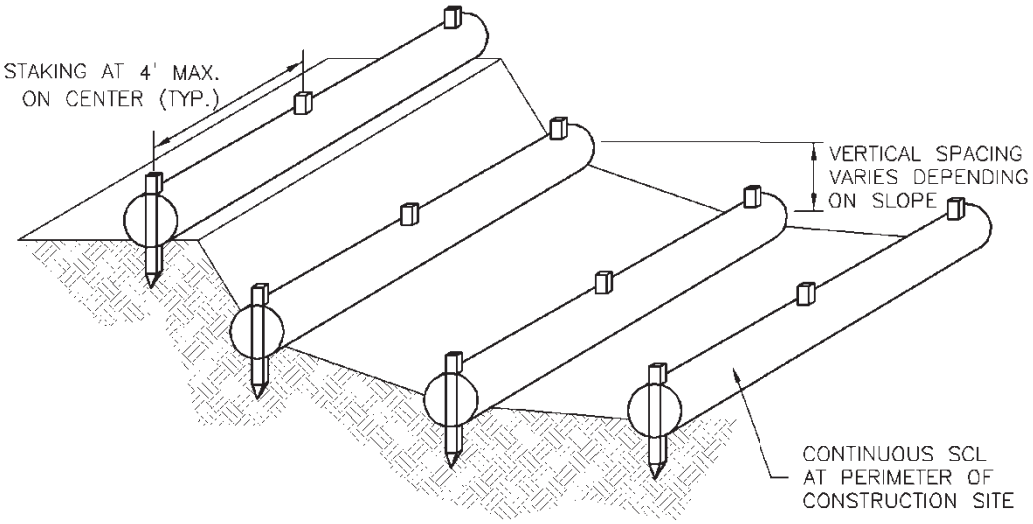
Sediment Control Log (SCL)



SCL–2. SEDIMENT CONTROL LOG AT BACK OF CURB



SCL–3. SEDIMENT CONTROL LOG AT SIDEWALK WITH TREE LAWN



SCL–4. SEDIMENT CONTROL LOGS TO CONTROL SLOPE LENGTH

Sediment Control Log (SCL)

SCL

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.

2. SEDIMENT CONTROL LOGS *THAT ACT* AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR *TO* ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.

3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.

4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES. HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE WAYS.

5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND *TO* A DEPTH OF APPROXIMATELY .l3 OF THE DIAMETER OF THE LOG. IF TRENCHING *TO* THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT *TO* DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST STAKING

6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.

7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4' CENTERS AND EMBEDDED A MINIMUM OF 6" INTO THE GROUND. 3" OF THE STAKE SHALL PROTRUDE FROM THE TOP OF THE LOG. STAKES THAT ARE BROKEN PRIOR *TO* INSTALLATION SHALL BE REPLACED.

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY *TO* MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED *TO* MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY)2 OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.

5. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO. JEFFERSON COUNTY, COLORADO, DOUGLAS COUNTY, COLORADO, AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Check Dam (CD)

CD

Description



Check dams are small, temporary dams constructed across a swale or roadside ditch. Check dams can be constructed using rock, sandbags, gravel bags, earth with erosion control blanketing, sediment control logs, or synthetic materials to slow the velocity of concentrated flow in a channel and thus reduce erosion. As a secondary function, check dams can also be used to catch sediment from the channel itself or from the contributing drainage area as stormwater runoff flows through or over the structure.

Applicability

Check dams are most often used in small, open channels with contributing drainage area of less than 10 acres and side slopes of 2:1 or less. Check dams may be used in the following applications.

- In swales or roadside ditches where it is not practical to line the channel or implement other flow control and sediment control practices;
- In swales or roadside ditches where temporary seeding has been recently implemented but has not had time to take root and fully develop;
- As a series of check dams, spaced at appropriate intervals, used in one of the above two applications.

Rock ditch checks should be **perpendicular** to the flowline of the ditch and must be designed so that water can flow over them, not around them. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the low point on the crest of the check. Where multiple check dams are used, the top of the lower dam should be at the same elevation as the toe of the upper dam.

The following table provides check spacing for a given ditch grade:

Ditch Grade (Percent)	Check Spacing (feet)	Check Spacing (meters)
5	59	18
6	49	15
7	43	13
8	36	11
9	33	10
10	30	9

Limitations

- Check dams should not be used in live, continuously flowing streams unless approved by an appropriate regulatory agency.
- Check dams may require frequent removal of accumulated sediments. Dams should therefore be located in areas accessible to maintenance vehicles.
- Leaves have been shown to be a significant problem by clogging check dams in the fall. Therefore, increased inspection and maintenance may be required in the fall.
- Sediment control log check dams decompose over time, and may be consumed by livestock.

Construction Specifications

- Install straw bale check dams, rock check dams, and other check dams according to design criteria outline at the end of the BMP Fact Sheet.
- Check dams should be located in areas accessible to maintenance vehicles for the periodic removal of accumulated sediments.
- Check dams should be installed with careful placement of the construction material. Do not dump rocks into the drainage channel carefully place material to construct the check dams.
- Check dams can be constructed from a number of different materials. Most commonly, they are made of sediment control log or rock. When using rock, the material diameter should be four to eight inches depending on the expected velocity and quantity of runoff within the channel. Sand/gravel bags may also be used. Silt fence is not an appropriate material for check dams.
- When reinforced check dams are used, install erosion control fabric around the dam to prevent erosion on the upstream and downstream sides. Each section of the check dam should be keyed in with good contact with the ground surface and extend to the top of the swale/ditch.
- When installing more than one check dam in a channel, outlet erosion stabilization measures should be installed below the final dam in the series because this area is likely to be vulnerable to further erosion. Riprap, erosion control blanket lining, or some other stabilization measure can be used for this outlet/energy dissipation.

Maintenance and Removal

Replace missing rocks causing voids in the check dam. If gravel bags or sandbags are used, replace or repair torn or displaced bags.

Remove accumulated sediment, as needed to maintain BMP effectiveness, typically before the sediment depth upstream of the check dam is within ½ of the crest height. Remove accumulated sediment prior to mulching, seeding, or chemical soil stabilization. Removed sediment can be incorporated into the earthwork with approval from the Project Manager, or disposed of at an alternate location in accordance with the standard specifications.

Check dams constructed in permanent swales should be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment should be removed, and the area seeded and mulched, or otherwise stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm
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Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

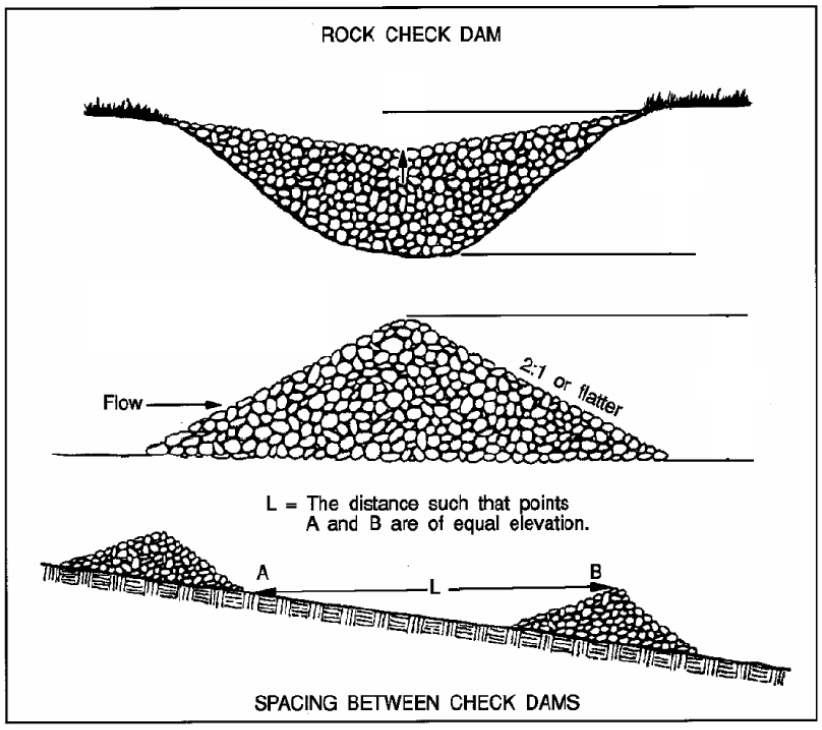
North Dakota Department of Health Division of Water Quality, *A Guide to Temporary Erosion-Control Measures for Contractors, Designers and Inspectors, June 2001.*

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

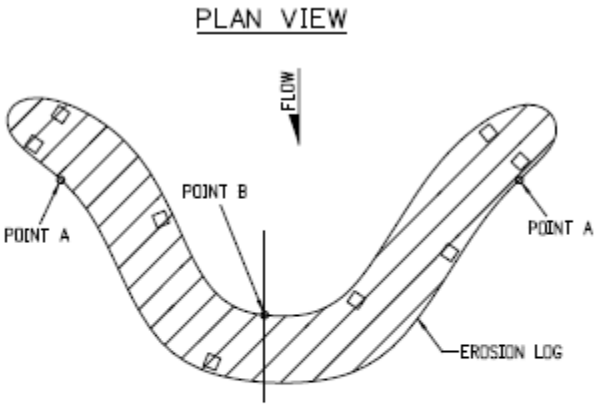
Check Dam (CD)

CD

Design Criteria

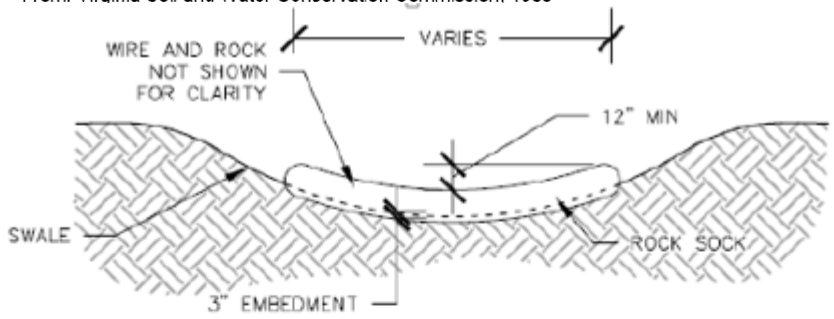


From: Virginia Soil and Water Conservation Commission, 1985

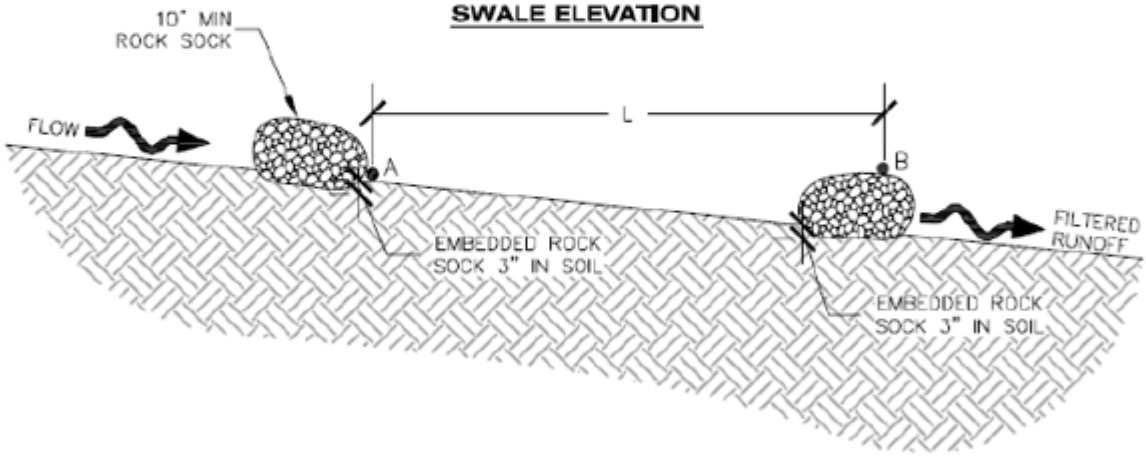


NOTES

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. STAKES SHALL BE EMBEDDED TO A MINIMUM DEPTH OF 12 INCHES.
3. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.



SWALE ELEVATION



L = THE DISTANCE SUCH THAT POINT A AND B ARE OF EQUAL ELEVATION.

SWALE SPACING

ROCK SOCK IN SWALE

CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF CHECK DAMS.
   - –CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - –LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).

2. CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.

3. RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").

4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.

5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.

5. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

6. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Basin (SB)

SB

Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.



Photograph SB-1. Sediment basin at the toe of a slope. Photo courtesy of WWE. Source: UDFCD BMP Fact Sheet

Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume**: Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent "clean" runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft^3/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft^3/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.

- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.

- **Dam Embankment**: It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- **Inflow Structure**: For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins

Imperviousness (%)	Additional Storage Volume (ft^3) Per Acre of Tributary Area
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works**: The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:

  - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.

  - **Orifice Plate or Riser Pipe**: Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.

  - **Floating Skimmer**: If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.

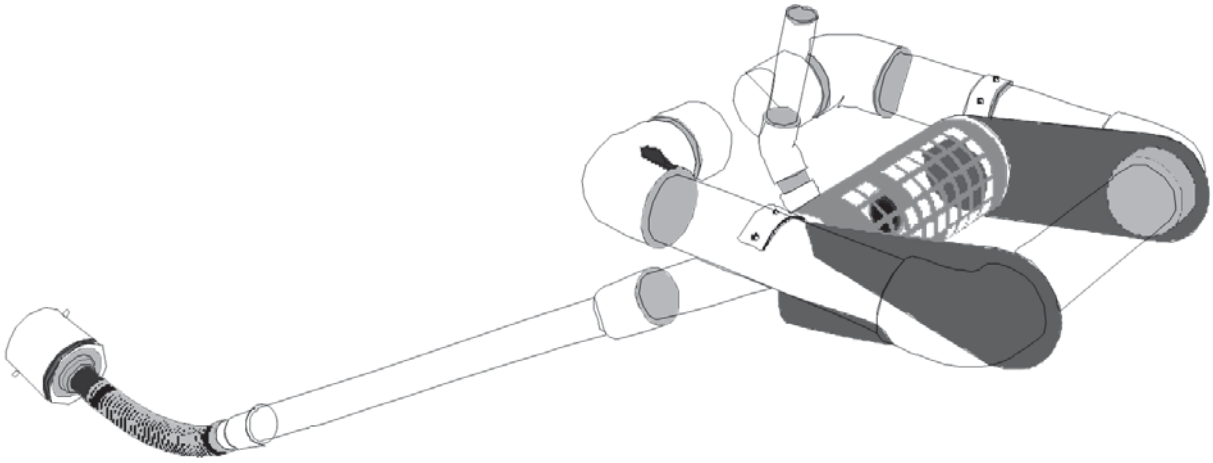


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

Maintenance and Removal

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

Sediment Basin (SB)

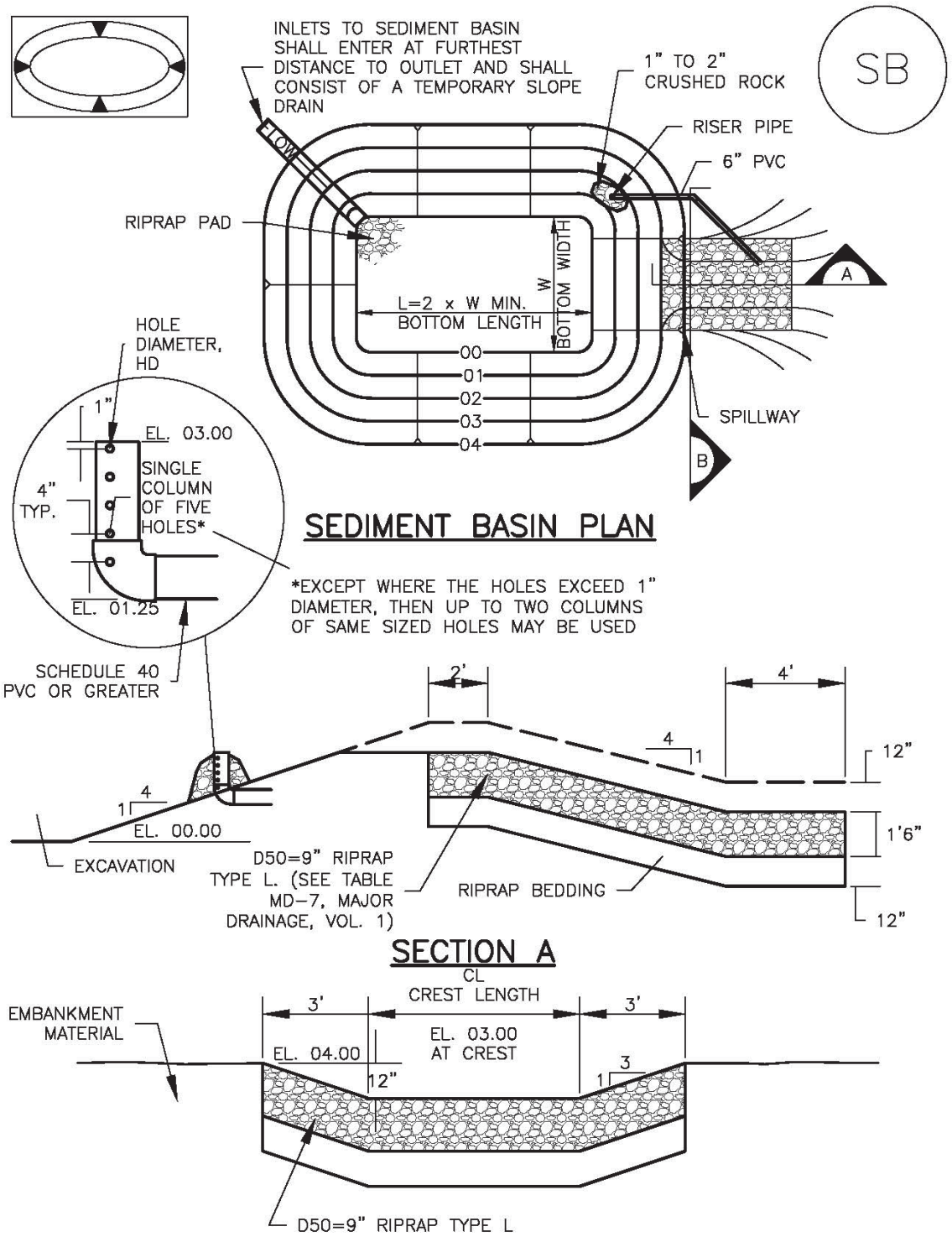


TABLE SB–1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 ½	2	9/32
2	21	3	13/16
3	28	5	½
4	33 ½	6	9/16
5	38 ½	8	21/32
6	43	9	21/32
7	47 ¼	11	25/32
8	51	12	27/32
9	55	13	⅞
10	58 ¼	15	15/16
11	61	16	31/32
12	64	18	1
13	67 ½	19	1 1/16
14	70 ½	21	1 ⅛
15	73 ¼	22	1 3/16

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF SEDIMENT BASIN.
   - –TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
   - –FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
   - –FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.

2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.

3. SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.

4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.

5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.

6. PIPE SCH 40 OR GREATER SHALL BE USED.

7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).

5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.

6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Trap

ST



Description

Sediment traps are small collection areas that allow sediment to settle out of stormwater runoff. They are usually installed in a drainage way or other point of discharge from a disturbed area. Sediment traps are formed by excavating below grade and/or by constructing an earthen embankment.

Applicability

Sediment traps are generally temporary control measures used at the outlets of stormwater diversion structures, channels, slope drains, construction site entrance wash racks, or any other runoff conveyance that discharges waters containing erosion sediment and debris. Sediment traps should be used for drainage areas less than five acres. The effective life span of these temporary structures is usually limited to 24 months. Traps may be located in a series to allow for backup control in case one trap fails.

Limitations

- Regular maintenance is needed to remove sediment. Traps should be located near roads or where accessible to remove sediment.
- Although sediment traps allow eroded soils to settle, due to the short detention periods for stormwater, traps typically do not remove fine particles such as silts and clays.
- Water may remain in sediment traps for extended periods causing mosquitoes and other insects to gather. Locate the trap in a sunny spot if possible.
- Never construct a sediment trap on a live flow stream or in wetlands.

Design Criteria

Location

Traps should be located at points of discharge from disturbed areas. The location will be determined by the natural terrain, drainage pattern of the runoff, and the accessibility for maintenance. Sediment traps should not be located in areas where their failure due to stormwater runoff excess can lead to further erosive damage of the landscape. Alternative diversion pathways should be designed to accommodate these potential overflows. Sediment trap locations should also allow for easy maintenance access for the periodic removal of accumulated sediment.

Storage capacity

A sediment trap should be designed to maximize surface area for infiltration and sediment settling. This will increase the effectiveness of the trap and decrease the likelihood of backup during and after periods of high runoff intensity. The designed capacity of the sediment trap shall be determined based on site-specific conditions. The orientation of the sediment trap will be limited by the amount of space on a site especially at boundaries.

Construction Specifications

See Figure ST-1 for installation details.

- If possible, sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.
- Traps should be located above the floodplain, where possible. If there are space constraints, several small sediment traps may be constructed in series.
- Area under embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared.
- The fill material for the embankment shall be free of roots and other woody vegetation as well as over-sized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Seeding of the embankment should be performed as soon as possible after construction of the sediment trap. Erosion control blanketing may also be used to cover the embankment in combination with seeding or during time periods when seeding is ineffective.
- The spillway may consist of a stone section in the embankment formed by a combination coarse aggregate/riprap to provide for filtering/detention capability. Riprap shall be 4-inch to 8-inch rock, while the coarse aggregate shall be ½ to ¾ inches. A Geotextile may be placed at the stone-soil interface to act as a separator.
- Another option for the spillway is to use straw bales or wattles at the overflow point in the trap and line the rest of the spillway with an erosion control blanket (see EROSION CONTROL BLANKET [ECB]).

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). The primary maintenance consideration for temporary sediment traps is the removal of accumulated sediment from the basin to ensure the continued effectiveness of the sediment trap. Sediments should be removed when the basin reaches approximately 50% sediment capacity. Inspectors should also ensure that the trap is draining properly and check the structure for damage from erosion. The depth of the spillway should be checked and maintained at a minimum of 1.5 feet below the low point of the trap embankment.

Sediment Trap

ST

Removal

The structure shall be removed and the area stabilized when the drainage area has been properly stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide.* 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004

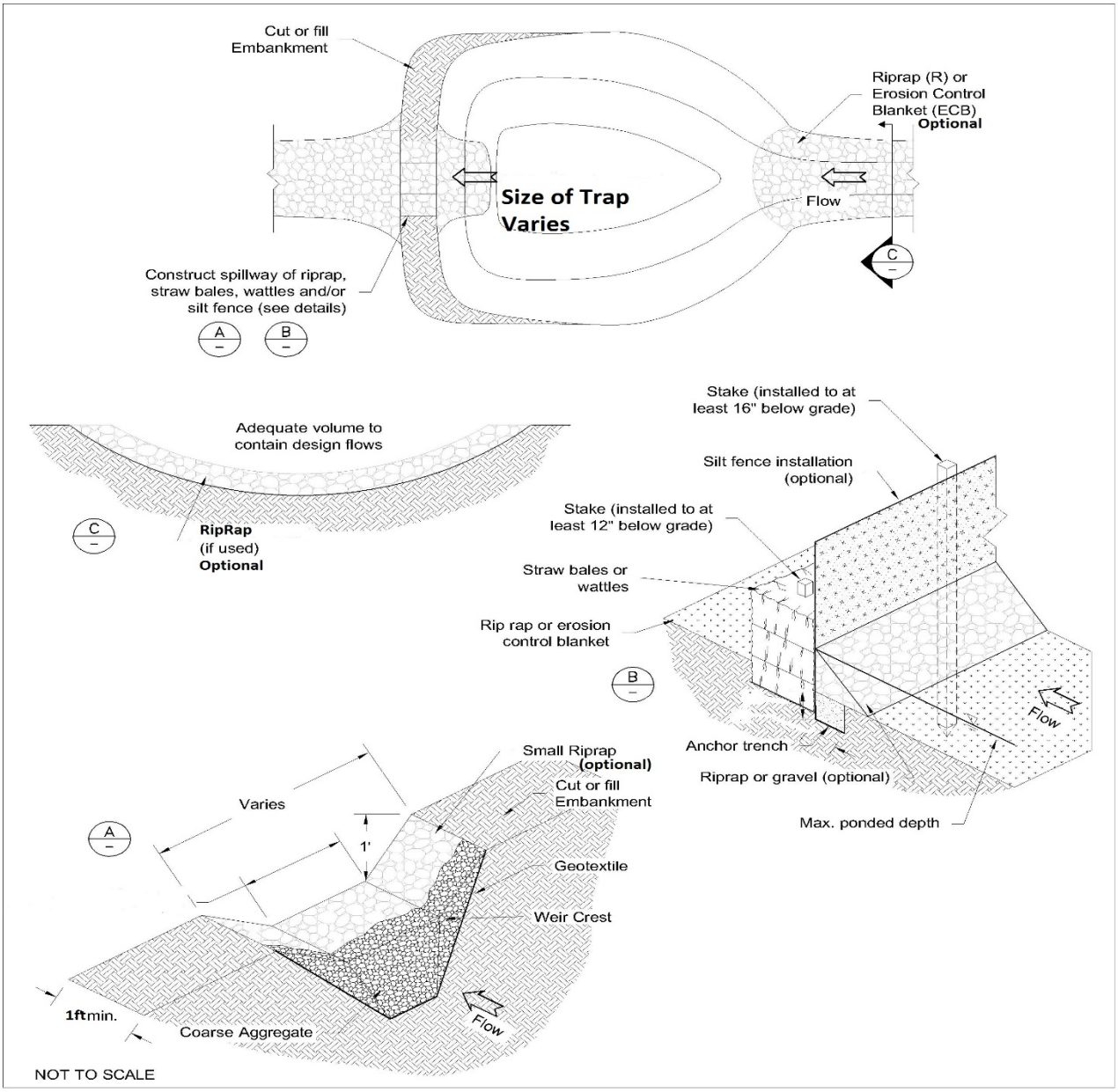

Cut or fill
Embankment
Riprap (R) or
Erosion Control
Blanket (ECB)
Optional
Size of Trap
Varies
Flow
C
Construct spillway of riprap,
straw bales, wattles and/or
silt fence (see details)
A
B
Adequate volume to
contain design flows
C
RipRap
(if used)
Optional
Stake (installed to at
least 16" below grade)
Silt fence installation
(optional)
Stake (installed to at
least 12" below grade)
Straw bales or
wattles
Rip rap or erosion
control blanket
B
Flow
Anchor trench
Riprap or gravel (optional)
Max. ponded depth
Small Riprap
(optional)
Cut or fill
Embankment
Varies
A
1'
Geotextile
Weir Crest
1ftmin.
Coarse Aggregate
Flow
NOT TO SCALE

Figure ST-1.

Sediment Trap

ST

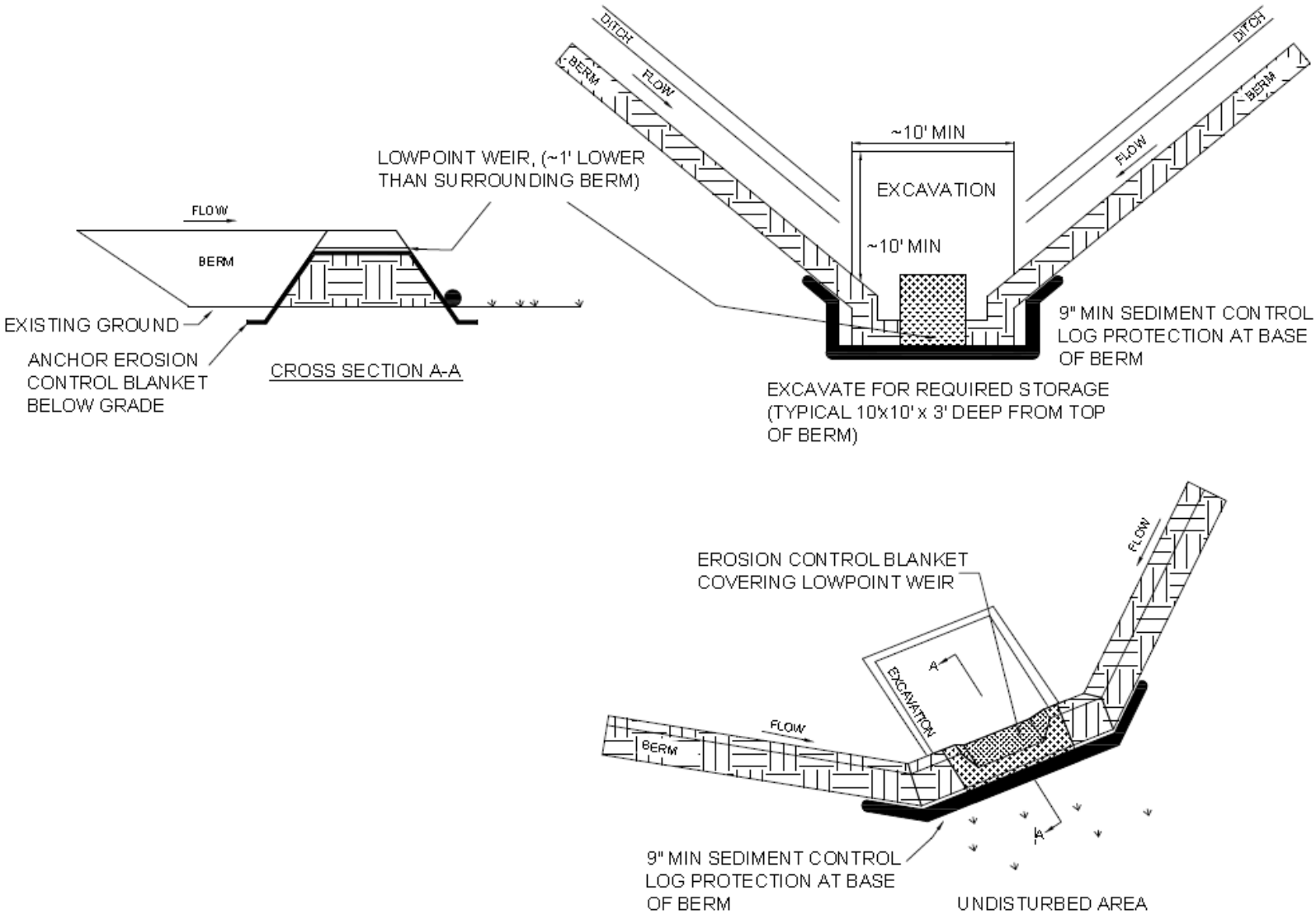


Figure ST-2.

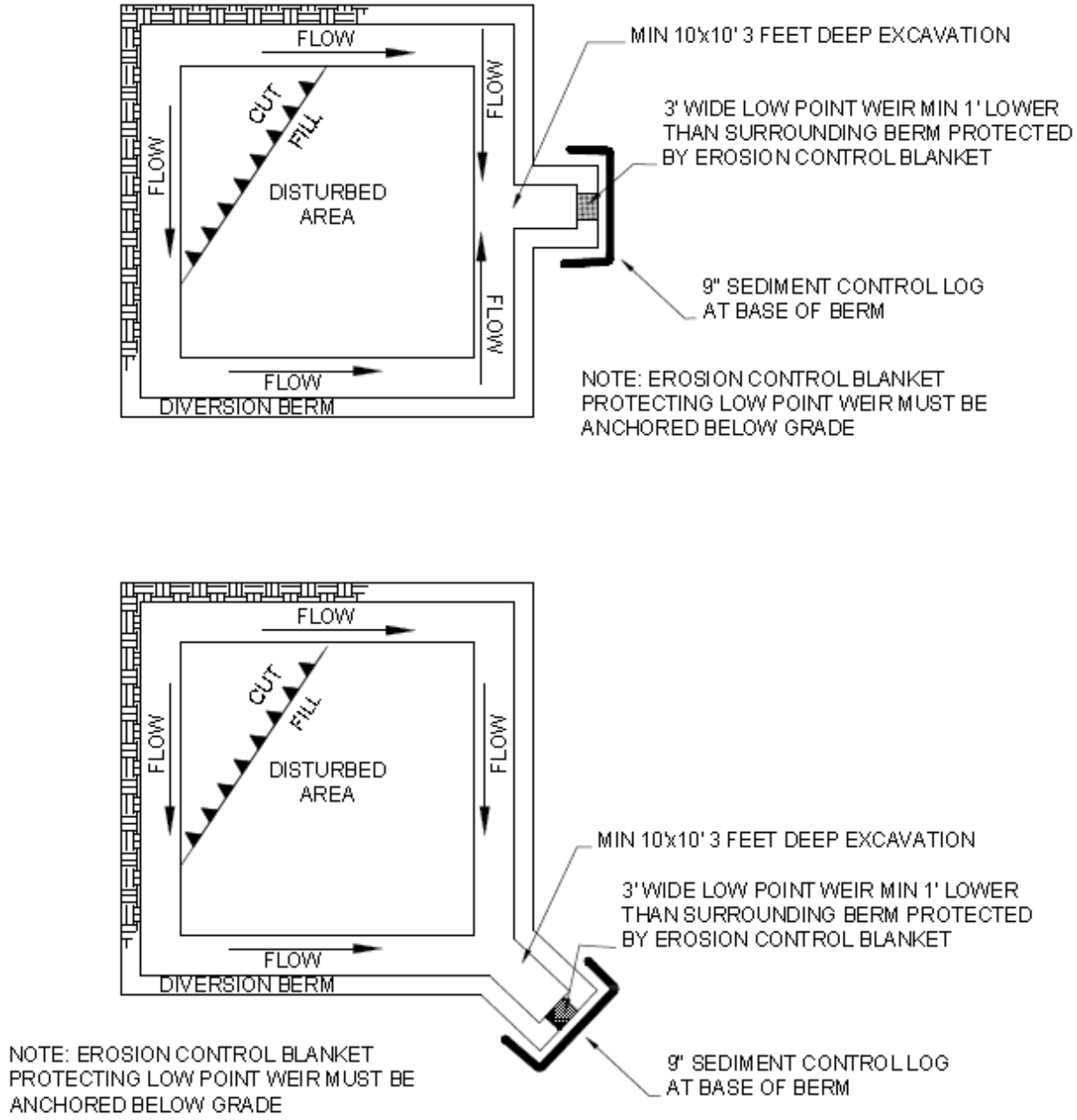


Figure ST-3.

minor revisions to
detail 02/21/2017

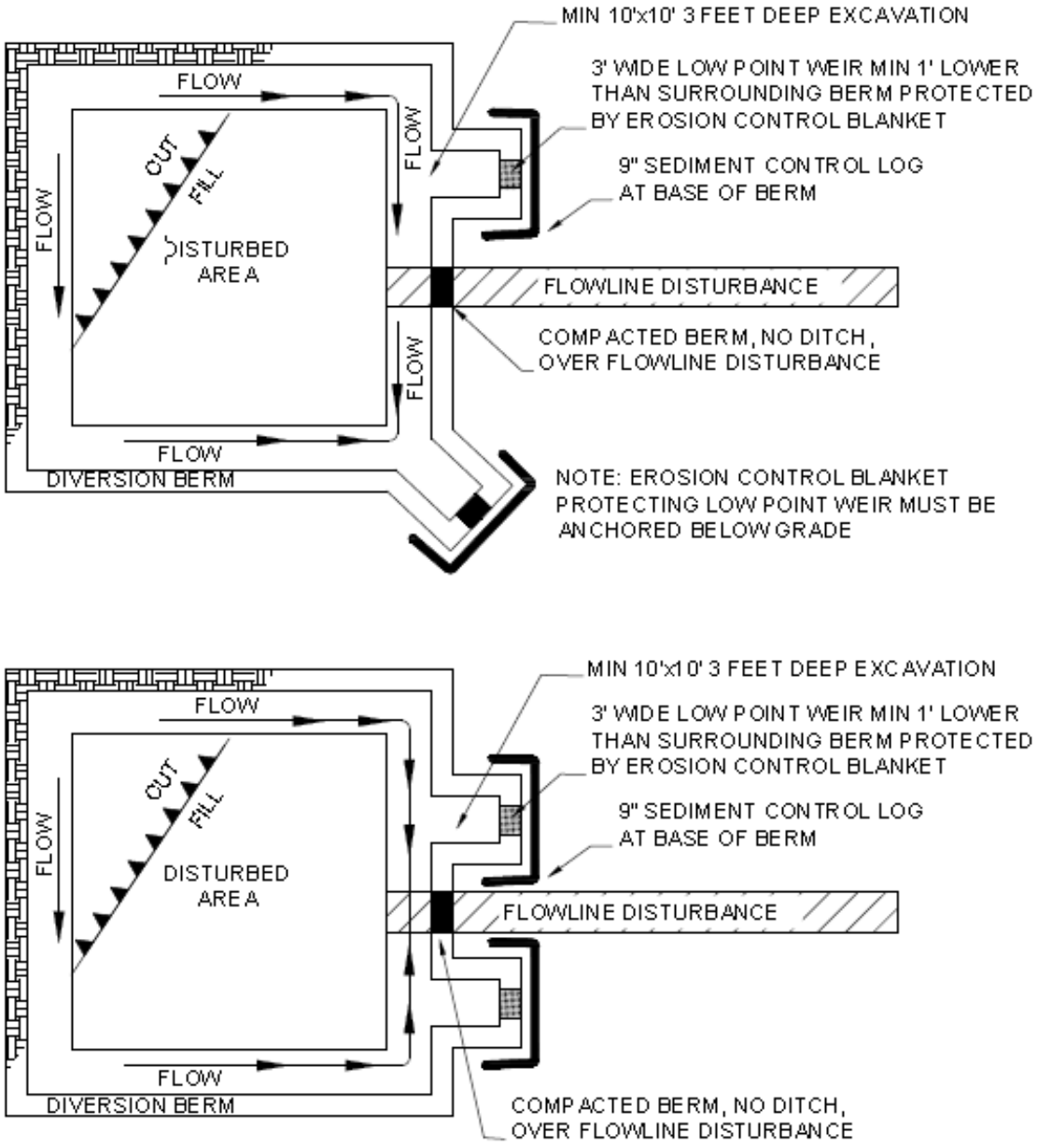


Figure ST-4.

minor revisions to detail 02/21/2017

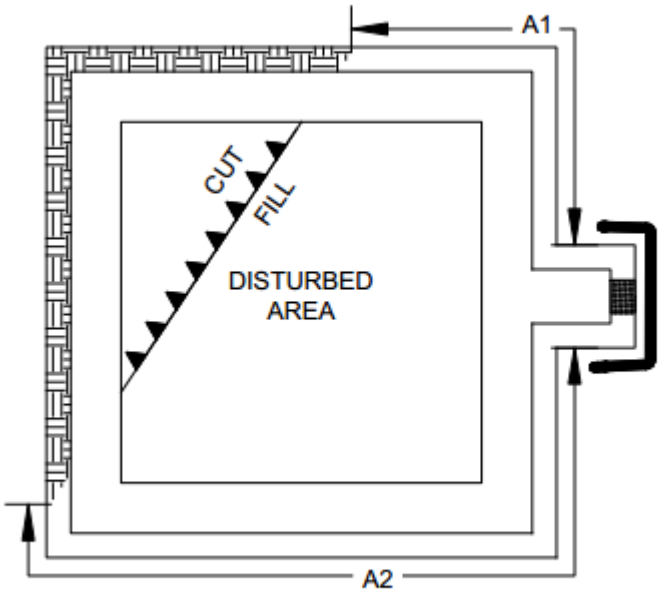


Figure ST-5. A1 + A2 = Total ditch and berm diversion length used to size sediment trap (ft).

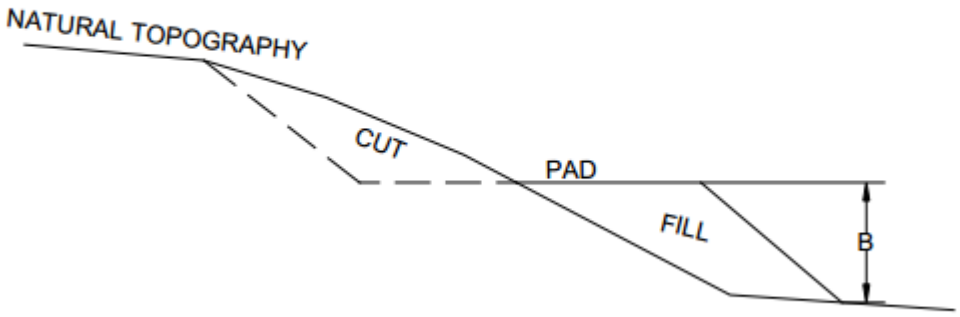


Figure ST-6. B = Pad fill height (ft), at pad low point.

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	**4**	**6**	**8**	**10**	**12**
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	**Area of 3.0' Deep Sediment Trap (ft^2)**					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Culvert

C

Description



Culverts are typically concrete, steel, aluminum, or plastic pipe used to move water under a road or to direct flow under the road or construction area.

Applicability

Culverts are ideal on roads with grades of less than 15%. For grades over 15%, it is best to use frequently spaced relief culverts and drainage crossing culverts, with armored ditches. Culverts may be used in the following applications:

- As drainage crossing culverts in streams and gullies to allow normal drainage to flow under the traveled way;
- As ditch relief culverts to periodically relieve the inside ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway.

Limitations

- Undersized culverts are susceptible to plugging and will require cleaning.
- Culverts will not filter sediment.
- Culverts are easily crushed if not properly designed.

Design Criteria and Construction Specifications

Pipe size can be determined for culverts in Weld County by using their criteria. According to the Weld County Drainage Criteria, a minimum culvert capacity is the capacity required to convey the 10-yr storm. However, the minimum culvert diameter allowed in public right-of-way is 15-inches. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties. Culvert sizing needs to account for the Weld County requirement that a road cannot be overtopped by more than 6-inches of water during the 10-yr event. In jurisdictions other than Weld County, use the jurisdiction's applicable culvert sizing criteria. Table C-1 may be used as a general design guide, but size is ideally based upon site-specific hydrologic analysis.

Culvert

C

Table C-1

Drainage Area (acres)	Size of Drainage Structure (diameter and area)			
	Steep Slopes (Light Vegetation) C=0.7		Gentle Slopes (Heavy Vegetation) C=0.2	
	Round Pipe (In)	Area (sq.ft)	Round Pipe (In)	Area (sq.ft)
0-10	30"	4.9	18"	1.8
10-20	42"	9.6	24"	3.1
20-35	48"	12.6	30"	4.9
35-75	72"	28.3	42"	9.6
75-125	84"	38.5	48"	12.6
125-200	96"	50.3	60"	19.6

* Due to site specific conditions this table may not be used.

Depth

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost to road use and erosion. Weld County requires a minimum of 1–foot of cover. If 1-foot of cover is not possible, the culvert material must be rated for a minimum of HS-20 loading or the largest expected loads crossing it (oil rigs, semis, etc.)

Firmly compact well-graded fill material (soil or road base) around culverts, particularly around the bottom half, using placement in layers to achieve a uniform density. Use slightly plastic sandy gravel with fines. Avoid the use of fine sand and silt rich soils for bedding material because of their susceptibility to piping. Pay particular attention to culvert bedding and compaction around the haunches of the pipe. Do not allow the compaction to move or raise the pipe. In large fills, allow for settlement.

End Sections

Culverts installed in Weld County public right-of-ways must be equipped with a flared end section on the entrance and outlet. Erosion protection such as riprap may be required. See Culvert Protection BMP Fact Sheet for details on riprap installation.

Drainage crossing culverts

Make road crossings of natural drainages perpendicular to the drainage to minimize pipe length and area of disturbance (See Drainage Crossing Culvert Detail).

Use single large pipes versus multiple smaller diameter pipes to minimize plugging potential in most channels (unless roadway elevation is critical). In very broad channels, multiple pipes are desirable to maintain the natural flow spread across the channel. All culverts should be concrete corrugated metal pipe made of steel or aluminum, or properly bedded and backfilled corrugated plastic pipe.

Culvert

C

Align culverts in the bottom and middle of the natural channel flowline so that installation causes no change in the stream alignment or stream bottom elevation. Culverts should not cause damming or pooling or increase stream velocities significantly.

Extend the outlet of the culvert at least one foot beyond the toe of the slope to prevent erosion of the fill material. Alternatively, use retaining walls (headwalls) to hold back the fill slope.
It may be necessary to install rip rap, erosion control blanketing, or a combination of both or other energy-dissipater device at the outlet end of the culvert to reduce soil erosion or to trap sediment (See Culvert Protection BMP Fact Sheet).

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Ditch Relief Culverts See Ditch Relief Culvert Detail and the Discharge Locations for Ditch Relief Culverts Detail for installation details.

Ditch relief culverts can provide better flow when skewed 0 to 30 degrees perpendicular to the road.

The culvert gradient should be at least 2% greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris from plugging the culvert inlet. Discharge the culvert at natural ground level where possible (see Discharge Locations For Ditch Relief Culverts Detail, Type A), on firm, non-erosive soil or in rocky or bushy areas. If discharging on fill slopes, armor outlets with riprap or logging slash (see Discharge Locations For Ditch Relief Culverts Detail, Type B.)

Extend the inlet of the culvert at least one foot beyond the flowline of the roadside ditch. Extend the outlet of the culvert at least one foot beyond the toe slopes to prevent erosion of the fill material.

It may be necessary to install riprap or other energy-dissipater devices at the outlet end of the culvert to prevent soil erosion or to trap sediment (see Culvert Protection BMP Fact Sheet). Spacing of culverts is dependent on the road gradient, soil types, and runoff characteristics according to the table below.

Soil Type	Road Grade		
	3-4%	5-8%	9-12%
Highly Corrosive Granitic or Sandy	240'	180'	140'
Intermediate Erosive Clay or Load	310'	260'	200'
Low Erosive Shale or Gravel	400'	325'	250'

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Maintenance and Removal Considerations

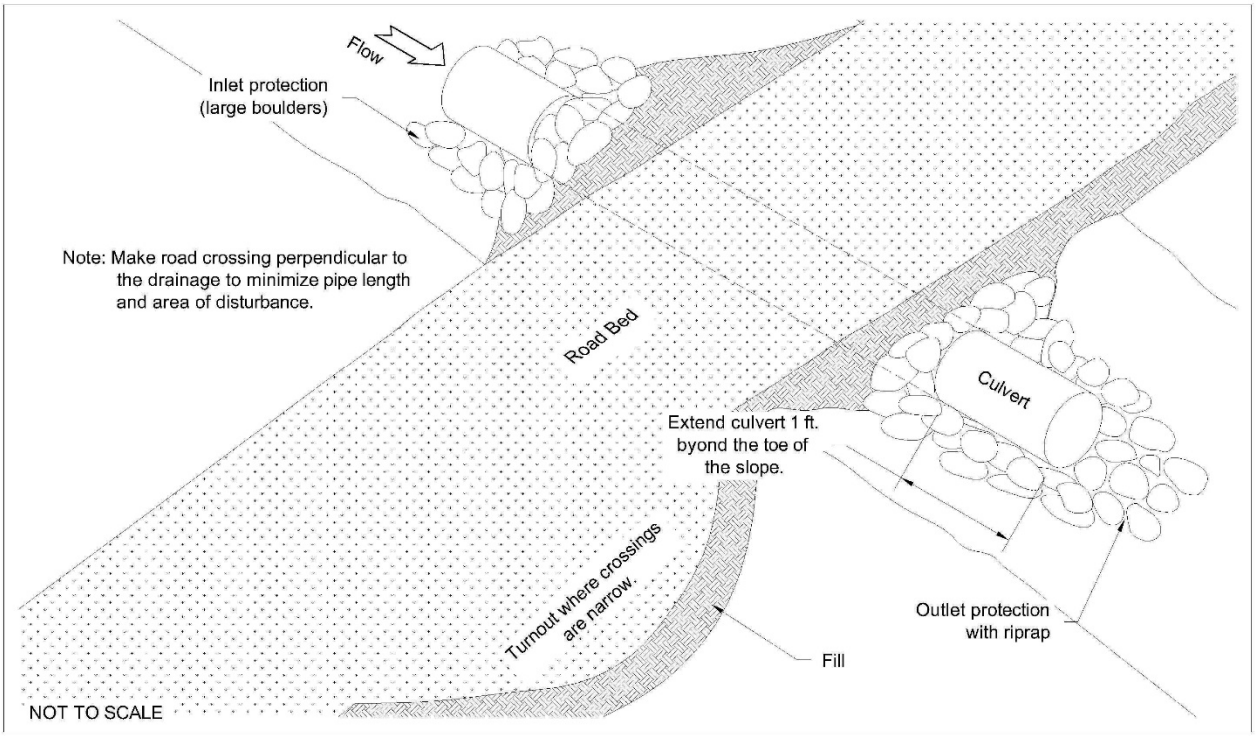
The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). If any damage to culvert or inlet/outlet protection is noted or if there is any evidence of scour, repairs should be made immediately. Any debris that may be blocking the culvert inlet or outlet should be removed. Culverts are typically left in place for permanent drainage for the site.

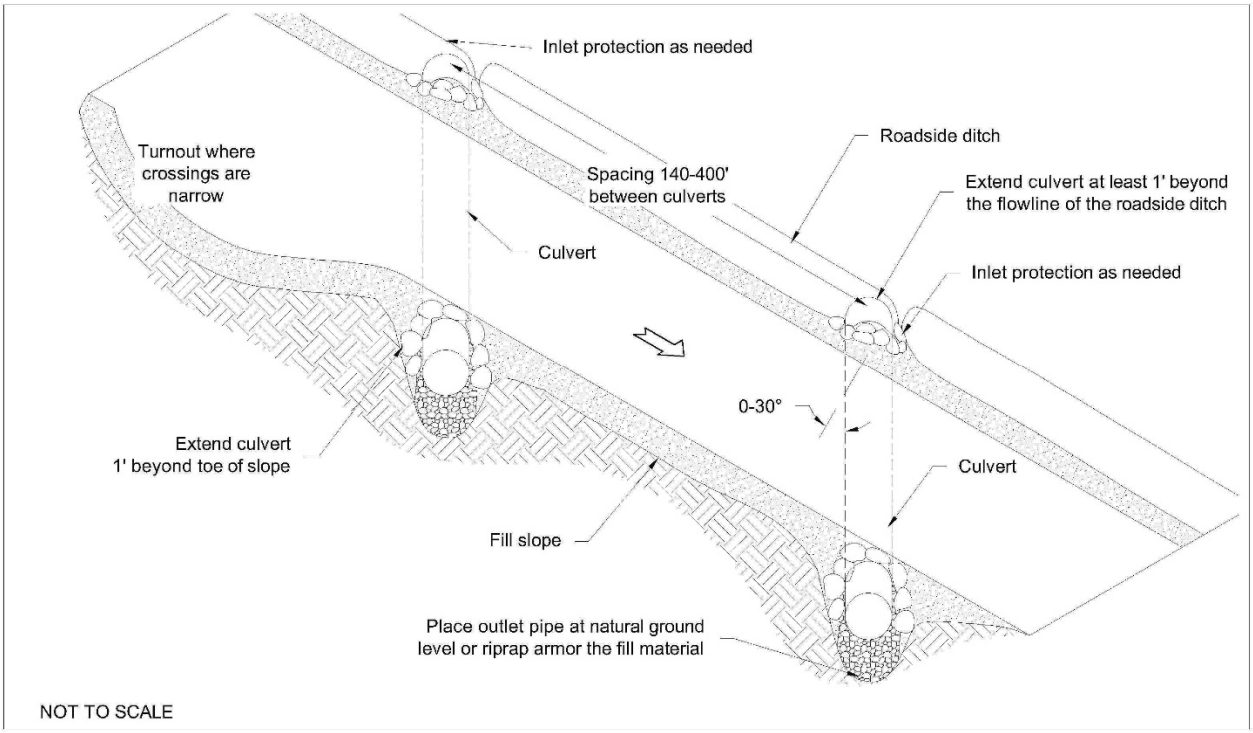
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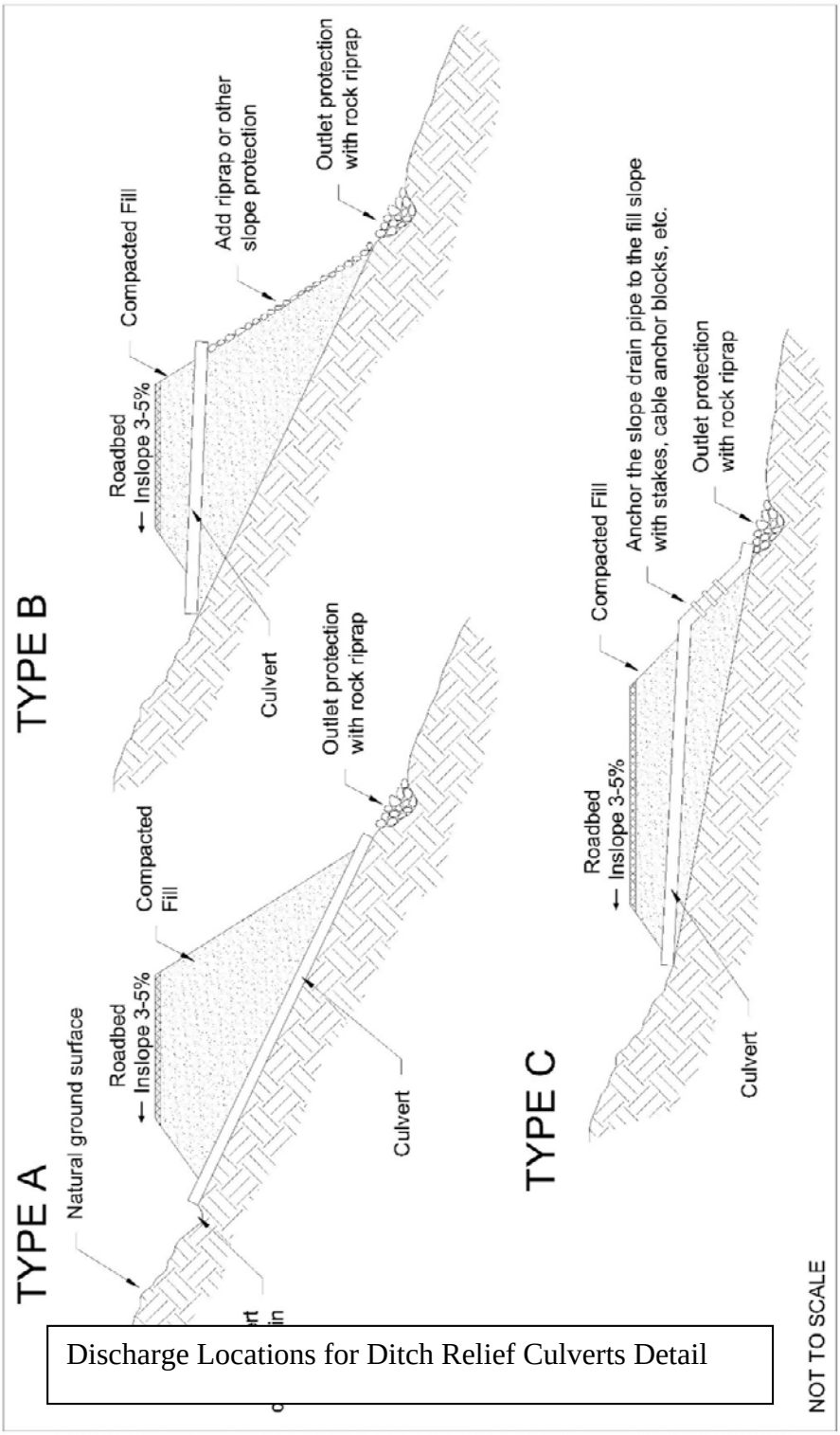




Ditch Relief Culverts Detail

Culvert

C



Discharge Locations for Ditch Relief Culverts Detail

Culvert Protection

IPC/OPC

Description

Culvert protection may be required at the inlet (upstream side) of the culvert and/or the outlet side of the culvert (downstream side).



Photograph. Riprap outlet protection with flared end

Culvert inlet protection may involve placing riprap, gabions, sediment control logs, rock socks, erosion control blankets/turf reinforced mats, and/or any other protection at the inlet pipes. Riprap, or other energy-dissipating devices, will reduce the velocity of stormwater flows and armor the banks, thereby preventing erosion and helping to protect the inlet structure. Sediment control logs minimize the potential for sediment from upgradient construction activities to enter the culvert.

Culvert outlet protection typically involves placing riprap or other appropriate energy-dissipating devices at the outlets of the pipes to reduce the velocity of stormwater flows, reducing the scour potential at stormwater outlets, protecting the outlet structure, and minimizing the potential for erosion downstream. Sediment control logs are also frequently used on the outlet to minimize erosion; however, they do not provide the energy dissipation that rock does.

Applicability

To prevent erosion from occurring at the culvert inlet and outlet, and to reduce the potential for sediment to enter into the culvert, culvert protection may be necessary. Riprap should be used where velocities and energies at the inlets and outlets of culverts are sufficient to erode the structure or the next downstream reach.

Limitations

Inlet protection should not block flow into the culvert. Rock aprons at the culvert outlets should not be placed on slopes steeper than 10 percent. Runoff from pipe outlets at the top of cut/fills or on slopes steeper than 10 percent should be routed via slope drains or riprap chutes to a rock apron at the toe of the slope. Otherwise, the flow will re-concentrate and gain velocity as the flow leaves the apron.

Design Criteria and Construction Specifications

Culvert Inlet protection

Erosion control blanket, riprap, gabions, rock socks or sediment control logs at culvert inlets shall be designed according to the appropriate BMP Fact Sheet for that material.

Culvert Inlet Protection Detail shows typical culvert inlet protection. However, site specifics shall dictate actual design. Modification which differ from the detail sheet must be based on good engineering and hydrologic design and documented in the SWMP.

Culvert Protection

IPC/OPC

Culvert Outlet Protection

Sediment control logs may also be used for temporary outlet protection during construction (see Sediment Control Log Culvert Outlet Protection Detail). If additional erosion protection and energy dissipation are required, riprap may be needed. If riprap is required and the riprap will be in place less than two years, the Temporary Outlet Protection Riprap Detail may be used. If the riprap will be permanently installed, the design methodologies outlined in the Hydraulic Structures chapter of the UDFCD Manual (Volume 2) must be followed.

Maintenance and Removal Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Inspect for debris at the entrance to culverts and within culverts. Inspect culvert protection for damage and erosion. The maintenance needs are usually very low for properly installed riprap aprons at culvert outlets; however, inspect for evidence of scour beneath the riprap at outlet aprons or dislodged stones which have moved beyond the outlet structure. Corrective action items found to reduce the effectiveness of the culvert or culvert outlet protection should be repaired immediately. See additional notes at the end of the details for maintenance.

References

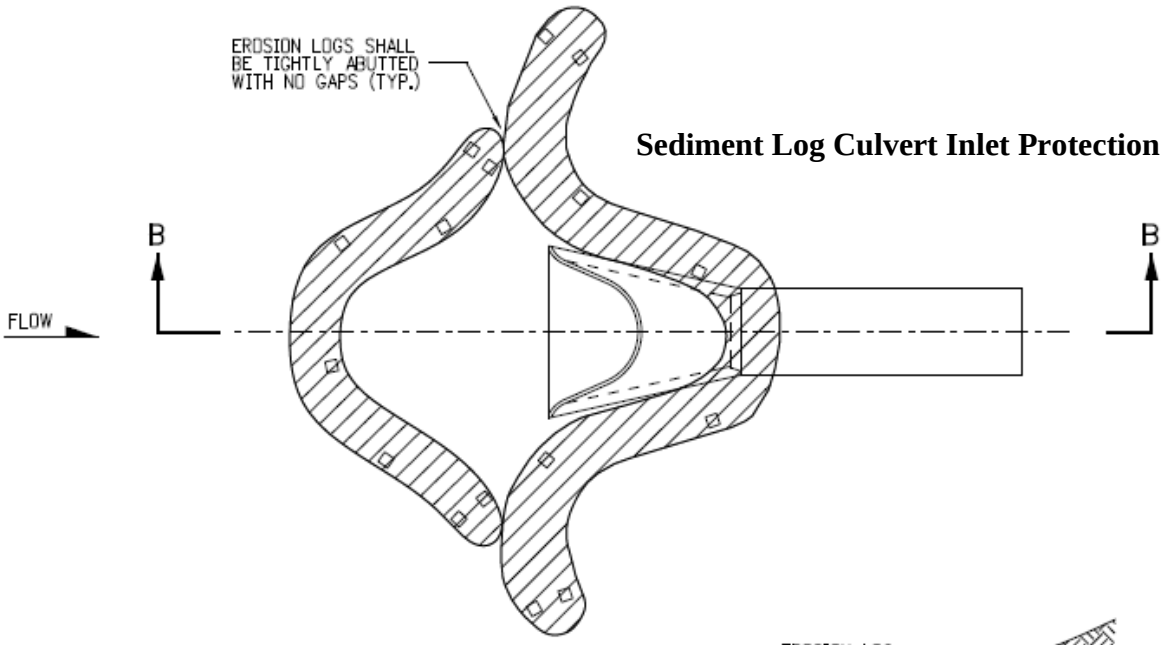
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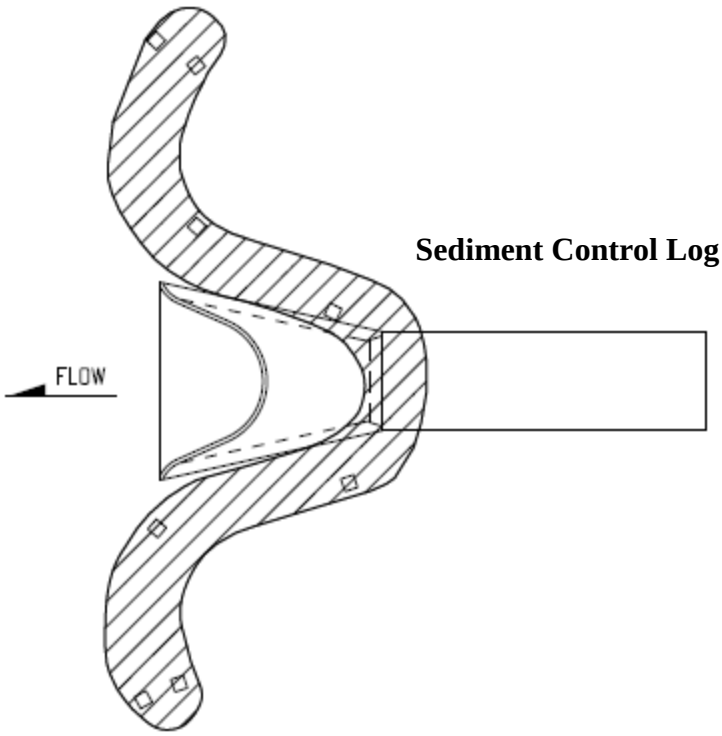
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Culvert Protection

IPC/OPC



Sediment Log Culvert Inlet Protection

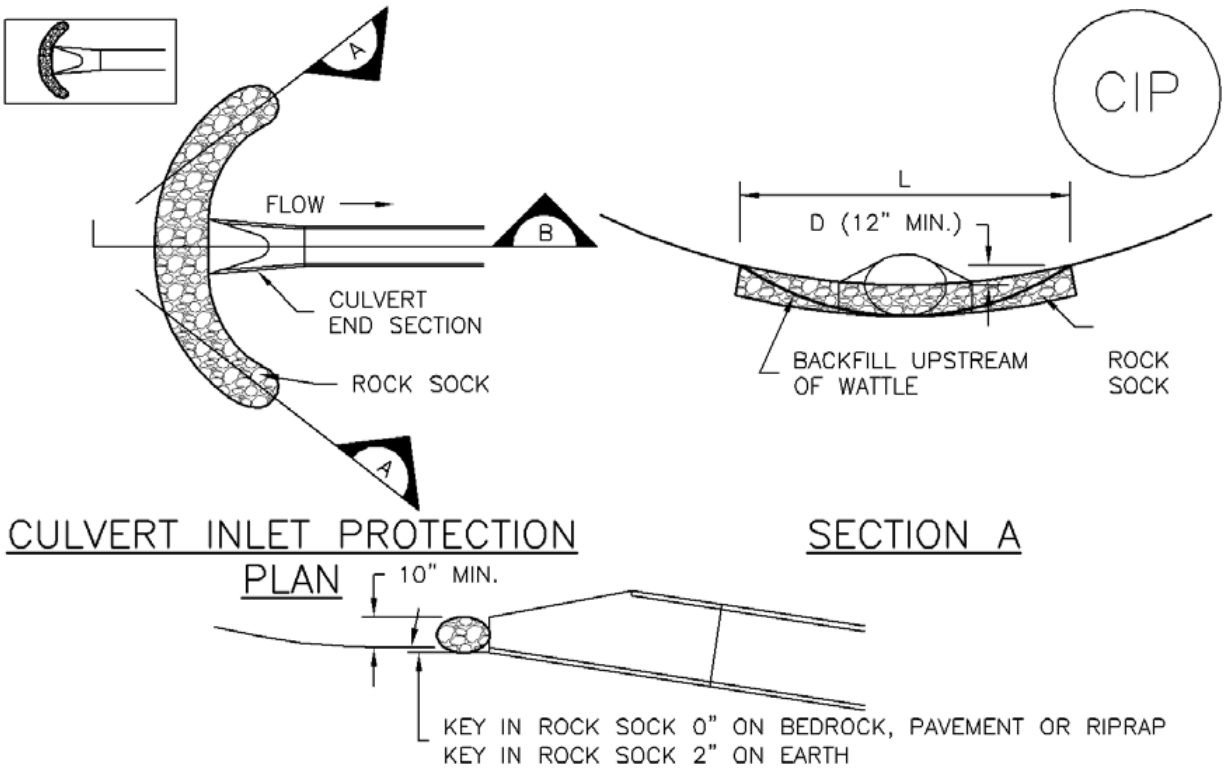


Sediment Control Log Culvert Outlet Protection

Culvert Protection

IPC/OPC

CULVERT PROTECTION DETAIL



CIP-1. CULVERT INLET PROTECTION – ROCK SOCK DETAIL

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CULVERT INLET PROTECTION.

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL OR SEDIMENT CONTROL LOG.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

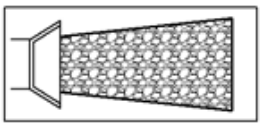
(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

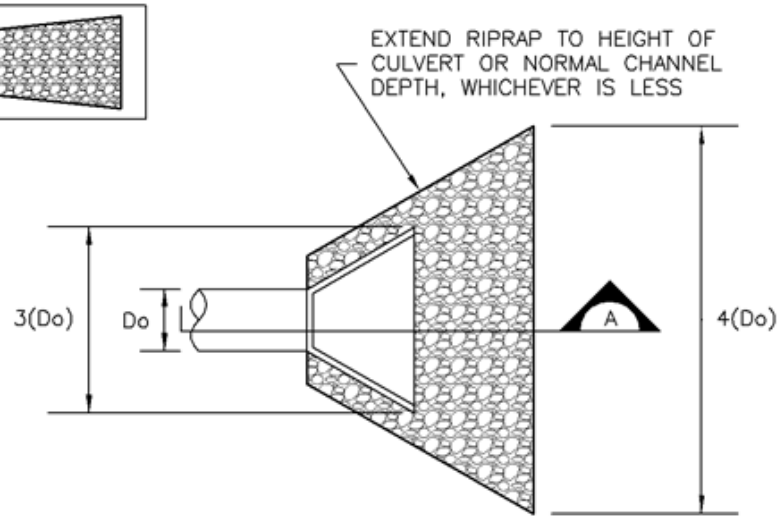
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Culvert Protection

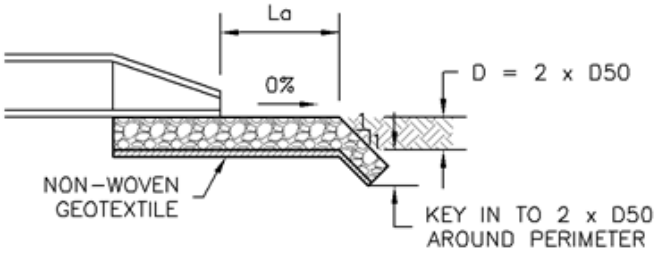
IPC/OPC

OP





TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

TEMPORARY OUTLET PROTECTION RIPRAP DETAIL

Culvert Protection

IPC/OPC

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   - –LOCATION OF OUTLET PROTECTION.
   - –DIMENSIONS OF OUTLET PROTECTION.

2. DETAIL IS INTENDED FOR PIPES WITH SLOPE $\leq$ 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Temporary and Permanent Seeding (TS/PS)

TS/PS

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.



Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period, proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms,

rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period, plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. See applicable seed mixes and/or landowner agreements for revegetation requirements. Other seed mixes may be used if the site conditions warrant a different seed mix.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Various Known Seeding Mixes for Kerr-McGee

Anadarko Dryland Pasture Mix (Lot 20071)

Kind and Variety	Pure%	Germ%	Origin
Tetraploid Perennial Ryegrass	19.68	91	OR
Smooth Brome, Lincoln	18.66	96	KS
Intermediate Wheatgrass, Oahe	14.76	91	SD
Dahurain Wildrye	14.44	93	WA
Orchardgrass, Paiute	14.29	94	OR
Pubescent Wheatgrass, Luna	13.35	97	CAN
Crop: .23% Inert: 3.94% Weeds: .15% Net Wt: 27.9167# (25 pls) 1 ac			

H2 Salty Dog Mix (Lot 20195)

Kind and Variety	Pure%	Germ%	Origin
Newhy Saltlander Wheatgrass	36.34	97	MT
Western Wheatgrass	15.85	98	KS
Canada Wildrye	15.48	97	CAN
Indian Ricegrass	13.19	94	WA
Tall Fescue	8.61	91	OR
Alkali Grass, Fults	3.44	95	WA
Alkali Sacaton	.82	80	OK
Crop: .00% Inert: 5.75% Weeds: .52% Net Wt: 15.34# (13.78 pls) 1 ac			

Temporary and Permanent Seeding (TS/PS)

TS/PS

Sandy Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.4	9.0	15%
Intermediate Wheatgrass	Thinopyrum intermedia	4.5	9.0	15%
Sand Dropseed	Sporobolus cryptandrus	0.1	9.0	15%
Indian Ricegrass	Achnatherum hymenoides	2.8	9.0	15%
Green Needlegrass	Nassella viridula	2.2	9.0	15%
Sideoats Grama	Bouteloua curtipendula	2.05	9.0	15%
Switchgrass	Panicum virgatum	0.7	6.0	10%
Total	--	12.6	60.0	100%

Clay Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	3.3	12.0	20%
Sideoats Grama	Bouteloua curtipendula	2.7	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Green Needlegrass	Nassella viridula	1.4	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	11.8	60.0	100%

Temporary and Permanent Seeding (TS/PS)

TS/PS

Salty Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Alkaligrass (Fults)	Puccinellia distans	0.5	15.0	25%
Newhy Saltlander	Hybrid wheatgrass	4.3	12.0	20%
Tall Fescue	Festuca arundinacea	2.3	12.0	20%
Indian Ricegrass	Achnatherum hymenoides	1.9	6.0	10%
Alkali sacatons	Sporobolus airoides	0.1	6.0	10%
Western Wheatgrass	Pascopyrum smithii	1.2	3.0	5%
Canada Wildrye	Elymus Canadensis	2.3	6.0	10%
Total	--	12.6	60.0	100%

Lowland Equine Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Green Needlegrass	Nassella viridula	2.9	12.0	20%
Timothy	Phleum Prantense	0.4	12.0	20%
Intermediate Wheatgrass	Thinopyrum intermedia	5.9	12.0	20%
Sand Dropseed	Sporobolus cryptandrus	0.1	12.0	20%
Sideoats Grama	Bouteloua curtipendula	1.4	6.0	10%
Little Bluestem	Schizachyrium scoparium	1.0	6.0	10%
Total	--	11.7	60.0	100%

Lowland Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Mountain brome	Bromus marginatus	5.8	12.0	20%
Blue grama	Bouteloua gracilis	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	1.6	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	12.4	60.0	100%

Arkansas Valley Seed, Inc.

Premium Irrigated Pasture Mix

A mixture of perennial, cool season grasses formulated with varieties that produce the highest quality and yielding forage. These grasses are palatable and excellent for grazing and hay production. Performs well in the Intermountain West as well as the High Plains of the Rocky Mountain region.

Characteristics:

Grows 2-6 feet tall
Premium varieties
High yielding and quality irrigated forage

Seeding Rate:

New Seeding
Broadcast: 30-35 lbs/acre
Drilled: 20-25 lbs/acre
Overseeding
Broadcast: 15-20 lbs/acre
Drilled: 10-15 lbs/acre

Mix Contains:

25% Elite Tetraploid Perennial Rye

Bunchgrass with ermination in 5-10 days.
One of the most widely used grasses and is adaptable to a wide variety of soils and climate conditions. A leafy pasture type perennial rye.

25% Potomac Orchardgrass

Bunchgrass with germination in 14-21 days.
One of the earliest species to exhibit growth in the spring, making tremendous forage potential under cooler conditions. Performs well on different textured soils. Found throughout the west, this grass is great forage and hay producer.

20% Improved Meadow Brome

Bunchgrass with germination in 10-14 days.
Meadow Brome is a long-lived perennial that is slow to establish. It is very palatable and highly productive.

15% Crown Royale Orchardgrass

Bunchgrass with germination in 14-21 days.
Similar to Potomac, but with a later maturity date.

10% Manchar Smooth Bromegrass

Sod-forming grass with germination in 10-14 days.
Smooth bromegrass is resistant to drought and extremes in temperature. It is the most widely used of the cultivated brome grasses. Grows throughout most of the US.

Foothills Mix

A mixture developed for elevations of 3,000 to 8,000 feet to provide natural cover under dryland conditions. Contains both cool and warm season grasses adapted to the Western Great Plains and Southwest region. Has excellent cold and drought tolerance. Good for soil stabilization on poor soils.

Characteristics:

Grows 36-60 inches with average rainfall
Excellent natural cover for dryland areas

Seeding Rate:

New Seeding
Broadcast: 20-25 lbs/acre
Drilled: 15-20 lbs/acre
Overseeding
Broadcast: 10-15 lbs/acre
Drilled: 5-10 lbs/acre

Mix Contains:

25% Annual Ryegrass

Cool season bunchgrass with germination in 5-10 days.
Noted for quick germination. Provides fast green up and root structure to stabilize soil.

15% Slender Wheatgrass

Cool season bunchgrass with germination in 21-28 days.
A native species to the mountain and intermountain areas of the western United States and the northern Great Plains.

12% Pubescent Wheatgrass

Cool season bunchgrass with germination in 14-21 days.
Drought tolerant, and winter hardy grass with deep rooted system making an excellent soil binder.

10% Mountain Brome

A cool-season bunchgrass with germination in 10-14 days.
Survives on thin, dry or coarse soils, and displays strong winter hardiness. Will produce best in moist deep fertile soils.

10% Hard Fescue
Cools bunchgrass with germination in 7-10 days.
Well adapted to many soil types and often used for erosion control.

10% Canada Bluegrass
Cool season bunchgrass with germination in 14-21 days.
Often used for soil stabilization.

6% Sideoats Grama
Warm season bunch/sod forming grass with germination in 14-21 days.
A medium-sized perennial 15 – 30" tall, it is adapted to most soil conditions.

6% Big Bluestem
Warm season sod-former with germination in 14-21 days.
It is tall grass, reaching a height of 6 to 8 feet on most sites when left un-grazed.

5% Blue Grama (Coated)
Warm season bunchgrass with germination in 7-10 days.
This grass demonstrates good drought, fair salinity, and moderate alkalinity tolerances.

5% Switchgrass
Warm season bunchgrass with germination in 21-28 days.
Very tolerant of poor soils, flooding and drought. Often used in reclamation of sand dunes and dikes.

1% Sand Dropseed
Warm season bunchgrass with germination in 14-21 days.
Commonly grows on sandy soils but is adapted to medium textured soils also.

Landowners may also have special requests for specific seed mixes. In these cases, those seed mixes will take precedence.

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

Section 7

Dust Suppressant Plan

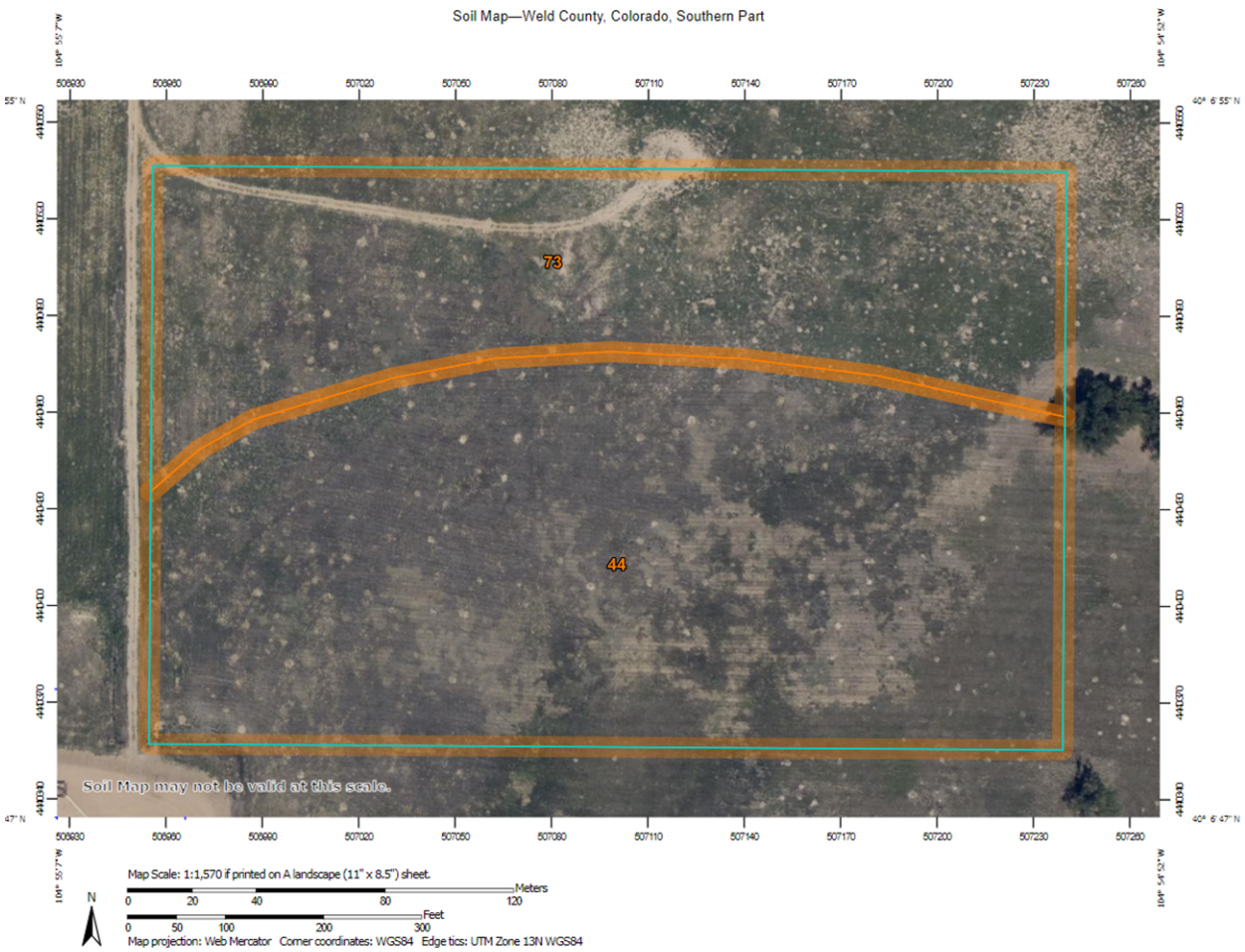
Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP (KMOG)
Dust Mitigation Plan - Columbine 4-29HZ

KMOG has developed this Dust Mitigation Plan in compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 427.

427.a(1) Soil Type



Map Unit Symbol	Map Unit Name
44	Olney loamy sand, 1 to 3 percent slopes
73	Vona loamy sand, 3 to 5 percent slopes

427.a(2) Proposed Vehicle Speed Limits to Minimize Dust

- 10 mph on lease road from WCR 18/Grant Ave. south into location and 5 mph once vehicles reach well pad/ facility

427.a(3) Total Area of Disturbance (In Acres)

- 12.66 acres (Well pad and Facility)

427.a(4) Whether Access Roads are Paved

- Access roads are not paved

427.a(5) Number of Anticipated Truck Trips During Each Phase

- Construction Phase (includes pad and production facility construction) – 4,747 truck trips
- Drilling Phase – 4,508 truck trips
- Completions Phase – 5,845 truck trips
- Production Phase – 188/ average annual truck trips

427.a(6) A plan for Suppressing Fugitive Dust Caused Solely by Wind

- On active locations, in the event dust is caused solely by the wind KMOG will have fresh water deployed to suppress dust for the duration of the wind event
- In addition, disturbed soils will be placed to minimize ability for soil particles to become airborne. Various techniques to be used depending on soil type specific to each location:
    - Track pack/compact topsoil piles, consolidate soil used to construct perimeter ditch/berm and sediment traps
    - Hydro mulch and/or hydroseed topsoil piles and/or other stormwater BMP features
    - Seed/straw crimp disturbed soils where feasible
    - Place and compact gravel layer on working pad surfaces and access roads

427.a(7) Best Management Practices

- KMOG will proactively deploy fresh water to suppress dust along access road to well pad/ facility during all phases of pre-production operations
- Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach well pad/ facility
- Access roads and Vehicle Tracking Control will receive maintenance as needed throughout operations
- In the event of high winds that generate dust that cannot be mitigated with an application of water, KMOG will shut down construction operations
- KMOG will coordinate with Firestone and Weld County to apply magnesium chloride on WCR 18 from our location entrance east to WCR 19 (1.7 miles)

Section 8

Wildlife Assessment and Weed Management Plans

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

June 16, 2021

Joseph Riemer
Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Subject: Summary of the Environmental and Cultural Considerations Pertaining to the Columbine Project

Dear Mr. Riemer,

Two Dot Consulting, LLC (2DOT) has prepared this letter on behalf of Kerr-McGee Oil & Gas Onshore LP (KMOG) to summarize the current environmental considerations pertaining to the environmental surface inspection (Survey) for the Columbine multi well pad and production facility (Project). The environmental considerations covered by the Survey included the following: a wildlife and wildlife habitat assessment, an evaluation of the impacts of the proposed operation on wildlife and wildlife habitat, an evaluation and assessment of Waters of the United States (WOTUS) and wetlands, a updated Phase I environmental site assessment (ESA), a cultural desktop review, and a summary of the ecological site characteristics. 2DOT conducted the Survey on 6/9/2021.

1. Project Location and Site Conditions

The Project is located in the Town of Firestone in section 29, township 2N, range 67W, Weld County, CO (**Appendix A**: *Figure 1*). The Project is approximately 12.6 acres and is situated entirely on agricultural land with an existing oil and gas access road and wellhead located within. Weld County Road (WCR) 18 is located approximately 520 feet north and WRC 15 is approximately 1,500 feet west of the Project (**Appendix A**: *Figure 2*).

2. Wildlife and Wildlife Habitat Assessment/Evaluation of Impacts to Wildlife and Wildlife Habitat

A. Raptors

2DOT conducted a site visit on 3/11/2021. During the site visit, four raptor nests, RNest_407, RNest_408, RNest_1286, and RNest_1287 were observed within 0.5 mile of the Project (**Appendix A**: *Figure 2*). RNest_408 and RNest_1287 were active and occupied by Swainson's hawks and hatchlings. RNest_407 and RNest_1286 were in good condition, had a direct line-of-sight to the Project, and were unoccupied during the site visit. A subsequent site visit on 6/9/2021 was performed. RNest_408 was active, with a single adult Swainson's hawk observed; RNest_407 and RNest_1286 were inactive. RNest_1287 was undetermined. See Table 1 for a summary of the survey observations. Raptor surveys are recommended if the Project is constructed between 2/15 and 7/31, or until nest has fledged if active nest is observed.

Table 1: Raptor Nests Within 0.5 Mile of Project

Nest ID	Location [NAD 1983 (2011)]		Nest Condition	Distance to Project (feet)	Status
	Latitude	Longitude			
RNest_407	40.11441	-104.915	Good	Within Project	Inactive
RNest_408	40.11633	-104.919	Good	434 North	Active
RNest_1286	40.11734	-104.921	Good	1,495 Northeast	Inactive
RNest_1287	40.12127	-104.9/12/	Good	2,347 Northeast	Undetermined

B. Eagles

There were no eagle nests or bald eagle winter night roosts observed within 0.5 mile of the Project. The nearest mapped eagle nest, Nest_13, is located approximately 1.08 miles east of the Project. The nearest mapped bald eagle winter night roost is located over five miles northwest and northeast of the Project. There are no current constraints pertaining to bald eagles.

C. Burrowing Owls

There is suitable burrowing owl habitat located approximately 200 feet east of the Project (**Appendix A**: *Figure 2*). Burrowing owl surveys were conducted on 7/15, 7/22, and 7/29/2020. No burrowing owls were observed. 2DOT recommends an additional survey be conducted to confirm that burrowing owls have not moved into the Project if construction activities are set to occur prior to 8/31.

D. Preble's Meadow Jumping Mouse

The Project is located within Colorado Parks and Wildlife (CPW) mapped Preble's Meadow Jumping Mouse (PMJM) overall range. The U.S. Fish and Wildlife Service (USFWS) recommends that projects within 300 feet of the 100-year floodplain associated with rivers, creeks, and their tributaries (and projects which may have potential secondary impacts to such areas) be assessed as to their potential direct and indirect impacts to PMJM and PMJM's habitat. However, no suitable habitat exists within the Project. Therefore, no constraints are expected pertaining to PMJM.

E. Ute Ladies'-Tresses Orchid

No suitable habitat was identified for the Ute ladies'-tresses orchid. There are no current constraints pertaining to the Ute ladies'-tresses orchid.

3. WOTUS and Wetlands

No WOTUS or wetlands were identified within the Project. The nearest hydrologic feature is an excavated pond located approximately 480 linear feet northeast of the Project. An ephemeral drainage is present south of the Project, where a berm has been constructed to redirect surface water flow following storm events (**Appendix A:** *Figure 2*).

4. Phase I Environmental Site Assessment (ESA) and Cultural Desktop Review

A. Phase I ESA

2DOT conducted an updated Phase I ESA of the Project on 6/11/2021. No recognized environmental conditions, business environmental risks, or *de minimis* conditions were found. See *(603-128) Columbine Updated Phase I ESA June 2020* for the full Phase I report.

B. Cultural Desktop Review

A search of the Colorado Inventory of Cultural Resources was received from the Office of Archaeology and Historic Preservation on 7/7/2020. No cultural sites or surveys were located in the Project (**Appendix** B: *Cultural Review*).

5. Ecological Site Characteristics

A. Site Description

The Project is located within an agricultural field (**Appendix C**: *Photographs*). During the site visit on 6/9/2021, the field was a recently harvested of what appeared to be a wheat crop (*Triticum* sp.). The topography is uniformly flat and even with very little elevation gain or loss. There was no sign of livestock observed within the Project. An oil and gas access road that leads to a wellhead intersects the northern end of the Project.

B. Soils

The Project is comprised of Olney loamy sand, 1 to 3 percent slopes and Vona loamy sand, 3 to 5 percent slopes.

C. Vegetative Communities

The Project is comprised of entirely cropland (**Appendix C**: *Photographs*). Several opportunistic species were also observed within the cultivated areas, including field bindweed (*Convolvulus arvensis*), kochia (*Bassia scoparia*), Russian thistle (*Salsola tragus*), thistle poppy (*Argemone polyanthemos*), cheatgrass (*Bromus tectorum*), and smooth brome (*Bromus inermis*).

D. Noxious Weeds

The following Colorado Noxious Weeds were observed dispersed throughout the Project; field bindweed (List C) and cheatgrass (List C).

E. Proposed Mitigation to Address Impacts

The proposed mitigation to address the potential impacts to vegetation is to limit the potential of noxious weeds being introduced to the Project. Where needed, best management practices (BMPs) such as routine equipment inspections and wash down stations will limit the potential of introducing noxious weeds and impacts to vegetation. 2DOT also recommends chemically treating the noxious weeds within the Project. Herbicide application in compliance with the Colorado Department of Agriculture has been proven to effectively treat noxious weeds.

Upon KMOG's completion of the proposed disturbance, restoration and revegetation should occur as soon as practicable and follow COGCC 1003. Interim Reclamation rules and regulations.

If the disturbance occurs on crop lands, then the following is recommended to be implemented: COGCC 1003.e(1): "All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour, and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established".

To obtain the final reclamation threshold for release of financial assurance, the following shall be met: COGCC 1004.c(1): "reclamation has been performed as per Rules 1003 and 1004, and observation by the Director over two growing seasons has indicated no significant unrestored subsidence."

Please let me know if you have any questions.

Sincerely,

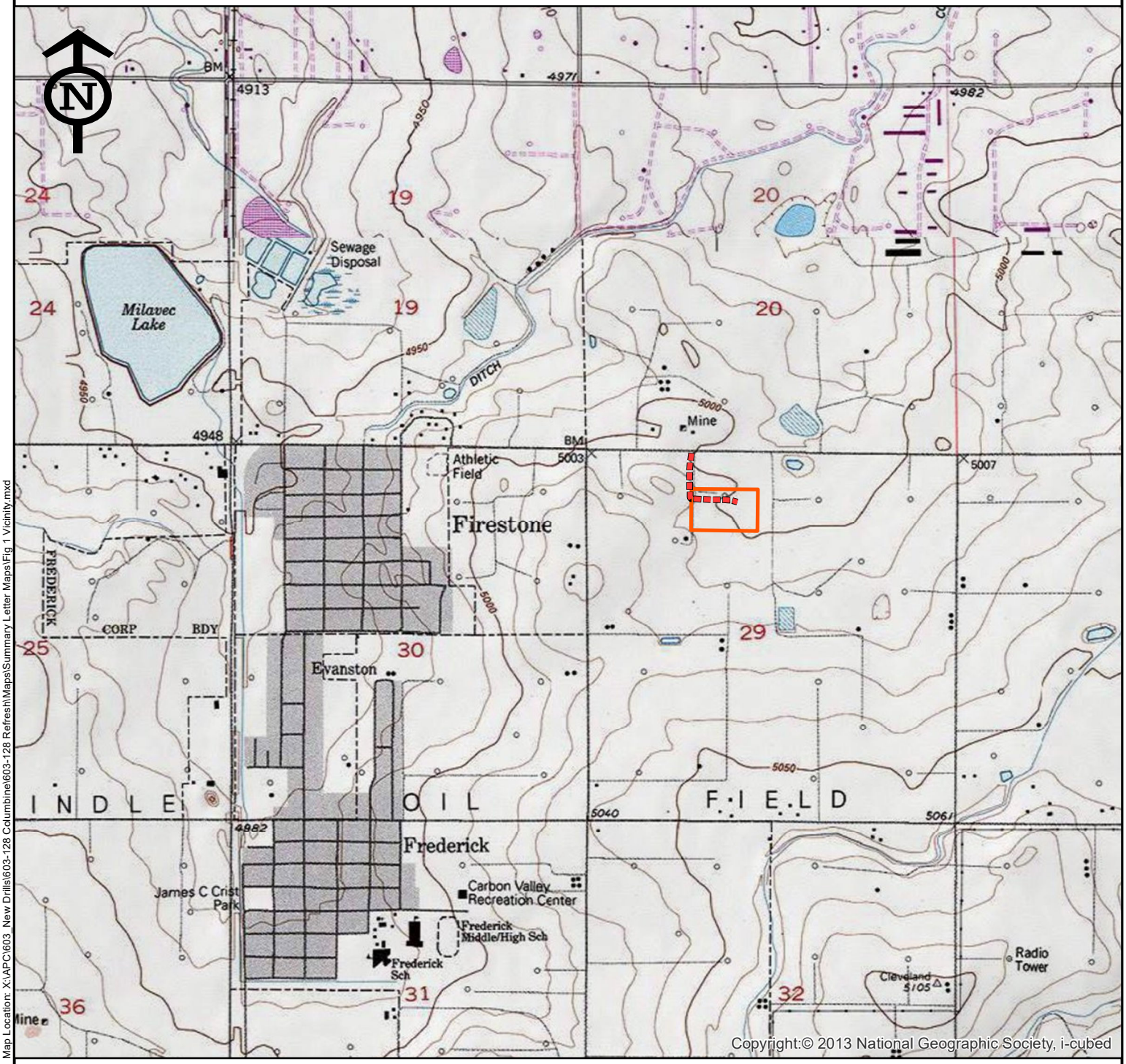
SAM JOSEPH
project manager ● NEPA ● wetlands
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Appendix A: *Figures*

Columbine

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-128 Columbine\603-128 Refresh\Maps\Summary Letter Maps\Fig 1 Vicinity.mxd

Preliminary Survey Area

Access Road

PREPARED BY:

2. two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 1,000 2,000 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/11/2021
Drafted By: MC Reviewed By: SJ

Vicinity Map
Figure 1

(603-128) Columbine

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-128 Columbine\603-128 Refresh\Maps\Summary Letter Maps\(603-128) Columbine_Environmental Map 2_210611.mxd

- Raptor Nest
- Raptor Nest Removed
- Potential Burrowing Owl Habitat
- Raptor Nest 600 ft Buffer
- Preliminary Survey Area
- Kerr-McGee Facilities Half Mile Buffer
- Access Road
- NHD Mapped Ditch
- NHD Mapped Lake/Pond
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Riverine

PREPARED BY:

two dot
7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 650 1,300 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/11/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 2



Appendix B: *Cultural Review*

HISTORY COLORADO
Office of Archaeology and Historic Preservation
1200 Broadway, Denver, Colorado 80203

Morgan Colacone
Two Dot Consulting
7674 Grandview Ave, Ste. 210
Arvada, CO 80002

July 7, 2020

Re: Columbine
File Search No. 22883

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources within the area shown in the provided map, located in the following areas:

PM	T	R	S
6th	2N	67W	29

0 sites and 0 surveys were located in the designated area(s).

If information on any district, site, building, structure, or object in the project area was found, detailed information follows the summary. If no properties were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Our letter should not be interpreted as formal consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) or the Colorado Register of Historic Places (CRS 24-80.1). In the event that there is federal or state agency involvement, please note that it is the responsibility of the agencies to meet the requirements of these regulations.

We look forward to consulting with you regarding the effect of the proposed project on significant cultural resources in accordance with the Advisory Council on Historic Preservation regulations titled "Protection of Historic Properties" or the Colorado Register of Historic Places, as applicable (http://www.historycolorado.org/oahp/consultation-guidance).

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3392. Thank you for your interest in Colorado's cultural heritage.

Steve Turner, AIA
State Historic Preservation Officer

*Information regarding significant archaeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.



Appendix C: *Photographs*



Photograph 1. Center of the Project.



Photograph 2. Center of the Project. View is looking east towards nest tree with RNest_407.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Proposed wellhead locations within the Project.

Section 9

Phase I Environmental Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Phase I Environmental Site Assessment Update

Columbine Oil and Gas Multi-Well Pad and Production Facility
Town of Firestone, Colorado

June 2021

Prepared for:

Kerr-McGee Oil and Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Prepared by:

Two Dot Consulting, LLC | 7674 Grandview Avenue Suite 210 | Arvada CO 80002 | 303.953.2255 | www.2dotconsulting.com

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Acronyms and Abbreviations

2DOT	Two Dot Consulting, LLC
AAI	All Appropriate Inquiry
AMSL	Above Mean Sea Level
APCDP	Air Pollution Control Division Permitted Facilities
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity Use Limitations
BER	Business Environmental Risk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CREC	Controlled Recognized Environmental Condition
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
HREC	Historical Recognized Environmental Condition
IPaC	Information for Planning and Consultation
KMOG	Kerr-McGee Oil & Gas Onshore LP
MSD	Minimum Search Distance
OSMRE	Office of Surface Mining Reclamation and Enforcement
PCB	Polychlorinated Biphenyl
REC	Recognized Environmental Condition
Site	Columbine Oil and Gas Project, Town of Firestone, Colorado
SMCRA	Surface Mining Control and Reclamation Act Sites
T&E	Threatened and Endangered
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
WOTUS	Waters of the U.S.

Executive Summary

Two Dot Consulting, LLC (2DOT) has conducted an updated Phase I Environmental Site Assessment (Phase I ESA) of the Columbine Oil and Gas Project located in the Town of Firestone, Colorado. This updated Phase I ESA has been prepared for Kerr-McGee Oil and Gas Onshore LP (KMOG) to determine the property's suitability for oil and gas operations.

The property, referenced herein as the "Site", encompasses approximately 12.8 acres for a proposed multi-well pad, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad boundary. The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of County Road 15 and County Road 18 in section 29, township 2 north, range 67 west (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with some oil and gas operations present and an existing access road. Land use adjacent to the Site consists of agriculture, rangeland, oil and gas operations, and private residences.

A review of historical sources, including aerial photographs and historical topographic maps, indicates the Site has been primarily vacant and agricultural land since 1937.

The Phase I ESA was conducted in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM). Elements of the Phase I ESA include: (i) interviews with owners, operators, and occupants; (ii) searches for recorded environmental records; (iii) reviews of federal, tribal, state, and local government records; (iv) visual inspections of the property and of adjoining properties; and (v) the declaration by the environmental professional responsible for the assessment.

The objective of this Phase I ESA was to identify the presence or likely presence, use, or release on the Site of hazardous substances or petroleum products as defined in ASTM Practice E 1527-13 as a Recognized Environmental Condition (REC). This report includes a summary of the site reconnaissance conducted on July 8, 2020 and June 9, 2021, a review of environmental databases, and a review of historical data sources. Any exceptions to or deletions from these ASTM practices are described later in this report.

RECs

Recognized Environmental Condition (REC):

A REC is defined as - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

Based on conditions noted within the Site, 2DOT did not identify any RECs in connection with the Site.

Findings and Conclusions

2DOT has developed the following findings and conclusions:

- The Site is comprised of predominately actively managed agricultural land with an oil and gas access road and wellhead located along the northern border of the Site and a well pad located adjacent to the southwestern border.

- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

1. Introduction

Two Dot Consulting, LLC (2DOT) conducted an updated Phase I Environmental Site Assessment (ESA) of the property proposed for the Columbine Oil and Gas Project (Site) located in the Town of Firestone, Colorado (Site). This updated Phase I ESA has been prepared for Kerr-McGee Oil & Gas Onshore LP (KMOG), in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM, 2013). This report documents our findings, opinions, and conclusions of the updated Phase I ESA.

1.1 Property Location and Description

The Site is a proposed oil and gas multi-well pad, production facility, and access road.

The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of the intersections of County Road 15 and County Road 18 in section 29, township 2 north, range 67 west.

The Site consists of approximately 12.8 acres of farmlands and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. See **Appendix A: Figure 2.**

The Site currently operates as agricultural land.

1.2 Purpose

2DOT understands that the purpose for conducting this updated Phase I ESA is to assess and document the current environmental conditions at the Site. The goal of the Phase I ESA is to identify recognized environmental conditions (RECs) in connection with the Site. ASTM Practice E 1527-13 defines the following categories of RECs:

Recognized Environmental Condition (REC):

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not RECs (see definition below).

ASTM E 1527-13 defines release as a release of any hazardous substance or petroleum product and shall have the same meaning as the definition of "release" in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 United States Code (U.S.C.) § 9601(22)).

Historical REC (HREC):

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Controlled REC (CREC):

A REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of

required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Additional conditions that are not included under the definitions of a REC, but are defined by ASTM Practice 1527-13 include:

De minimis:

A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Business Environmental Risk (BER):

A risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations.

1.3 Report Users

ASTM E1527-13, Section 3, Terminology, defines "user" as "the party seeking to use Practice E1527 to complete an ESA of the property. A user may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager. ASTM E1527-13, Section 10.7.1, defines "user" as "the person on whose behalf the Phase I Environmental Site Assessment is being conducted."

2DOT received authorization from KMOG to conduct a Phase I ESA on June 29, 2020. A request to perform an updated Phase I ESA was received on June 7, 2021. The Site is defined as approximately 12.8 acres of agricultural fields and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. This updated Phase I ESA has been prepared for KMOG, and only KMOG has the right to rely on the contents of this Phase I ESA without written authorization.

1.4 Scope of Services

ASTM Practice E 1527-13 states that there are four components of a Phase I ESA: 1) Records Review; 2) Site Reconnaissance; 3) Interviews; and 4) Report.

The scope of services provided for this Phase I ESA include:

- On-site assessment of the Site to identify environmental conditions.
- Observation of adjacent properties and the local area to evaluate the potential for adverse environmental impact to the Site.
- Review of available environmental documents for the Site.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the Site.
- Review historical data sources for the Site, including aerial photographs, topographic maps, ownership records, and other readily available development data.
- Interviews with persons represented to be familiar with the operation and history of the Site.

- Determine data gaps in the information obtained and comment on their significance in identifying RECs for the Site.
- Prepare a written report of methods, findings, opinions, and conclusions.

The goal of this scope of services is to assist the user in identifying conditions at the Site that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three "defenses" identified in the 2002 Brownfields Amendments to the CERCLA Section 9607 (All Appropriate Inquiry [AAI] subsections). These three defenses include:

- The "innocent landowner" defense to potential liabilities under 42 U.S.C. § 9601
- The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
- The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. §9607r

Federal regulations at (42 U.S.C §9601(35)(A) & (B), §9607(b)(3), §9607(q); and §9607(r)), promulgated by the United States (U.S.) Environmental Protection Agency (EPA), require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-13: 3.2.6) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-13 as the party seeking to use Practice E 1527 to complete an ESA of the site and may include, without limitation, a potential purchaser of land at the site, a potential tenant of the site, an owner of land at the site, a lender, or a site manager.

Investigative areas not included in the standard ASTM ESA scope include: asbestos-containing building materials, radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, endangered species, indoor air quality, mold, biological agents, cultural and historic resources, ecological resources, health and safety, and industrial hygiene.

1.5 Significant Assumptions

2DOT has made certain assumptions in preparing the scope of this assessment:

- Boundaries of the Site were provided by KMOG. 2DOT assumed this information was accurate.
- Data gathered from public information sources (i.e. libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases and no intentional concealment of environmental conditions or releases has occurred.
- Interview information is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.
- Regulatory information is limited to sites identified after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

1.6 Limitations

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-13, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this updated Phase I ESA, and 2DOT's interpretation of the information obtained as part of this updated Phase I ESA. The findings and conclusions are limited to the Site and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs associated with a site within reasonable limits of time and cost. In conducting its services, 2DOT used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. This Phase I ESA conforms to the level of documentation required in ASTM Practice E 1527-13. However, 2DOT may omit discussion of certain records, i.e., sources deemed, in 2DOT's professional opinion, to be inapplicable, or of limited value, to the specific needs of KMOG. In accordance with ASTM, if the lack of available documentation results in a data gap, this data gap is identified herein, and its significance is discussed.

2. User-Provided Information

The user of the report provided a location drawing via pdf of the Site boundaries. Full access to the Site was granted to 2DOT.

3. Records Review

3.1 Environmental Records Review

GeoSearch was contracted by 2DOT to complete a database search of federal, state, and tribal environmental records for the Site and facilities in the ASTM-designated search radius. A computerized environmental information database search was performed by GeoSearch on July 2, 2020 and June 8, 2021. The databases searched included federal, state, local, and tribal databases as defined by ASTM E 1527-13. A summary of the sources and results of the database search where the number of records found were greater than zero is listed below in Table 1. A complete copy of the GeoSearch environmental database report (GeoSearch Radius Report) is included in **Appendix B: Environmental Records Review** (GeoSearch, 2021f). The approximate minimum search distance (MSD) for this review is noted for each database listed below.

Table 1 - Summary of Environmental Database Search

Database	Description	Search Radius (MSD)	Records Found
Federal			
Resource Conservation & Recovery Act – Corrective Action Facilities (RCRAC)	The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and	1.0 mi	1

Database	Description	Search Radius (MSD)	Records Found
	other hazardous substances. This listing refers to facilities with corrective action activity.		
Surface Mining Control and Reclamation Act Sites (SMCRA)	An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of Abandoned Mine Land impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.	0.5 mi	2
State			
Air Pollution Control Division Permitted Facilities (APCDP)	This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.	0.5 mi	5
Total			8

Two records were identified in the July 2021 GeoSearch Radius Report that were not previously identified in the June 2020 GeoSearch Radius Report. These records were identified with the addition of the access road that was not included in the previous Phase I ESA.

The following table (Table 2) summarizes the site-specific information provided by the database and/or gathered by this office for identified facilities of potential concern to the Site. The remaining facilities listed in the database report do not appear to represent RECs to the Site based upon regulatory status, apparent topographic gradient, and/or distance from the Site.

Table 2 – Summary of facilities of potential concern to the Site

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
RUSSELL MINE	845 ft north, northwest / Higher	SMCRA	No, reclamation completed.

Well Search Report

A Water Well Report (Geosearch, 2021c) received from GeoSearch on June 9, 2021 listed 33 water wells within ½ mile of the Site boundary. No wells were listed within the Site. No water wells were observed within the Site during the ESA.

An Oil & Gas Report that searched environmental databases for oil and gas well and pit locations (Geosearch, 2021b) was received from GeoSearch on June 9, 2021 (**Appendix C: Oil & Gas Report**). A total of 57 oil and gas wells and 5 pits were listed within ½ mile of the site boundary. Two oil and gas wells are listed within the Site; one shut in well owned by KMOG (3-29A HSR-TEETS) and one plugged and abandoned well owned by KP Kaufman Company, Inc. (2 BERNARD E. TEETS B.).

3.2 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses at and in the vicinity of the Site and to assess these uses for potential hazardous materials impacts that may affect the Site. 2DOT reviewed those historical sources that were reasonably ascertainable and likely to provide useful information, as defined by the ASTM standard.

Historical Aerial Photographs

2DOT reviewed historical aerial photographs provided by GeoSearch (**Appendix D: Historical Aerial Photographs**) (GeoSearch, 2020d) for the following years: 1937, 1948, 1953, 1963, 1970, 1975, 1978, 1984, 1999, 2004, 2005, 2006, 2009, 2011, 2013, 2015, and 2017. Google Earth imagery from 9/29/2020 was also reviewed (Google Earth, 2021). The Site appears to have changed from undeveloped land and agriculture fields to agricultural fields with some oil and gas operations present from 1937 to 2020. Hydrologic and geologic features remain relatively unchanged throughout the time span.

1937-1970: The Site appears to be mostly vacant land used for agriculture and rangeland. The adjacent properties appear to be vacant/agricultural land with some development and a railroad likely associated with underground mining located north of County Road 18. The railway appears to be removed by 1970.

1975-1978: The imagery shows the addition of an oil and gas access road and associated equipment located along the north end of the Site as well as some additional oil and gas access roads and infrastructure on the adjacent properties.

1984-2020: The imagery shows more development and oil and gas activities surrounding the Site, in addition to the oil and gas access road and associated equipment noted on the north edge of the property. The well pad located adjacent to the southwestern border of the Site is present by 1984. There is a large housing development present to the west of County Road 15 by 2004.

Historical Topographic Maps

2DOT reviewed historical topographic maps of the Site provided by GeoSearch (**Appendix E: Historical Topographic Maps**) (GeoSearch, 2020e). The following United States Geological Survey (USGS) 7.5 minute series topographic maps were reviewed: 1950, 1969, 1979, 1994, and 2013 Frederick, CO; and 1950, 1969, 1979, and 2013 Gowanda, CO. The 30-minute 1902 Greeley, CO topographic map was also reviewed.

1902: The Site appears as relatively flat, vacant land. There are two mine symbols located north of the Site. County Road 15 and County Road 18 are not mapped.

1950-1969: The Site appears as entirely vacant land. County Road 15 and 18 are mapped. There is a railroad located north of County Road 18 that leads to the mine shaft north of the Site. There is a pond located adjacent to the northeast corner of the Site.

1979-1994: There is an oil and gas access road and wellhead located in the north portion of the Site. The railroad is no longer mapped by 1979. The 1994 topo shows the addition of the oil and gas access road and associated equipment located along the southwestern boundary of the Site.

2013: The Site appears as vacant land. There are no roads or structures depicted within the Site or its adjacent boundaries.

Fire Insurance Maps

GeoSearch reviewed fire insurance maps (GeoSearch, 2020a) and determined there is no coverage available for this area.

City Directory Information

A City Directory Report (**Appendix F: City Directory**) was received from GeoSearch for County Road 15 for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, and 2019 and for County Road 18 for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, and 2019 (Geosearch, 2020g).

All addresses listed on County Road 15 were residential with the exception of 10230, which is listed as D & D Auto Repair during 2001, 11955 listed as H & J Nelson Management LLC in 2006 & 2014, and 10558 listed as 24 HR Locksmith in 2011.

The addresses listed on County Road 18 were residential except for the following:

2880 County Road 18	Human Resrc Sltns (2001); Human Resource Solutions & Des (2006)
3801 County Road 18	Chldrns Hse Wld (2001)
390 County Road 18	Empire Warehouse Inc (2006)
3991 County Road 18	Mid Amer Tl&Mach (2001)
4300 County Road 18	Peak Indstrs Inc (2001); Delphi Medical Systems (2006)
5136 County Road 18	Wit Systems (2001)
5151 County Road 18	Equine Energy Works Llc (2006)
5306 County Road 18	Cowan Family Properties Llc (2006); Eds Electric (2006); 2 Ash Court Llc (2006)
5327 County Road 18	Medicine Hat Farriers (2006)
5366 County Road 18	Double Eagle Services (2006)
547 County Road 18	Amrcn Eng&Sply (2001); Aquatic And Fitness Professional Int (2011); Aquatic & Fitness Pro Intl (2014-2019)
5976 County Road 18	Tri Town Nrsy Llc (2001)
603 County Road 18	Charken Construction Inc (2006-2011)
677 County Road 18	Flying Piglet Rnch (2001-2006); (2011); Flying Piglet Ranch (2014-2019)

3.3 Environmental Liens and Activity and Use Limitations

GeoSearch performed an environmental lien and activity use limitations (AULs) search for the Site identified as Tax Parcel Number 131129200002 in July 2020. None were found. Based on GeoSearch's recommendation and with agreement from KMOG, environmental lien and AULs were not reordered for this June 2021 update since ownership has not changed.

4. Site Reconnaissance

On July 8, 2020, Shannon Regan and Morgan Colacone conducted a Phase I ESA site reconnaissance at the Site. The site reconnaissance included approximately 12.8 acres. On June 9, 2021, Sam Joseph and Morgan Colacone conducted an updated Phase I ESA site reconnaissance consisting of approximately 12.8 acres of farmlands and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. The purpose of the site reconnaissance was to observe Site conditions and identify exposed features that could represent or indicate ASTM RECs. Features of interest included, but were

not limited to, underground storage tanks (USTs), aboveground storage tanks (ASTs), chemical storage areas, transformers, stressed vegetation, and staining. Adjoining properties were observed from the property boundaries and public rights-of-way. During the walkover, photographs were taken of the Site and adjoining properties. Selected photographs are included in **Appendix G: Site Photographs**.

The Site was accessed from vehicle within the agricultural roads located on Site as well as on foot for areas that could not be verified from the vehicle. Public roads were utilized to observe the surrounding and adjacent properties.

4.1 Methodology and Limiting Conditions

The Phase I ESA site reconnaissance consisted of visual and/or physical observations of the Site and adjoining properties. The methodology for the site reconnaissance included walking and driving the Site to observe current conditions.

4.2 General Site Setting

The Site encompasses approximately 12.8 acres for a proposed well pad and an access road that extends approximately 0.13 miles beyond the proposed well pad. The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of the intersections of County Road 18 and County Road 15 in section 29, township 2 north, range 67 west. (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with an oil and gas access road and wellhead located along the northern boundary of the Site. There is a line of metal stakes/posts oriented from east to west located in the center of the Site and a stand of cottonwoods located on the eastern edge of the Site. (**Appendix A: Figure 2; Appendix G: Site Photographs**).

Adjacent land use surrounding the Site is mostly agricultural with historic mining operations located north of County Road 18 and development associated with oil and gas access roads and operations located on the adjacent properties.

Current Uses of the Site

The Site is comprised of actively managed agricultural land, an oil and gas wellhead, and access road associated with the oil and gas wellhead.

Past Uses of the Site

The Site appears to have historically been used for pasture and cropland.

Adjoining Properties and Surrounding Area

Land use south of the Site consists of cropland and oil and gas operations. East of the Site pasture for cattle. West of the Site is cropland. North of the project area is cropland and grazing and a historic mine located north of County Road 18.

Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

According to the United States Geologic Survey (Tweto, 1979) Special Geographic Map, the Site is located within the Eolian deposits map unit which includes dune sand and silt and Peoria Loess.

According to the Natural Resources Conservation Service's Soil Survey Geographic database, the Site is comprised of Olney loamy sand, 1 to 3 percent slopes and Vona loamy sand, 3 to 5 percent slopes.

Topographic maps and aerial imagery indicate that the highest point is located along the western border at approximately 5,011 feet above mean sea level (AMSL). The lowest point is located along the northeastern edge at approximately 5,001 feet ASML. The Site consists of relatively flat agricultural fields with elevation generally decreasing with northeastern travel.

Groundwater flow is assumed to follow topography and flows northeast toward Coal Ridge Ditch.

General Description of Structures and Roads

There is an oil and gas access road located along the northern and western borders of the Site. No additional structures, other than the oil and gas wellhead and fencing, were observed within the Site.

Potable Water Supply

There is no potable water supply for the Site.

Sewage Disposal System

There is no sewage disposal system for the Site.

4.3 Exterior and Interior Observations

Hazardous Substances and Petroleum Products in Connection with Identified Users

There is an oil and gas wellhead on Site. No leaks or stains were observed.

Storage Tanks – ASTs and USTs

There were no storage tanks observed within the Site.

Odors

No odors were observed.

Pools of Liquid

No abnormal puddles or pools of liquid were observed within the Site.

Drums

There were no drums observed within the Site.

Hazardous Substances and Petroleum Product Containers (Not Necessarily in Connection with Identified Uses)

No hazardous substances or petroleum product containers were located within the Site, that are not in connection with identified uses.

Unidentified Substance Containers

No unidentified substance containers were observed within the Site.

Utilities and PCBs

Although no longer commercially produced in the United States, Polychlorinated Biphenyl (PCB) may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include:

- Transformers and capacitors;
- Electrical equipment including voltage regulators, switches, re-closers, bushings, and electromagnets; and

- Oil used in motors and hydraulic systems.

No evidence of PCBs was observed.

Pits, Ponds, or Lagoons

No pits, ponds, or lagoons were observed within the Site.

Stained Soil or Pavement

No stained soil or pavement was observed within the Site.

Stressed Vegetation

No areas of stressed vegetation were observed within the Site.

Solid Waste

No solid waste was observed within the Site.

Wastewater

No wastewater or stormwater was observed within the Site.

Wells

One oil and gas well, 3-29A HSR-TEETS, was located within the Site. This well is owned by KMOG and is currently listed as shut in.

5. Non-Scope Considerations

The following sections briefly discuss investigative areas that are not included in the standard ASTM Practice E 1527-13 scope. These items are presented as anecdotal information.

Radon

Radon testing was not conducted as part of this Phase I ESA.

Lead-in-Drinking Water

Drinking water at the Site was not tested for lead as part of the Phase I ESA.

Wetlands

Field surveys were conducted on July 8, 2020 and on June 9, 2021 to evaluate the Site for any potential wetlands or waters of the U.S. (WOTUS). No wetlands or WOTUS are located within 150 feet of the Site. The nearest hydrologic feature is an excavated pond located approximately 480 linear feet northeast of the Project. An ephemeral drainage is present south of the Project, where a berm has been constructed to redirect surface water flow following storm events (**Appendix A: Figure 2**).

Endangered Species Act

An Information for Planning and Consultation (IPaC) test for threatened and endangered (T&E) species from the United States Fish and Wildlife Service (USFWS) was run for the Site on June 10, 2021. Based on the results, the following T&E birds, fishes, and flowering plants were identified as potentially occurring in or near the Site:

- Preble's Meadow Jumping Mouse, *Zapus hudsonius preblei* (Threatened)
- Eastern Black Rail, *Laterallus jamaicensis ssp. Jamaicensis* (Threatened)

- Piping plover, *Charadrius melodus* (Threatened)
- Whooping Crane, *Grus americana* (Endangered)
- Pallid Sturgeon, *Scaphirhynchus albus* (Endangered)
- Ute Ladies'-tresses, *Spiranthes diluvialis* (Threatened)
- Western Prairie Fringed Orchid, *Platanthera praeclara* (Threatened)

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures. An IPaC test for migratory bird species from USFWS Birds of Conservation Concern list was review for the Site on June 10, 2021. Based on the results, the following migratory birds were identified as potentially occurring in or near the Site:

- Bald Eagle, *Haliaeetus leucocephalus*
- Burrowing Owl, *Athene cunicularia*
- Cassin's Sparrow, *Aimophila cassinii*
- Chestnut-collared Longspur, *Calcarius ornatus*
- Golden Eagle, *Aquila chrysaetos*
- Lark Bunting, *Calamospiza melanocorys*
- Lesser Yellowlegs, *Tringa avipes*
- Long-billed Curlew, *Numenius americanus*
- Mccown's Longspur, *Calcarius mccownii*
- Semipalmated Sandpiper, *Calidris pusilla*
- Willet, *Tringa semipalmata*

6. Interviews

Tom Crouch, Senior Landman for KMOG, completed a questionnaire regarding the history and current conditions of the Site in July 2020 and June 2021. The questions are below with Tom's answers from June 2021 in **bold**.

To the best of your knowledge…

1. Have any current or past environmental permits been obtained? (solid waste, disposal permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits)…
    a. **Not to my knowledge.**
2. Are there any underground or above ground storage tanks on the property? If yes, what are their contents?
    a. **There is an oil and gas facility located on the property.**

3. Are you aware of any environmental investigations or problems on the property or on adjacent properties?
    a. **I am unaware of any environmental investigations or problems related to the property or adjacent properties.**
4. Have any past or current environmental violations relating to environmental laws occurred?
    a. **Not to my knowledge.**
5. Are there any underground injection systems on the property?
    a. **I am unaware of any underground injection systems on the property.**
6. Were there any unreported spills?
    a. **I am unaware of any unreported spills. Might need to check with operations if there are any spills associated with the Oil & Gas wells and facilities.**
7. Are there any environmental liens on the property?
    a. **Not to my knowledge**
8. Is there any environmental waste on the property?
    a. **Not to my knowledge**
9. What has the property previously been used for? (back to what year are you aware of the property use)
    a. **Not sure**
10. What is the property presently used for?
    a. **The parcel is classified as range land. We are currently planning horizontal wells on this parcel.**
11. Are there any aboveground or underground storage tanks on the site such as gasoline tanks, diesel tanks?
    a. **Not that I am aware of.**
12. Are there any hazardous materials stored on the property such as drums, fuel, chemicals, pesticides, etc?
    a. **Not That I am aware of.**
13. Are there any oil or gas lines, wells, or pumps on the property?
    a. **The parcel does have active wells and facility located on the property.**
14. What are the adjacent properties used for?
    a. **Residential to the west, Agricultural to the west**
15. Has there ever been a fuel spill, fire, or emergency response at the property?
    a. **Not to my knowledge.**
16. Are there active water wells on the property? Have any of the wells ever been contaminated?
    a. **Not sure and not to my knowledge.**

7. Data Gap Analysis

The ASTM E 1527-13 standards require a listing of "data gaps," including data failure encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-13, Section 12.7, Data Gaps, requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring

basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this Site, the following items may constitute a data gap as defined by ASTM E 1527-13:

- Absence of aerial photography prior to 1937
- Absence of Sanborn Fire Insurance Maps
- Absence of Tax Map coverage
- Absence of previous landowner(s) interviews

These data gaps do not appear to be significant because the presence of other supporting historical information along with the lack of development in the area, both past and present, provided enough information to determine the historical usage of the Site.

8. Findings, Opinions, and Conclusions

2DOT has conducted a Phase I ESA of the Columbine proposed oil and gas multi-well pad and production facility and access road located in the Town of Firestone, Colorado. The Phase I ESA was performed in accordance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described previously in this report. Included in this updated Phase I ESA are summaries of site reconnaissance conducted on July 8, 2020 and June 9, 2021, the review of the environmental database search report (**Appendix B: Environmental Records Review**), historical data sources (**Appendix D, E, & F**) and other records.

8.1 Findings and Opinions

2DOT has developed the following findings and opinions:

- The Site is comprised of predominately actively managed agricultural land with an oil and gas access road and wellhead located along the northern border of the Site and a well pad located adjacent to the southwestern border.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

8.2 Conclusions

Based upon the Findings and Opinions, 2DOT concludes that no RECs have been identified in connection with the Site.

The following statement is required by ASTM E 1527-13 as a declaration of whether RECs were found:

> *2DOT has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of the Site (Columbine, Firestone, Colorado). Any exceptions to, or deletions from, this practice are described in previous sections of this report. This assessment has revealed zero RECs, zero HRECs, zero CRECs, zero de minimis, and zero BERs in connection with the Site.*

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year

timeframe. The report is valid for use in any of the CERCLA defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

9. Qualifications of Environmental Professionals

2DOT has performed a Phase I ESA for the Columbine Oil and Gas Project located in the Town of Firestone, Colorado. We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in § 312.10 of 40 CFR § 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the "all appropriate inquiries" in conformance with standards and practices set forth in 40 CFR Part 312.

The scope of the ESA was consistent with practices and procedures set forth in ASTM Practice E 1527-13.

This Phase I ESA was performed by the following 2DOT personnel:



Qualified Environmental Professional, Sam Joseph

Site Reconnaissance, Project Manager

Mr. Sam Joseph, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Wildlife & Fisheries Biology & Management Conservation Biology, a Bachelor of Science Degree Environment and Natural Resources, and a minor in Zoology. Mr. Joseph has worked in the environmental field over 5 years. Mr. Joseph has the following registrations and certifications relevant to the environmental field: OSHA 10-Hour Construction Program, OSHA 40-Hour HAZWOPER, OSHA H2S Safety, Wetland Training Institute Wetland Delineation Training, Boulder County Open Spaces T&E Species Identification, SafeLand USA Training.



Qualified Environmental Professional, Kathleen Madigan

Quality Assurance/ Quality Control

Ms. Kathleen Madigan, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Bioresource and Agricultural Engineering with a minor in Spatial Information Management Systems. Ms. Madigan has worked in the environmental field for more than 18 years as a project

manager and field technician working on a variety of projects. Ms. Madigan has the following registrations and certifications relevant to the environmental field: SafeLand USA Training, Erosion Control Supervisor Certificate CDOT, and 40-Hour OSHA Hazwoper Training. Additionally, Ms. Madigan has taken online courses for ASTM E1527 Standard Practice for Environmental Site Assessments.

10. References

American Society for Testing and Materials (ASTM) Practice E 1527-13, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

GeoSearch, 2020a. Fire Insurance Map Abstract. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2021b. GeoPlus Oil & Gas Report. Columbine, Longmont, Weld County, CO 80504. June 9, 2021.

GeoSearch, 2021c. GeoPlus Water Well Report. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2020d. Historical Aerial Photographs. Columbine, Longmont, Weld County, CO 80504. July 8, 2020.

GeoSearch, 2020e. Historical Topographic Maps. Columbine, Longmont, Weld County, CO 80504. July 8, 2020.

GeoSearch, 2021f. Radius Report. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2020g. City Directory. Longmont, Weld County, CO 80504. July 2, 2020.

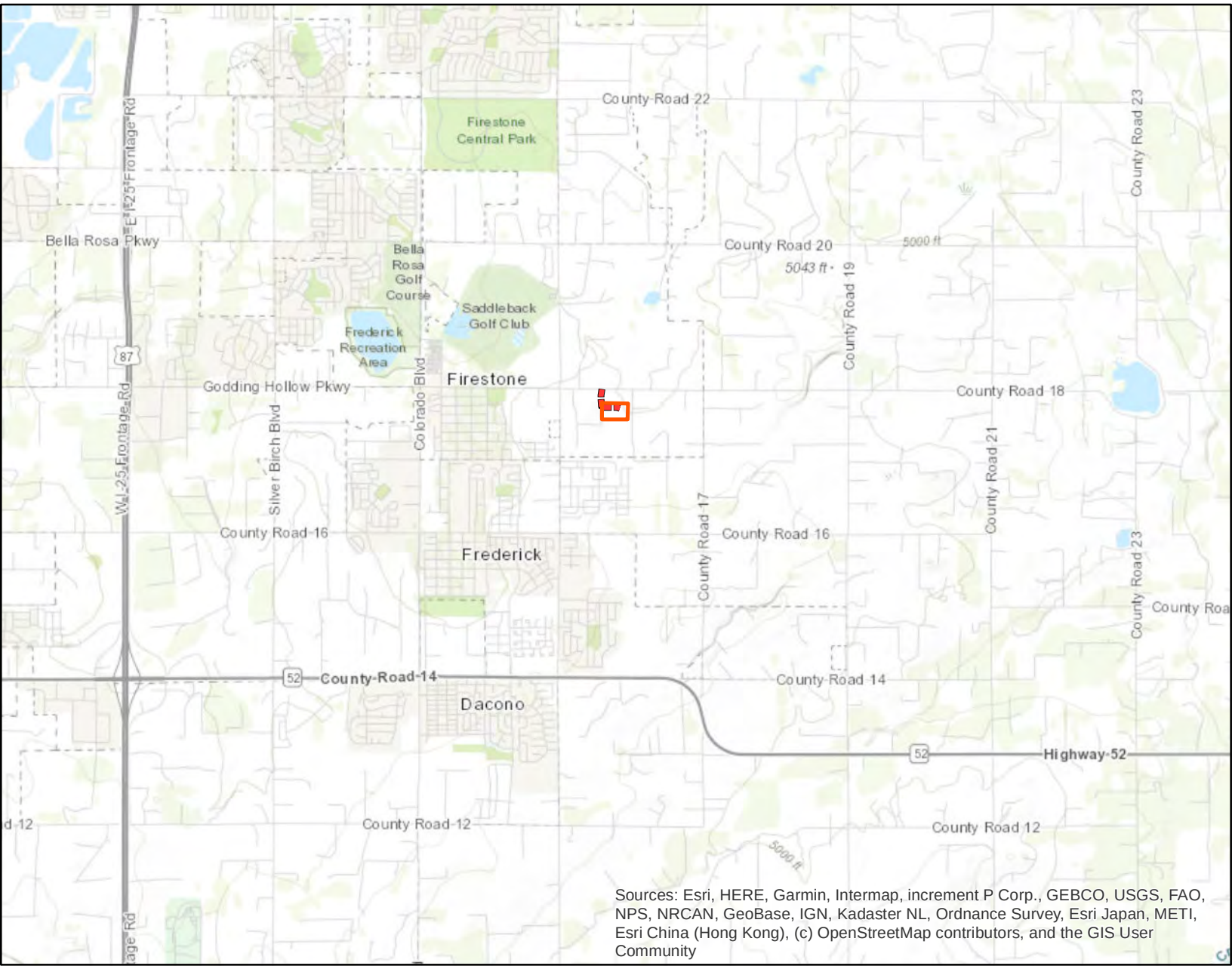
Google Earth, 2021. Aerial Imagery. 40.114348,-104.916659. Imagery date 9/29/2020.

Tweto, Ogden, 1979. Geologic Map of Colorado: U.S. Geological Survey Special Geologic Map, scale 1:500,000.

Appendix A: Figures

Columbine Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

two dot

PREPARED FOR:

KerrMcGee

Figure 1: Vicinity Map

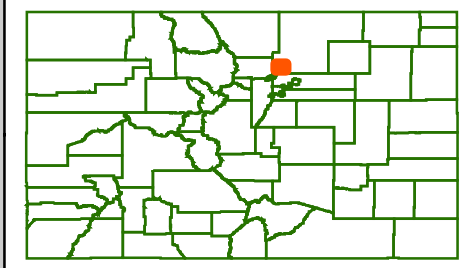
0 0.5 1 Miles

Project Area

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Columbine Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

two dot

PREPARED FOR:

KerrMcGee

Figure 2: Site Location

0 500 1,000 Feet

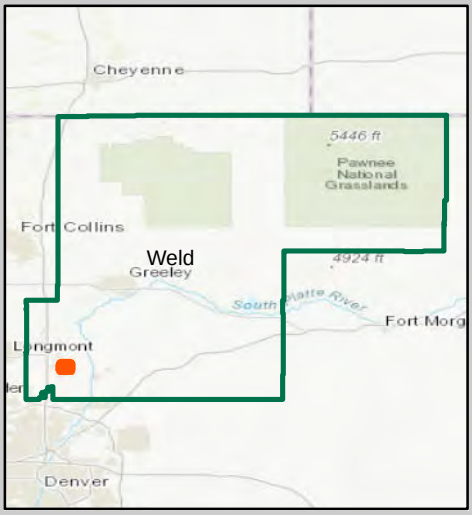
Weld County Streets

Project Area

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Appendix B: Environmental Records Review

GeoSearch
On time. On target. In touch.™

Radius Report

GeoLens by GeoSearch

Target Property:

Columbine
Frederick, Weld County, Colorado 80530

Prepared For:

Two Dot Consulting, LLC

Order #: 166399
Job #: 412762
Project #: 603-128
Date: 06/08/2021

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Unlocatable Report . . . . . See Attachment

Zip Report . . . . . See Attachment

Disclaimer

This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquiries Rule (40 CFR ï¿½312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal,state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR ï¿½312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.

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Target Property Summary

Target Property Information

Columbine
Frederick, Colorado 80530

Coordinates
Area centroid (-104.91666, 40.1143466)
4,998 feet above sea level

USGS Quadrangle
Frederick, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530
Fort Lupton CO: 80621

Database Summary

FEDERAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSCO	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	TP/AP
RCRA SITES WITH CONTROLS	RCRASC	0	0	TP/AP
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR	RCRAGR08	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR	RCRANGR08	0	0	0.1250
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - NON-CORRACTS TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM	SEMS	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM ARCHIVED SITE INVENTORY	SEMSARCH	0	0	0.5000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	1	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - SUBJECT TO CORRECTIVE ACTION FACILITIES	RCRASUBC	0	0	1.0000

SUB-TOTAL		1	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	0	0	TP/AP
BIENNIAL REPORTING SYSTEM	BRS	0	0	TP/AP
CERCLIS LIENS	SFLIENS	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	TP/AP
EPA DOCKET DATA	DOCKETS	0	0	TP/AP
ENFORCEMENT AND COMPLIANCE HISTORY INFORMATION	ECHOR08	0	0	TP/AP
FACILITY REGISTRY SYSTEM	FRSCO	0	0	TP/AP

Database Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR08	0	0	TP/AP
HAZARDOUS WASTE COMPLIANCE DOCKET FACILITIES	HWCD	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	0	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR08	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	PCSR08	0	0	TP/AP
SEMS LIEN ON PROPERTY	SEMSLIENS	0	0	TP/AP
SSEHRI PFAS CONTAMINATION SITES	SSEHRIPFAS	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	TP/AP
TOXICS RELEASE INVENTORY	TRI	0	0	TP/AP
ALTERNATIVE FUELING STATIONS	ALTFUELS	0	0	0.2500
FEMA OWNED STORAGE TANKS	FEMAUST	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
INTEGRATED COMPLIANCE INFORMATION SYSTEM DRYCLEANERS	ICISCLEANERS	0	0	0.2500
MINE SAFETY AND HEALTH ADMINISTRATION MASTER INDEX FILE	MSHA	0	0	0.2500
MINERAL RESOURCE DATA SYSTEM	MRDS	0	0	0.2500
OPEN DUMP INVENTORY	ODI	0	0	0.5000
SURFACE MINING CONTROL AND RECLAMATION ACT SITES	SMCRA	2	0	0.5000
URANIUM MILL TAILINGS RADIATION CONTROL ACT SITES	USUMTRCA	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMER MILITARY NIKE MISSILE SITES	NMS	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	FUSRAP	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000

SUB-TOTAL		2	0	

Database Summary

STATE (CO) LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ENVIRONMENTAL REAL COVENANTS LIST	COVENANTS	0	0	TP/AP
HAZARDOUS WASTE SITES- GENERATOR	HWSG	0	0	0.1250
ABOVEGROUND STORAGE TANK FACILITIES	AST	0	0	0.2500
UNDERGROUND STORAGE TANK FACILITIES	UST	0	0	0.2500
COLORADO BROWNFIELD SITES	BF	0	0	0.5000
HISTORICAL SOLID WASTE LANDFILLS	HISTSWLF	0	0	0.5000
LEAKING STORAGE TANK FACILITIES	LST	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS TRUST FUND SITES	LUSTTRUST	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	0	0.5000
VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM SITES	VCRA	0	0	0.5000
HAZARDOUS WASTE SITES- CORRECTIVE ACTION	HWSCA	0	0	1.0000
SUPERFUND SITES	SF	0	0	1.0000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ASBESTOS ABATEMENT AND DEMOLITION PROJECTS	ASBESTOS	0	0	TP/AP
COLORADO DISCHARGE PERMIT SYSTEM FACILITIES	CDPS	0	0	TP/AP
SPILLS LISTING	SPILLS	0	0	TP/AP
DRY CLEANING FACILITIES	CLEANERS	0	0	0.2500
AIR POLLUTION CONTROL DIVISION PERMITTED FACILITIES	APCDP	5	0	0.5000
HAZARDOUS WASTE SITES- TREATMENT, STORAGE & DISPOSAL	HWSTSD	0	0	0.5000
METHANE GAS STUDY SITES	METHANESITES	0	0	0.5000
REGISTERED RECYCLING FACILITIES	RECYCLERS	0	0	0.5000
URANIUM MILL TAILINGS SITES	UMTS	0	0	0.5000
SUB-TOTAL		5	0	

Database Summary

LOCAL LISTING

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
WELD COUNTY SOLID WASTE FACILITIES	WCSWF	0	0	0.5000
SUB-TOTAL		0	0	

TRIBAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR08	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR08	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		8	0	

Database Radius Summary

FEDERAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200	0	NS	NS	NS	NS	NS	0
BRS	0.0200	0	NS	NS	NS	NS	NS	0
CDL	0.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	0.0200	0	NS	NS	NS	NS	NS	0
EC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
ECHOR08	0.0200	0	NS	NS	NS	NS	NS	0
ERNSCO	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
FRSCO	0.0200	0	NS	NS	NS	NS	NS	0
HMIRSR08	0.0200	0	NS	NS	NS	NS	NS	0
HWCD	0.0200	0	NS	NS	NS	NS	NS	0
ICIS	0.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	0.0200	0	NS	NS	NS	NS	NS	0
LUCIS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
MLTS	0.0200	0	NS	NS	NS	NS	NS	0
NPDESR08	0.0200	0	NS	NS	NS	NS	NS	0
PADS	0.0200	0	NS	NS	NS	NS	NS	0
PCSR08	0.0200	0	NS	NS	NS	NS	NS	0
RCRASC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SEMSLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SSEHRIPFAS	0.0200	0	NS	NS	NS	NS	NS	0
SSTS	0.0200	0	NS	NS	NS	NS	NS	0
TRI	0.0200	0	NS	NS	NS	NS	NS	0
TSCA	0.0200	0	NS	NS	NS	NS	NS	0
RCRAGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
RCRANGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
ALTFUELS	0.2500	0	0	0	NS	NS	NS	0
FEMAUST	0.2500	0	0	0	NS	NS	NS	0
HISTPST	0.2500	0	0	0	NS	NS	NS	0
ICISCLEANERS	0.2500	0	0	0	NS	NS	NS	0
MRDS	0.2500	0	0	0	NS	NS	NS	0
MSHA	0.2500	0	0	0	NS	NS	NS	0
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
DNPL	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
NLRRCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**

Database Radius Summary

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ODI	0.5000	0	0	0	0	NS	NS	0
RCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMS	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMSARCH	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SMCRA	0.5000	0	1	0	1	NS	NS	2
USUMTRCA	0.5000	0	0	0	0	NS	NS	0
DOD	1.0000	0	0	0	0	0	NS	0
FUDS	1.0000	0	0	0	0	0	NS	0
FUSRAP	1.0000	0	0	0	0	0	NS	0
NLRRCRAC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
NMS	1.0000	0	0	0	0	0	NS	0
NPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
PNPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RCRAC	**1.0000**	**0**	**0**	**0**	**0**	**1**	**NS**	**1**
RCRASUBC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RODS	1.0000	0	0	0	0	0	NS	0

SUB-TOTAL		0	1	0	1	1	0	3

Database Radius Summary

STATE (CO) LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ASBESTOS	0.0200	0	NS	NS	NS	NS	NS	0
CDPS	0.0200	0	NS	NS	NS	NS	NS	0
COVENANTS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SPILLS	0.0200	0	NS	NS	NS	NS	NS	0
HWSG	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
AST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
CLEANERS	0.2500	0	0	0	NS	NS	NS	0
UST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
APCDP	0.5000	0	1	1	3	NS	NS	5
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HISTSWLF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSTSD	0.5000	0	0	0	0	NS	NS	0
LST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
LUSTTRUST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
METHANESITES	0.5000	0	0	0	0	NS	NS	0
RECYCLERS	0.5000	0	0	0	0	NS	NS	0
SWF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
UMTS	0.5000	0	0	0	0	NS	NS	0
VCRA	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSCA	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
SF	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**

SUB-TOTAL		0	1	1	3	0	0	5

Database Radius Summary

LOCAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
WCSWF	0.5000	0	0	0	0	NS	NS	0
SUB-TOTAL		0	0	0	0	0	0	0

Database Radius Summary

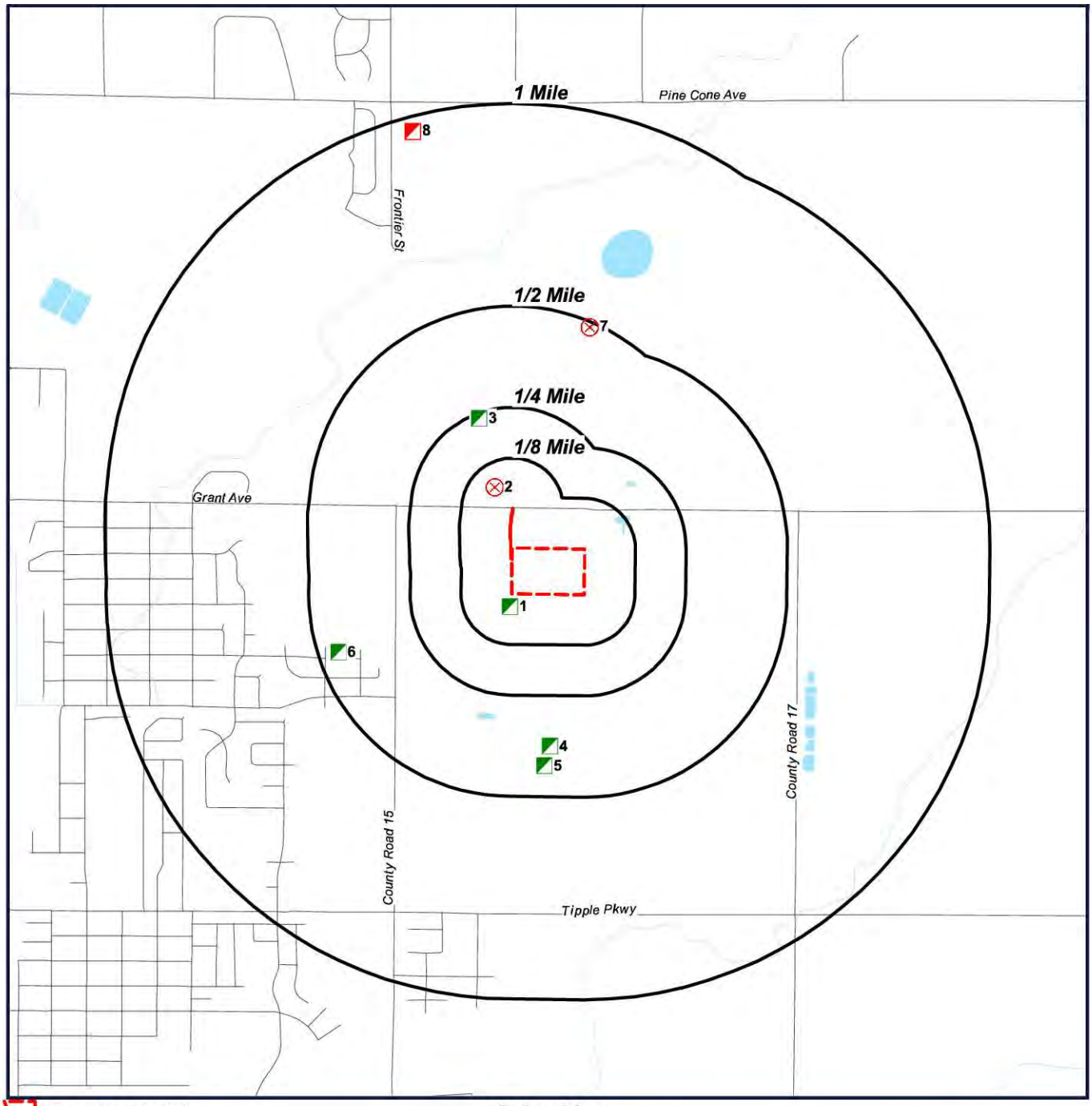
TRIBAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR08	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
LUSTR08	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
ODINDIAN	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
INDIANRES	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	0	0	0	0	0	0
TOTAL		0	2	1	4	1	0	8

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

Radius Map 1



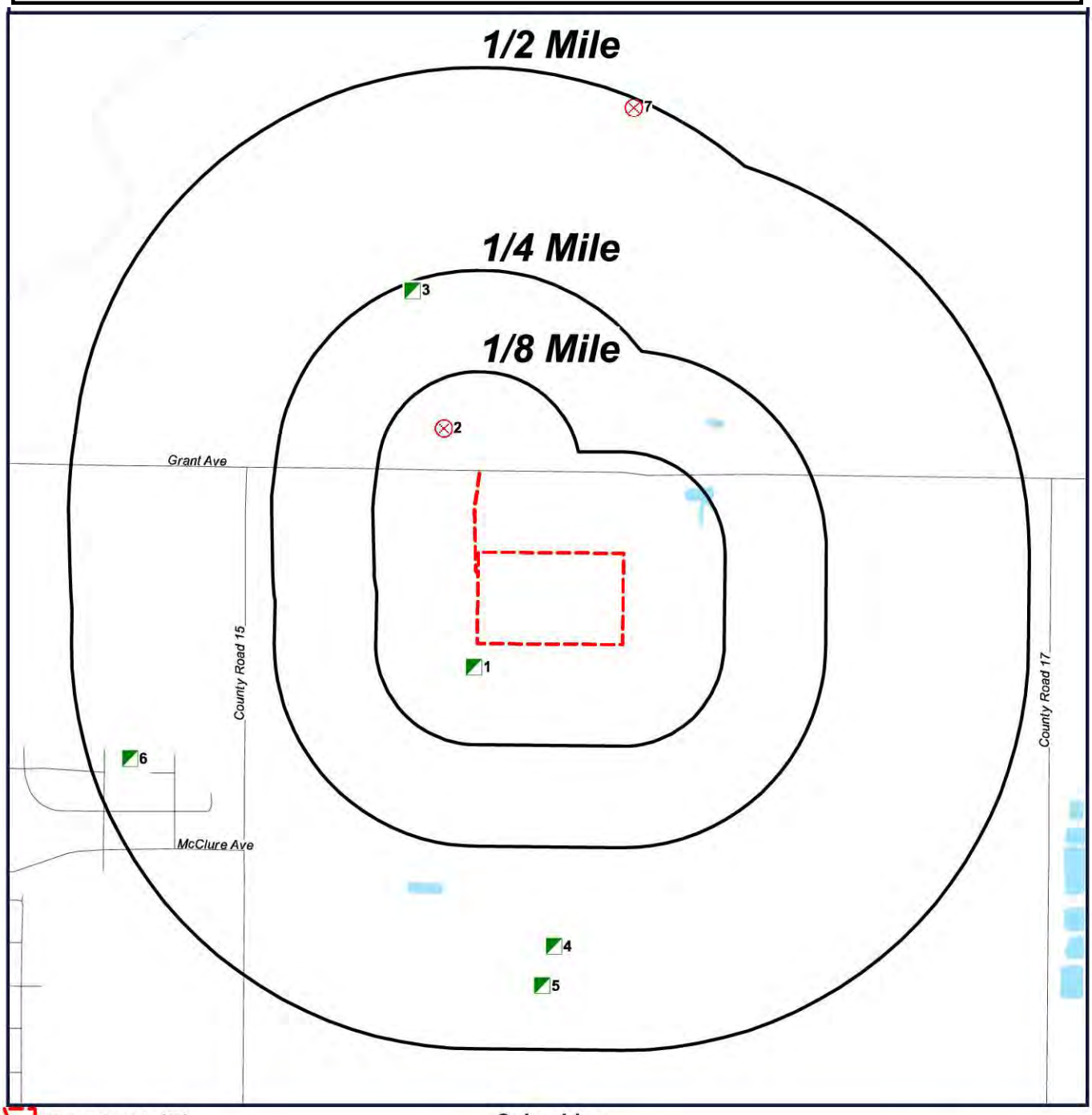
Target Property (TP)
APCDP
SMCRA
RCRAC

Columbine
Frederick, Colorado
80530

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Radius Map 2



Target Property (TP)
APCDP
SMCRA
RCRAC

Columbine
Frederick, Colorado
80530

N
W E
S

0' 500' 1000' 1500'
SCALE: 1" = 1000'

Ortho Map



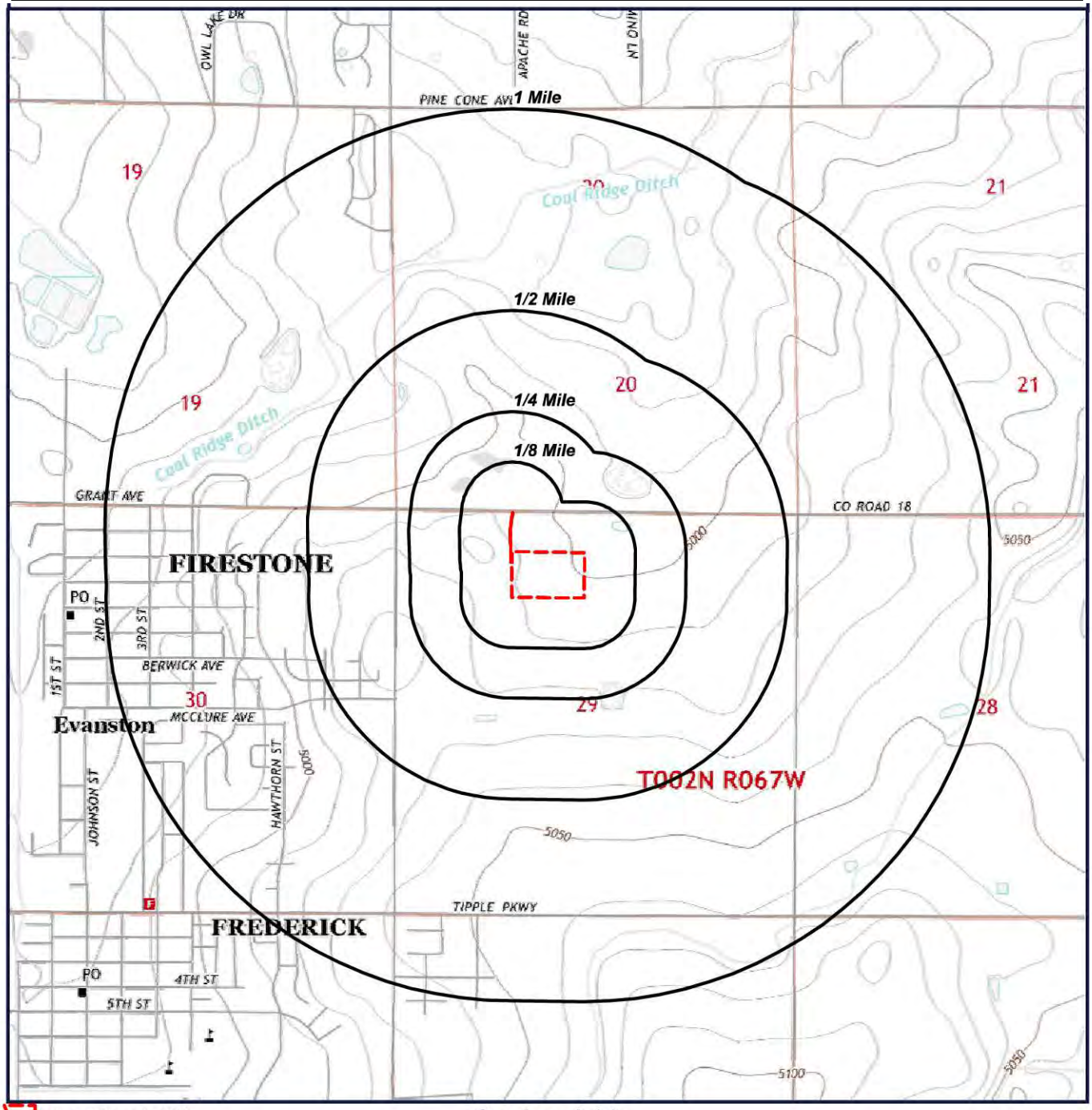
Target Property (TP)
APCDP
SMCRA
RCRAC

Quadrangle(s):
Frederick
Columbine
Frederick, Colorado
80530

N
W E
S

0' 500' 1000' 1500'
SCALE: 1" = 1000'

Topographic Map



Target Property (TP)

Quadrangle(s):
Frederick
Source: USGS,
07/17/2013
Columbine
Frederick, Colorado
80530

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Located Sites Summary

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address	PAGE #
1	APCDP	123-8269	Higher (5,013 ft.)	0.028 mi. SSW (148 ft.)	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530	19
2	SMCRA	CO006202	Higher (4,999 ft.)	0.071 mi. NW (375 ft.)	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621	39
3	APCDP	123-5128	Lower (4,986 ft.)	0.241 mi. NNW (1272 ft.)	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504	41
4	APCDP	123-9A3B	Higher (5,027 ft.)	0.370 mi. S (1954 ft.)	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621	58
5	APCDP	123-7840	Higher (5,027 ft.)	0.419 mi. S (2212 ft.)	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530	69
6	APCDP	123-7847	Higher (5,022 ft.)	0.450 mi. WSW (2376 ft.)	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530	72
7	SMCRA	CO006228	Lower (4,964 ft.)	0.491 mi. NNE (2592 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621	100
8	***RCRAC***	***COR000005207***	***Lower (4,977 ft.)***	***0.966 mi. NNW (5100 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***102***

Site Summary By Database

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address
1	APCDP	123-8269	Higher (5,013 ft.)	0.028 mi. SSW (148 ft.)	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530
3	APCDP	123-5128	Lower (4,986 ft.)	0.241 mi. NNW (1272 ft.)	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504
4	APCDP	123-9A3B	Higher (5,027 ft.)	0.370 mi. S (1954 ft.)	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621
5	APCDP	123-7840	Higher (5,027 ft.)	0.419 mi. S (2212 ft.)	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530
6	APCDP	123-7847	Higher (5,022 ft.)	0.450 mi. WSW (2376 ft.)	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530
8	***RCRAC***	***COR000005207***	***Lower (4,977 ft.)***	***0.966 mi. NNW (5100 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***
2	SMCRA	CO006202	Higher (4,999 ft.)	0.071 mi. NW (375 ft.)	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621
7	SMCRA	CO006228	Lower (4,964 ft.)	0.491 mi. NNE (2592 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621

Elevation Summary

Elevations are collected from the USGS 3D Elevation Program 1/3 arc-second (approximately 10 meters) layer hosted at the NGTOC. .

Target Property Elevation: 4998 ft.

*NOTE: Standard environmental records are displayed in **bold**.*

EQUAL/HIGHER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
1	APCDP	5,013 ft.	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530	19
2	SMCRA	4,999 ft.	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621	39
4	APCDP	5,027 ft.	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621	58
5	APCDP	5,027 ft.	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530	69
6	APCDP	5,022 ft.	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530	72

LOWER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
3	APCDP	4,986 ft.	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504	41
7	SMCRA	4,964 ft.	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621	100
8	***RCRAC***	***4,977 ft.***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***102***

MAP ID# 1

Distance from Property: 0.028 mi. (148 ft.) SSW
Elevation: 5,013 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-8269**
FACILITY NAME: **KERR-MCGEE - 62367**
ADDRESS: **NWNW-29-2N-67W**
FIRESTONE, CO 80530
PERMIT NAME: **KERR-MCGEE - 62367**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **12/09/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**
CONTACT PHONE: **(720)929-6916**
SITE DESCRIPTION:**E&P SITE. 34002422, ALSO KNOWN AS 62367.**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13439**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68790**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.01535**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.30718**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.64832**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.64832**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **15.65146**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **182.23696**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.64880 **0.64880** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03290	**0.47582**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.50181	**2.50181**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.28787	**4.16357**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.98475	**0.98475**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
25.66445	**278.50685**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00159	**0.01200**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01392	**0.10499**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.90865	**6.85001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2014**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2014**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **0.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **0.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS UNCONTROLLED**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **6.88380**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **6.88380**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13439**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68790**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
8.76766	**175.35316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
13.30749	**266.14990**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.98475	**0.98475**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.50181	**2.50181**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02331	**0.46624**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20398	**4.07968**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
6.88380	**6.88380**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.47315	**5.47315**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00958	**0.00958**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.08389	**0.08389**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Surface Mining Control and Reclamation Act Sites (SMCRA)

MAP ID# 2

Distance from Property: 0.071 mi. (375 ft.) NW
Elevation: 4,999 ft. (Higher than TP)

FACILITY INFORMATION

GEOSEARCH ID: **CO006202**

AMLIS KEY: **CO006202**

PROBLEM AREA NUMBER: **6202**

PROBLEM AREA NAME: **RUSSELL MINE**

ADDRESS: **WELD COUNTY**

FORT LUPTON, CO 80621

COUNTY: **WELD**

PLAN UNIT NUMBER: **154**

PLAN UNIT NAME: **FREDERICK**

FACILITY DETAIL(S)

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **P**
PROBLEM PRIORITY: **2**
MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/6/1993 0:00**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **35533**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **VO**
PROBLEM PRIORITY: **2**

Surface Mining Control and Reclamation Act Sites (SMCRA)

MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/6/1993 0:00**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **10476**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

Back to Report Summary

MAP ID# 3

Distance from Property: 0.241 mi. (1,272 ft.) NNW
Elevation: 4,986 ft. (Lower than TP)

SITE INFORMATION

SITE ID: **123-5128**
FACILITY NAME: **KERR-MCGEE 62492**
ADDRESS: **SWSW-20-2N-67W**
FIRESTONE, CO 80504
PERMIT NAME: **KERR-MCGEE 62492**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **08/03/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**CONDENSATE STORAGE TANK**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.02535**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.50716**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31100**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31100**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.35982**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **33.79105**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.12241**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.12241**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00413	**0.05919**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.31100 **0.31100** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.31100 **0.31100** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.31100 **0.31100** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.02535 **0.50716** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.00715 **0.11126** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.06264	**0.97356**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
4.08671	**63.51320**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00471	**0.04188**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20991	**0.20991**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08262	**0.08262**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.69205	**23.90650**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK
EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2007**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2007**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.70555	**0.70555**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.65427	**33.08550**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00289	**0.05796**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.11655	**22.33100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08262	**0.08262**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20991	**0.20991**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00195	**0.03912**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00123	**0.00123**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01081	**0.01081**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.08671	**63.51320**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00715	**0.11126**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06264	**0.97356**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 4

Distance from Property: 0.370 mi. (1,954 ft.) S
Elevation: 5,027 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-9A3B**
FACILITY NAME: **KERR-MCGEE 36114104**
ADDRESS: **NESW-29-2N-67W**
FREDERICK, CO 80621
PERMIT NAME: **KERR-MCGEE 36114104**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **KATHERINE DOOLITTLE**
CONTACT PHONE: **(720)929-6511**
SITE DESCRIPTION:**CONDENSATE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07975**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.59500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00825**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.16500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.04699**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **56.81949**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07975**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.59500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.04699	**56.81949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.04699	**56.81949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

4.04699 **56.81949** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

4.04699 **56.81949** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00825 **0.16500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00825 **0.16500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
0.00000	**0.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26949	**1.26949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 5

Distance from Property: 0.419 mi. (2,212 ft.) S
Elevation: 5,027 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-7840**
FACILITY NAME: **KERR-MCGEE 62366**
ADDRESS: **NESW-29-2N-67W**
FREDERICK, CO 80530
PERMIT NAME: **KERR-MCGEE 62366**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **KATHERINE DOOLITTLE**
CONTACT PHONE: **(720)929-6511**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68520**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68520**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.45230**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.45230**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

STACK

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2012**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.68520	**2.68520**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 6

Distance from Property: 0.450 mi. (2,376 ft.) WSW
Elevation: 5,022 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-7847**
FACILITY NAME: **KERR-MCGEE O&G ONSHORE - 34002441**
ADDRESS: **SENE-30-2N-67W**
FIRESTONE, CO 80530
PERMIT NAME: **KERR-MCGEE O&G ONSHORE - 34002441**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **DAVID STEGER**
CONTACT PHONE: **(720)929-6075**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY (FORMERLY 62410)**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31949**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.68527**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00821**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.16430**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.88162**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.88162**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **23.36352**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **112.46421**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.82614 **0.82614** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.02707	**228.14554**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.02707	**228.14554**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.24796	**228.36643**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.24796	**228.36643**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00961	**0.19199**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08410	**1.68001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.48651	**109.60001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00339	**0.05040**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02973	**0.44100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.93958	**28.77001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **HC LOADOUT**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
3081.00000	**51.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
14.00000	**1.87000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **HC LOADOUT**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **3081.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **51.00000**
STACK HEIGHT: **14.00000**
STACK DIAMETER: **1.87000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **0.00000**
STACK HEIGHT:
STACK DIAMETER:
PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

5916.00000 **98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2012**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS UNCONTROLLED**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

5916.00000 **98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.52024	**2.52024**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24761	**0.24761**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.15377	**16.15377**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07188	**1.43766**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.68951	**93.79020**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
11.16413	**223.28260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
11.16413	**223.28260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.41213	**28.24256**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00247	**0.04948**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02164	**0.43292**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.52024	**2.52024**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.74113	**2.74113**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.34270	**2.34270**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00410	**0.00410**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03591	**0.03591**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.34270	**2.34270**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.48651	**109.60001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00961	**0.19199**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08410	**1.68001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

UNIT COMMENT

TANK NAME: 34002441

Back to Report Summary

Surface Mining Control and Reclamation Act Sites (SMCRA)

MAP ID# 7

Distance from Property: 0.491 mi. (2,592 ft.) NNE
Elevation: 4,964 ft. (Lower than TP)

FACILITY INFORMATION

GEOSEARCH ID: **CO006228**

AMLIS KEY: **CO006228**

PROBLEM AREA NUMBER: **6228**

PROBLEM AREA NAME: **EMERSON**

ADDRESS: **WELD COUNTY**

FORT LUPTON, CO 80621

COUNTY: **WELD**

PLAN UNIT NUMBER: **154**

PLAN UNIT NAME: **FREDERICK**

FACILITY DETAIL(S)

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **S**
PROBLEM PRIORITY: **2**
MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/27/2013 20:13**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **15**
COMPLETED COSTS: **3688.74**
COMPLETED GPRA ACRES: **15**
COMPLETED METRIC UNITS: **6.1**

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **VO**
PROBLEM PRIORITY: **2**

Surface Mining Control and Reclamation Act Sites (SMCRA)

MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/27/2013 20:13**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **10476**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

Back to Report Summary

Resource Conservation & Recovery Act - Corrective Action Facilities (RCRAC)

MAP ID# 8

Distance from Property: 0.966 mi. (5,100 ft.) NNW
Elevation: 4,977 ft. (Lower than TP)

FACILITY INFORMATION

EPA ID#: **COR000005207**
NAME: **ARC COLORADO INC**
ADDRESS: **7040 WCR 20**
LONGMONT, CO 80504

CONTACT NAME: **REES JONES**
CONTACT ADDRESS: **7040 WCR 20**
LONGMONT CO 80504
CONTACT PHONE: **303-833-6130**
NON-NOTIFIER:
DATE RECEIVED BY AGENCY: **03/02/2020**

OWNER TYPE: **PRIVATE**
OWNER NAME: **ARC COLORADO INC**
OPERATOR TYPE: **PRIVATE**
OPERATOR NAME: **ARC COLORADO INC**

CERTIFICATION

CERTIFICATION NAME:	CERTIFICATION TITLE:	CERTIFICATION SIGNED DATE:
KEVIN SCHWINDT	**CONTROLLER**	**02/15/2010**
KEVIN SCHWINDT	**GENERAL MANAGER**	**02/06/2012**
DEREK H SHELTON	**EH&S MANAGER**	**02/17/2014**
DEREK SHELTON	**EH&S DIRECTOR**	**02/29/2016**
SHAWN COWLING	**SHAWN COWLING**	**03/01/2018**
REES JONES	**METALLURGIST**	**02/28/2020**
DEREK SHELTON	**MGR**	**09/20/2011**
DEREK SHELTON	**EH&S MGR**	**08/15/2012**
REES JONES	**METALLURGIST**	**03/02/2020**
NICOLLE DESANTIS	**ENV MGR**	**09/16/2003**
NICOLLE E DESANTIS	**EHS COORDINATOR**	**10/31/2003**
DOUGLAS BALL	**ENV MGR**	**08/03/2004**
DOUGLAS G BALL	**EH & S COORDINATOR**	**10/18/2004**
MARK ROSE	**PRESIDENT**	**02/27/2006**
MIM DUFFY	**HR/SAFETY MGR**	**02/07/2007**
MIM DUFFY	**HR/SAFETY MGR**	**02/28/2008**

INDUSTRY CLASSIFICATION (NAICS)

332117 - POWDER METALLURGY PART MANUFACTURING
332999 - ALL OTHER MISCELLANEOUS FABRICATED METAL PRODUCT MANUFACTURING
33911 - MEDICAL EQUIPMENT AND SUPPLIES MANUFACTURING
339999 - ALL OTHER MISCELLANEOUS MANUFACTURING

CURRENT ACTIVITY INFORMATION

GENERATOR STATUS: **LARGE QUANTITY GENERATOR** LAST UPDATED DATE: **03/02/2020**
SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**
TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: **NO**
TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**
NON TSDFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **YES**
CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**

IMPORTER: **NO**
MIXED WASTE GENERATOR: **NOT REPORTED**
UNDERGROUND INJECTION: **NO**
UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**
TRANSFER FACILITY: **NO**
TRANSPORTER: **NO**
USED OIL FUEL BURNER: **NO**
ONSITE BURNER EXEMPTION: **NO**
USED OIL PROCESSOR: **NO**
FURNACE EXEMPTION: **NO**
USED OIL FUEL MARKETER TO BURNER: **NO**
USED OIL REFINER: **NO**
SPECIFICATION USED OIL MARKETER: **NO**
USED OIL TRANSFER FACILITY: **NO**
USED OIL TRANSPORTER: **NO**

COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION

EVALUATIONS

01/10/2006	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
01/29/2018	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
02/01/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/03/2004	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/11/2014	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
03/05/2012	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/05/2012	**SNN**	**NOT A SIGNIFICANT NON-COMPLIER**
03/06/2014	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/09/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
08/17/2017	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
10/28/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
11/30/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
12/02/1999	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**SNY**	**SIGNIFICANT NON-COMPLIER**

VIOLATIONS

02/01/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
02/11/2014	**262.C**	**GENERATORS - PRE-TRANSPORT**
10/28/2010	**262.A**	**GENERATORS - GENERAL**
10/28/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
12/15/2011	**262.C**	**GENERATORS - PRE-TRANSPORT**

ENFORCEMENTS

02/01/2010	**175**	**COMPLIANCE ADVISORY**
02/11/2014	**175**	**COMPLIANCE ADVISORY**
03/08/2012	**310**	**FINAL 3008(A) COMPLIANCE ORDER**
10/28/2010	**175**	**COMPLIANCE ADVISORY**
12/15/2011	**175**	**COMPLIANCE ADVISORY**

HAZARDOUS WASTE

D001	**IGNITABLE WASTE**
D002	**CORROSIVE WASTE**
D003	**REACTIVE WASTE**
D006	**CADMIUM**
D007	**CHROMIUM**
D008	**LEAD**
D010	**SELENIUM**

D039	**TETRACHLOROETHYLENE**
D040	**TRICHLORETHYLENE**
F001	**THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE,TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE ANDCHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
F002	**THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE,TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE,CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001,F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
U228	**ETHENE, TRICHLORO-**
U228	**TRICHLOROETHYLENE**

UNIVERSAL WASTE

WASTE TYPE:	ACCUMULATED WASTE ON-SITE:	GENERATED WASTE ON-SITE:	SOURCE TYPE:
BATTERIES	**YES**		**NOTIFICATION**
OTHER	**YES**	**YES**	**NOTIFICATION**
LAMPS	**YES**		**NOTIFICATION**
PESTICIDES	**YES**		**NOTIFICATION**
MERCURY CONTAINING EQUIPMENT	**YES**		**NOTIFICATION**
A	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**
LAMPS	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**

CORRECTIVE ACTION AREA (RELEASE)

AREA NAME:	AIR:	GROUNDWATER:	SOIL:	SURFACE WASTE:
ENTIRE FACILITY		**Y**	**Y**	

CORRECTIVE ACTION EVENT

CA EVENT CODE: **CA375**
EVENT DESCRIPTION: **INTERIM DECISION FOR NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA400**
EVENT DESCRIPTION: **REMEDY DECISION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA550NR**
EVENT DESCRIPTION: **REMEDY CONSTRUCTION-NO REMEDY CONSTRUCTED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA900NC**
EVENT DESCRIPTION: **CA PERFORMANCE STANDARDS ATTAINED - NO CONTROLS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA999NF**
EVENT DESCRIPTION: **CA PROCESS IS TERMINATED-NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA190**
EVENT DESCRIPTION: **INVESTIGATION REPORT RECEIVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA370**
EVENT DESCRIPTION: **PETITION FOR NO FUR. ACTION RECEIPT DATE**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA070YE**

EVENT DESCRIPTION: **DETERMINATION OF NEED FOR AN INVESTIGATION-INVESTIGATION IS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA075LO**
EVENT DESCRIPTION: **CA PRIORITIZATION-LOW CA PRIORITY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA100**
EVENT DESCRIPTION: **INVESTIGATION IMPOSITION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA150**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN APPROVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA060**
EVENT DESCRIPTION: **NOTICE OF CONTAMINATION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA110**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN RECEIVED**
EVENT SEQUENCE NUMBER: **1**

EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

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Unlocated Sites Summary

This list contains sites that could not be mapped due to limited or incomplete address information.

No Records Found

Environmental Records Definitions - FEDERAL

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance. Enforcement and Compliance History Online (ECHO) Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014, the EPA retired this system for Clean Air Act stationary sources.

ALTFUELS Alternative Fueling Stations

VERSION DATE: 10/28/20

Nationwide list of alternative fueling stations made available by the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Bio-diesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE).

BF Brownfields Management System

VERSION DATE: 01/11/21

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment. This database includes tribal brownfield sites.

BRS Biennial Reporting System

VERSION DATE: 12/31/17

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 06/17/20

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

DNPL Delisted National Priorities List

VERSION DATE: 04/26/21

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

DOCKETS EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

DOD Department of Defense Sites

VERSION DATE: 12/01/14

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 04/27/21

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. The data displays remedy component information for Superfund decision documents issued in fiscal years 1982-2017, and it includes final and deleted NPL sites as well as sites with a Superfund Alternative Approach (SAA) agreement in place. The only sites included that are not on the NPL, proposed for NPL, or removed from proposed NPL, are those with an SAA Agreement in place. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the

potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ECHOR08 Enforcement and Compliance History Information

VERSION DATE: 11/28/20

The U.S. Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database, provides compliance and enforcement information for facilities nationwide. This database includes facilities regulated as Clean Air Act stationary sources, Clean Water Act direct dischargers, Resource Conservation and Recovery Act hazardous waste handlers, Safe Drinking Water Act public water systems along with other data, such as Toxics Release Inventory releases.

ERNSCO Emergency Response Notification System

VERSION DATE: 03/28/21

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FEMAUST FEMA Owned Storage Tanks

VERSION DATE: 12/01/16

This is a listing of FEMA owned underground and aboveground storage tank sites. For security reasons, address information is not released to the public according to the U.S. Department of Homeland Security.

FRSCO Facility Registry System

VERSION DATE: 03/02/21

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

FUDS Formerly Used Defense Sites

VERSION DATE: 12/31/18

The Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not

all properties currently have polygon data available. DISCLAIMER: This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

FUSRAP Formerly Utilized Sites Remedial Action Program

VERSION DATE: 03/04/17

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

HISTPST Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR08 Hazardous Materials Incident Reporting System

VERSION DATE: 03/24/21

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

HWCD Hazardous Waste Compliance Docket Facilities

VERSION DATE: 10/29/20

This list of the Federal Agency Hazardous Waste Compliance Docket Facilities is maintained by the United States Environmental Protection Agency (EPA). According to the EPA, Section 120(c) of CERCLA requires EPA to establish a listing, known as the Federal Facility Hazardous Waste Compliance Docket (Docket), of Federal facilities which are managing or have managed hazardous waste; or have had a release of hazardous waste. Thus, the Docket identifies all Federal facilities that must be evaluated to determine whether they pose a risk to human health and the environment and it makes this information available to the public. In order for the Docket to remain current and accurate it requires periodic updating.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 09/19/20

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISCLEANERS Integrated Compliance Information System Drycleaners

VERSION DATE: 09/19/20

This is a listing of drycleaner facilities from the Integrated Compliance Information System (ICIS). The U.S. Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments. The following Primary SIC Codes are included in this data: 7211, 7212, 7213, 7215, 7216, 7217, 7218, and/or 7219; the following Primary NAICS Codes are included in this data: 812320, 812331, and/or 812332.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 04/26/20

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. This database is provided by the U.S. Environmental Protection Agency.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 06/29/17

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements. Disclaimer: Due to agency regulations and policies, this database contains applicant/licensee location information which may or may not be related to the physical location per MLTS site.

MRDS Mineral Resource Data System

VERSION DATE: 03/15/16

MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps. A few updates last occurred 2015 and early 2016 for select mine site area/s.

MSHA Mine Safety and Health Administration Master Index File

VERSION DATE: 08/07/20

The Mine dataset lists all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970. It includes such information as the current status of each mine (Active, Abandoned, NonProducing, etc.), the current owner and operating company, commodity codes and physical attributes of the mine. Mine ID is the unique key for this data. This information is provided by the United States Department of Labor - Mine Safety and Health Administration (MSHA).

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 03/22/21

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 03/22/21

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

NMS Former Military Nike Missile Sites

VERSION DATE: 12/01/84

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline,

heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

NPDESR08 National Pollutant Discharge Elimination System

VERSION DATE: 04/01/07

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES database was collected from the U.S. Environmental Protection Agency (EPA) from December 2002 through April 2007. Refer to the ICIS and/or ICIS-NPDES database as source of current data. This database includes permitted facilities located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

NPL National Priorities List

VERSION DATE: 04/26/21

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

ODI Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

PADS PCB Activity Database System

VERSION DATE: 11/19/20

PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of Polychlorinated Biphenyls (PCB) who are required to notify the U.S. Environmental Protection Agency of such activities.

PCSR08 Permit Compliance System

VERSION DATE: 08/01/12

The historic Permit Compliance System tracked enforcement status and permit compliance of facilities controlled

by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. This database includes permitted facilities located in EPA Region 8 states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. This system has since been modernized by United States Environmental Protection Agency and is now integrated into the Integrated Compliance Information System (ICIS). Please refer to the ICIS database as the current source for this data.

PNPL Proposed National Priorities List

VERSION DATE: 04/26/21

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.

RCRAGR08 Resource Conservation & Recovery Act - Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities currently generating hazardous waste. EPA Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRANGR08 Resource Conservation & Recovery Act - Non-Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities classified as non-generators. Non-Generators do not presently generate hazardous waste. EPA

Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRASC RCRA Sites with Controls

VERSION DATE: 05/16/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with institutional controls in place.

RCRASUBC Resource Conservation & Recovery Act - Subject to Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities subject to corrective actions.

RCRAT Resource Conservation & Recovery Act - Non-CORRACTS Treatment, Storage & Disposal Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities recognized as hazardous waste treatment, storage, and disposal sites (TSD).

RODS Record of Decision System

VERSION DATE: 09/21/20

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

SEMS Superfund Enterprise Management System

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.

SEMSARCH Superfund Enterprise Management System Archived Site Inventory

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System Archived Site Inventory (List 8R Archived) replaced the CERCLIS NFRAP reporting system in 2015. This listing reflects sites at which the EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program.

SEMSLIENS SEMS Lien on Property

VERSION DATE: 06/22/20

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs. This is a listing of SEMS sites with a lien on the property.

SFLIENS CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete. Please refer to the SEMSLIENS database as source of current data.

SMCRA Surface Mining Control and Reclamation Act Sites

VERSION DATE: 12/18/20

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as information on the cost associated with the reclamation of those problems.

The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

SSEHRIPFAS SSEHRI PFAS Contamination Sites

VERSION DATE: 12/12/19

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Please access the following source link for the most current information: https://pfasproject.com/pfas-contamination-site-tracker/

SSTS Section Seven Tracking System

VERSION DATE: 08/04/20

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. "Production" includes formulation, packaging, repackaging, and relabeling. For this database, the Product Information is only available for establishments up through 2014 or prior years, product details are no longer released by the EPA within the current SSTS non-Confidential Business Information data.

TRI Toxics Release Inventory

VERSION DATE: 12/31/18

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/31/16

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured,

imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency (EPA) authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site. The EPA has collected Chemical Data Reporting (CDR) data since in 1986 (as Inventory Update Reporting). Collections occur approximately every four years and reporting requirements changed from collection to collection.

USUMTRCA Uranium Mill Tailings Radiation Control Act Sites

VERSION DATE: 03/04/17

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Environmental Records Definitions - STATE (CO)

APCDP Air Pollution Control Division Permitted Facilities

VERSION DATE: 06/29/20

This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.

ASBESTOS Asbestos Abatement and Demolition Projects

VERSION DATE: 12/28/17

The Colorado Department of Public Health and Environment's Air Pollution Control Division assists schools and businesses to comply with air pollution laws regulating asbestos and asbestos containing materials. The regulation that governs asbestos in Colorado is the Colorado Air Quality Control Commission s Regulation No. 8, Part B, "Emission Standards for Asbestos." Notification is required for all demolitions of all facilities and all asbestos abatement projects that exceed the trigger levels, whatever is the lesser quantity. The notification requirements apply to both friable and non-friable asbestos materials. This database contains those related projects since January 2008.

AST Aboveground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of aboveground storage tank (AST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

BF Colorado Brownfield Sites

VERSION DATE: 11/12/20

This list of Colorado brownfields is maintained by the Colorado Department of Public Health & Environment (CDPHE) Hazardous Materials and Waste Management Division Brownfields Program in conjunction with the Voluntary Cleanup Program (VCUP). The brownfields database is an inventory of sites for which CPDHE has provided brownfields assistance in the form of targeted brownfields assessments, a revolving loan or grant through the Colorado Brownfields Revolving Loan Fund, and/or assistance through our state brownfields grants program. Most of these incentives are available only to local governments or nonprofits. In some cases, sites that receive state incentives also go through the VCUP program but most of the VCUP applicants are private entities not eligible for other state brownfields incentives.

CDPS Colorado Discharge Permit System Facilities

VERSION DATE: 02/03/19

The Colorado Department of Public Health & Environment's Water Quality Control Division regulates the

Colorado Discharge Permit System. This system controls stormwater discharges from construction activities by requiring a Stormwater Construction Permit to reduce pollutants from entering streams, river, lakes and wetlands as a result of runoff from residential, commercial and industrial areas. This database also includes facilities with Industrial Stormwater Permits.

CLEANERS Dry Cleaning Facilities

VERSION DATE: 04/16/21

This list of dry cleaners, which have obtained an air permit through the Air Pollution Control Division, is maintained by the Colorado Department of Public Health and Environment.

COVENANTS Environmental Real Covenants List

VERSION DATE: 11/23/20

This list of environmental covenants is maintained by the Colorado Division of Public Health and Environment. Senate Bill 01-145 gave authority to the Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental covenant. These covenants, which are recorded with the deed and run with the land, provide a mechanism to ensure that institutional controls that are part of environmental remediation projects are properly implemented and that engineered structures are protected and maintained, so that implemented remedies continue to be protective of human health and the environment for as long as any residual contamination remains a risk.

HISTSWLF Historical Solid Waste Landfills

VERSION DATE: NR

This historical solid waste landfills database contains data from the Hazardous Materials Waste Management Division (HMWMD) of the Colorado Department of Public Health and other various state and local agencies. In the early 1980s, the HMWMD conducted a survey of staff members and local agencies to compile this listing of sites that were known or thought to have waste issues. This Solid Waste Historical Data is not considered complete or verifiable and has not been maintained since the late 1980s. The HMWMD is not responsible and shall not be liable to the used for damages of any kind arising out of the use of this data or information.

HWSCA Hazardous Waste Sites- Corrective Action

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by Congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the Hazardous and Solid Waste Amendments (HSWA) were added to RCRA providing for corrective action at facilities subject to RCRA. That same year, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. Corrective action may be implemented as part of a RCRA Hazardous Waste Permit, an Order, or a Corrective Action Plan pursuant to the Colorado Hazardous Waste Regulations. Corrective action is the process by which regulated facilities investigate and remediate, as necessary, all contamination (soil, ground water, surface water, air) associated with their releases into the environment. Historic Corrective Action Sites are facilities that have

completed the RCRA Subtitle C corrective Action process. This data was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

HWSG Hazardous Waste Sites- Generator

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. This facility listing includes RCRA sites listed as generators of hazardous waste (Small Quantity Generators and Large Quantity Generators) and was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

Small Quantity Generators (SQG) generate, in any calendar month, more than 100 kg (220 lbs.) but less than 1,000 kg (2,200 lbs.) of RCRA hazardous waste; and generate, in any calendar month, or accumulate at any time, no more than 1 kg (2.2 lbs.) of acute hazardous waste and no more than 100 kg (220 lbs.) of material from the cleanup of a spill of acute hazardous waste; and accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time; or, the site is a Small Quantity Generator if the site met all other criteria for a Conditionally Exempt Small Quantity Generator, but accumulated, at any time, more than 1,000 kg (2,200 lbs.) of RCRA hazardous waste.

Large Quantity Generators (LQG) generate, in any calendar month, 1,000 kg (2,200 lbs.) or more of RCRA hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 1 kg (2.2 lbs.) of RCRA acute hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 100 kg (220 lbs.) of spill cleanup material contaminated with RCRA acute hazardous waste.

HWSTSD Hazardous Waste Sites- Treatment, Storage & Disposal

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. TSD facilities treat, store, dispose, or recycle hazardous waste on site in units and therefore are subject to RCRA permitting requirements. Historic TSDs are facilities that have completed closure and/or post-closure of the RCRA Subtitle C Regulated Unit(s) or the Treatment/Storage/Disposal Unit is no longer regulated. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

LST Leaking Storage Tank Facilities

VERSION DATE: 05/03/21

This database of aboveground and underground storage tank facilities with confirmed releases is a compilation of several lists maintained by the Colorado Department of Labor and Employment. Currently In Use, Never Installed/Existed, Never Installed-Permit Revoked, Not Regulated, Other, Pending Installation, Permanently Closed, Temporarily Out of Use tanks are included in this data. The next set of data is obtained from the Active

and Closed OPS Petroleum Release Events in Colorado database. This data includes the OPS Open Event locations, but also shows locations of closed events (releases that have been issued a No Further Action determination). The Events data utilized in this database includes the following status types: Brownfield, Closed, Enforcement, LUST Trust, Open and State Lead. Please note some Events (confirmed releases) may not have a contaminant present.

LUSTTRUST Leaking Underground Storage Tanks Trust Fund Sites

VERSION DATE: 01/01/00

Suspected tank leaks have been discovered at the sites are included in this database, but the facility responsible for the leak has not been identified. The state's investigation and search for responsible parties is paid for out of the state's Leaking Underground Storage Tank (LUST) Trust Fund. This data was originally collected in 2002 from the Colorado Department of Labor & Employment, Division of Oil & Public Safety, State Fund Section by a former environmental database company known as Satisfi. Please refer to State LST database as source of current LUST Trust sites.

METHANESITES Methane Gas Study Sites

VERSION DATE: 01/01/81

This Investigation of Methane Gas Hazards report was prepared by the Denver Office of Emergency Preparedness in 1981. The purpose of this study was to assess the actual and potential generation, migration, explosive and related problems associated with specified landfills, and to identify existing and potential problems, suggested strategies to prevent, abate, and control such problems and recommend investigative and monitoring functions as may be deemed necessary. The Colorado Department of Health selected eight landfills as priorities due to population density and potential hazards to population and property.

RECYCLERS Registered Recycling Facilities

VERSION DATE: 09/01/19

This list of registered recycling facilities in Colorado is maintained by the Colorado Department of Public Health & Environment. This list includes primarily processing facilities for recyclable materials, such as: material recovery facilities, industrial recycling operations, and recyclable material end user sites. Collection centers/drop-off locations are not included unless the site is also processing recyclable materials (separating, sorting, dismantling, grinding, baling, etc.).

SF Superfund Sites

VERSION DATE: 12/10/20

This list of Superfund Sites is maintained by the Colorado Department of Public Health and Environment. This list contains active, deleted and proposed "Superfund" hazardous waste sites, as well as those sites identified through the Natural Resource Damages section of Superfund legislation and one Private Non-Superfund Cleanup site. A site qualifies for the National Priorities List (NPL or Superfund list) when the U.S. Environmental Protection Agency (EPA) determines there is a release or threatened release of hazardous substances that may

endanger public health, welfare or the environment. In Colorado, the lead agency for Superfund remediation may be either the EPA or the Colorado Department of Public Health and Environment.

SPILLS Spills Listing

VERSION DATE: 02/28/21

The Colorado Department of Public Health and Environment's Division of Emergency Preparedness and Response maintains this listing of chemical spills and/or releases.

SWF Solid Waste Facilities

VERSION DATE: 12/18/20

The Colorado Department of Public Health and Environment maintains this database of solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants. As of 11-6-19, the Waste Grease list has been discontinued and no new sites will be added as waste grease.

UMTS Uranium Mill Tailings Sites

VERSION DATE: 08/09/02

There were nine uranium mill tailings sites in Colorado designated for cleanup under the federal Uranium Mill Tailings Radiation Control Act (UMTRA). These nine sites, know commonly as UMTRA sites, were remediated jointly by the State of Colorado and the U.S. Department of Energy during the late 1980's and early 1990's. Mill tailings were removed from 8 of the mill sites and relocated in engineered disposal cells. A disposal cell is designed to encapsulate the material, reduce radon emanation, and prevent the movement of water through the material. At one site, Maybell, CO, the tailings were stabilized in-place at the mill site. After remediation of the tailings was completed, the State and DOE began to investigate the residual impacts to groundwater at the mill sites. The groundwater phase of the UMTRA program is on-going. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

UST Underground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of underground storage tank (UST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

VCRA Voluntary Cleanup and Redevelopment Program Sites

VERSION DATE: 03/31/21

This list of Voluntary Cleanup and Redevelopment Program Sites is maintained by the Colorado Department of Public Health and Environment (CDPHE) and includes both voluntary cleanup and brownfield properties. The

Voluntary Cleanup and Redevelopment program was created in 1994. The objective of the program is to facilitate the redevelopment and transfer of contaminated properties. Properties that sit untouched because of their real or perceived contamination can be rehabilitated using the CDPHE's Brownfields Program in conjunction with the Voluntary Cleanup Program. Cleanup decisions are based on existing standards and the proposed use of the property. The actual cleanup and verification is the owner's responsibility.

WCSWF Weld County Solid Waste Facilities

VERSION DATE: 01/25/18

This list of solid waste facilities is maintained by the Weld County Public Health Department. The Weld County Code (WCC), Section 23-4-380 is the only section of the WCC that pertains to solid waste operations. The siting, permitting and regulation of solid waste disposal sites is an area of dual jurisdiction between Colorado Department of Public Health and Environment and Weld County. The primary regulations that govern composting and solid waste facilities are the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). These regulations are implemented by the Colorado Department of Public Health & Environment. The Weld County Department of Public Health & Environment interacts with compost and solid waste facilities through the receipt of complaints, the land use planning process for facilities having a Use by Special Review (USR) Permit, site inspections, and investigations.

Environmental Records Definitions - TRIBAL

INDIANRES Indian Reservations

VERSION DATE: 09/27/17

This database is extracted from select geographic and cartographic information from the U.S. Census Bureau. The Bureau of Indian Affairs (BIA) within the U.S. Department of the Interior (DOI) provides the list of federally recognized tribes. The American Indian/Alaska Native/Native Hawaiian (AIANNH) Areas includes the following legal entities: federally recognized American Indian reservations and off-reservation trust land areas, state-recognized American Indian reservations, and Hawaiian home lands (HHLs). The boundaries for federally recognized American Indian reservations and off-reservation trust lands are as of January 2017. The boundaries for state-recognized American Indian reservations and for state designated tribal statistical areas were delineated by state governor-appointed liaisons for the 2010 Census through the State American Indian Reservation Program and Tribal Statistical Areas Program respectively.

LUSTR08 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

USTR08 Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

Appendix C: Well Search Report

GeoPlus Oil & Gas Report

GeoLens by GeoSearch

Target Property:

Columbine
Frederick, Weld County, Colorado 80530

Prepared For:

Two Dot Consulting, LLC

Order #: 166434
Job #: 412875
Project #: 603-128
Date: 06/09/2021

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Target Property Summary

Target Property Information

Columbine
Frederick, Colorado 80530

Coordinates
Area centroid (-104.91666, 40.1143466)

USGS Quadrangle
Frederick, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530
Fort Lupton CO: 80621

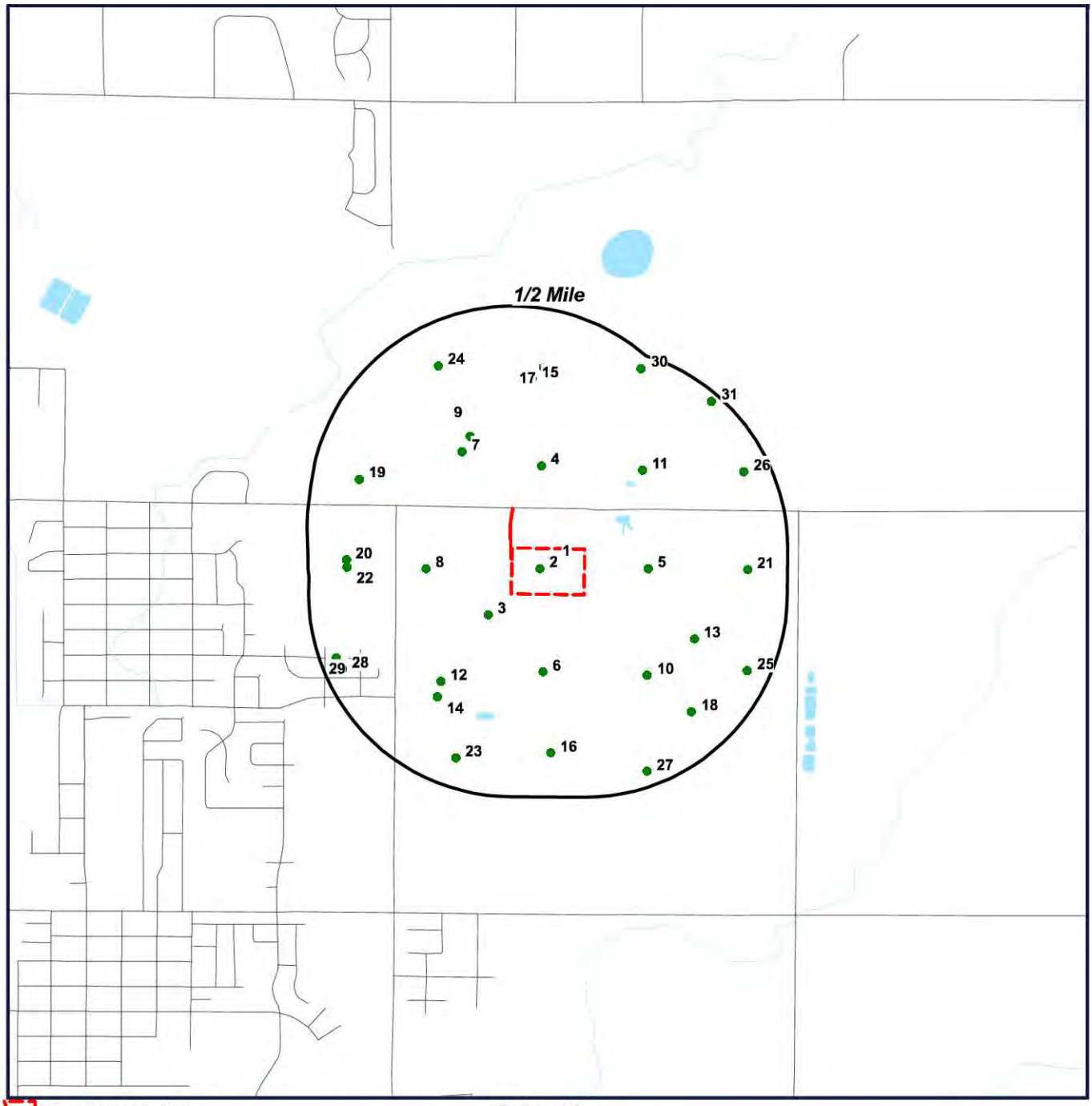
Database Radius Summary

STATE (CO) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
OG	0.5000	2	8	10	37	NS	NS	57
PITS	0.5000	0	0	1	4	NS	NS	5
SUB-TOTAL		2	8	11	41	0	0	62
TOTAL		2	8	11	41	0	0	62

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

OIL & GAS WELL MAP



Target Property (TP)

Well Location

Columbine
Frederick, Colorado
80530

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
1	OG	05-123-20363	TP	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
2	OG	05-123-07532	TP	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-11334	0.059 mi. WSW (312 ft.)	HELLEN RUSSELL PERRIN G.U.-TRUE	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35027	0.066 mi. WSW (348 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35029	0.065 mi. WSW (343 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35030	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35031	0.067 mi. WSW (354 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35032	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35033	0.063 mi. WSW (333 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35035	0.062 mi. WSW (327 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
4	OG	05-123-09501	0.143 mi. NE (755 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-08947	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-30590	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-08815	0.173 mi. S (913 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
7	OG	05-123-07503	0.203 mi. NW (1072 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
7	PITS	118682	0.203 mi. NW (1072 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-09045	0.209 mi. W (1104 ft.)	BERNARD TEETS B	WELD COUNTY, FREDERICK, CO 80530
9	OG	05-123-07271	0.224 mi. NW (1183 ft.)	BERNARD TEETS	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-21592	0.247 mi. NW (1304 ft.)	TEETS	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-07625	0.230 mi. SE (1214 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-30589	0.238 mi. SE (1257 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-07569	0.256 mi. NE (1352 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
11	OG	05-123-20339	0.253 mi. NE (1336 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-20375	0.263 mi. SW (1389 ft.)	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
13	OG	05-123-11399	0.285 mi. ESE (1505 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-07552	0.298 mi. SW (1573 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
14	PITS	118238	0.298 mi. SW (1573 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, FREDERICK, CO 80530
15	OG	05-123-08394	0.342 mi. N (1806 ft.)	TEETS, BERNARD E	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08677	0.375 mi. S (1980 ft.)	PERRIN B	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35013	0.374 mi. S (1975 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35018	0.372 mi. S (1964 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35019	0.370 mi. S (1954 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35020	0.367 mi. S (1938 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35022	0.360 mi. S (1901 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35024	0.368 mi. S (1943 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35025	0.362 mi. S (1911 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35050	0.364 mi. S (1922 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35055	0.376 mi. S (1985 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
17	OG	05-123-19958	0.376 mi. NNE (1985 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
18	PITS	118515	0.378 mi. SE (1996 ft.)	CRESTONE PEAK RESOURCES OPERATING LLC	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-19746	0.388 mi. W (2049 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-07523	0.405 mi. W (2138 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-19978	0.390 mi. W (2059 ft.)	HSR-RUSSELL	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-10239	0.402 mi. E (2123 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-30123	0.395 mi. E (2086 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34151	0.407 mi. W (2149 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
22	OG	05-123-34153	0.405 mi. W (2138 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34155	0.404 mi. W (2133 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34156	0.409 mi. W (2160 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34158	0.413 mi. W (2181 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34159	0.411 mi. W (2170 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-08814	0.408 mi. SSW (2154 ft.)	COLORADO NATL BANK TRUSTE	WELD COUNTY, FREDERICK, CO 80530
24	OG	05-123-09499	0.414 mi. NNW (2186 ft.)	TEETS UNIT	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08948	0.436 mi. ESE (2302 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-09503	0.444 mi. ENE (2344 ft.)	B.E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08781	0.444 mi. SSE (2344 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
27	OG	05-123-30588	0.453 mi. SSE (2392 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
28	PITS	118494	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118495	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-08816	0.453 mi. WSW (2392 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-09502	0.483 mi. NE (2550 ft.)	TEETS, BERNARD E B	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11009	0.494 mi. NE (2608 ft.)	BERNARD E. TEETS	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
1	OG	05-123-20363	4,998 ft.	TP	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
2	OG	05-123-07532	4,998 ft.	TP	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-11334	5,013 ft.	0.059 mi. WSW (312 ft.)	HELLEN RUSSELL PERRIN G.U.-TRUE	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35027	5,013 ft.	0.066 mi. WSW (348 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35029	5,013 ft.	0.065 mi. WSW (343 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35030	5,013 ft.	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35031	5,013 ft.	0.067 mi. WSW (354 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35032	5,013 ft.	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35033	5,013 ft.	0.063 mi. WSW (333 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35035	5,013 ft.	0.062 mi. WSW (327 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
4	OG	05-123-09501	4,995 ft.	0.143 mi. NE (755 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-08947	4,994 ft.	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-30590	4,994 ft.	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-08815	5,009 ft.	0.173 mi. S (913 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
7	OG	05-123-07503	4,986 ft.	0.203 mi. NW (1072 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-09045	5,007 ft.	0.209 mi. W (1104 ft.)	BERNARD TEETS B	WELD COUNTY, FREDERICK, CO 80530
9	OG	05-123-07271	4,986 ft.	0.224 mi. NW (1183 ft.)	BERNARD TEETS	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-21592	4,986 ft.	0.247 mi. NW (1304 ft.)	TEETS	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-07625	5,008 ft.	0.230 mi. SE (1214 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-30589	5,008 ft.	0.238 mi. SE (1257 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-07569	4,982 ft.	0.256 mi. NE (1352 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20339	4,982 ft.	0.253 mi. NE (1336 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-20375	5,021 ft.	0.263 mi. SW (1389 ft.)	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
13	OG	05-123-11399	5,005 ft.	0.285 mi. ESE (1505 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-07552	5,021 ft.	0.298 mi. SW (1573 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
15	OG	05-123-08394	4,986 ft.	0.342 mi. N (1806 ft.)	TEETS, BERNARD E	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08677	5,027 ft.	0.375 mi. S (1980 ft.)	PERRIN B	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35013	5,027 ft.	0.374 mi. S (1975 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35018	5,027 ft.	0.372 mi. S (1964 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35019	5,027 ft.	0.370 mi. S (1954 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35020	5,027 ft.	0.367 mi. S (1938 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35022	5,027 ft.	0.360 mi. S (1901 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35024	5,027 ft.	0.368 mi. S (1943 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35025	5,027 ft.	0.362 mi. S (1911 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35050	5,027 ft.	0.364 mi. S (1922 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35055	5,027 ft.	0.376 mi. S (1985 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
17	OG	05-123-19958	4,986 ft.	0.376 mi. NNE (1985 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-19746	4,987 ft.	0.388 mi. W (2049 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-07523	5,009 ft.	0.405 mi. W (2138 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-19978	5,009 ft.	0.390 mi. W (2059 ft.)	HSR-RUSSELL	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-10239	5,002 ft.	0.402 mi. E (2123 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-30123	5,002 ft.	0.395 mi. E (2086 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34151	5,009 ft.	0.407 mi. W (2149 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34153	5,009 ft.	0.405 mi. W (2138 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34155	5,009 ft.	0.404 mi. W (2133 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34156	5,009 ft.	0.409 mi. W (2160 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34158	5,009 ft.	0.413 mi. W (2181 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
22	OG	05-123-34159	5,009 ft.	0.411 mi. W (2170 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-08814	5,029 ft.	0.408 mi. SSW (2154 ft.)	COLORADO NATL BANK TRUSTE	WELD COUNTY, FREDERICK, CO 80530
24	OG	05-123-09499	4,991 ft.	0.414 mi. NNW (2186 ft.)	TEETS UNIT	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08948	5,013 ft.	0.436 mi. ESE (2302 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-09503	4,992 ft.	0.444 mi. ENE (2344 ft.)	B.E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08781	5,029 ft.	0.444 mi. SSE (2344 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
27	OG	05-123-30588	5,029 ft.	0.453 mi. SSE (2392 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
29	OG	05-123-08816	5,018 ft.	0.453 mi. WSW (2392 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-09502	4,968 ft.	0.483 mi. NE (2550 ft.)	TEETS, BERNARD E B	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11009	4,976 ft.	0.494 mi. NE (2608 ft.)	BERNARD E. TEETS	WELD COUNTY, LONGMONT, CO 80504
7	PITS	118682	4,986 ft.	0.203 mi. NW (1072 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
14	PITS	118238	5,021 ft.	0.298 mi. SW (1573 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, FREDERICK, CO 80530
18	PITS	118515	5,015 ft.	0.378 mi. SE (1996 ft.)	CRESTONE PEAK RESOURCES OPERATING LLC	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118494	5,022 ft.	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118495	5,022 ft.	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504

Oil & Gas Well Report

MAP ID	API #	WELL # AND NAME	OPERATOR NAME	GRND ELEV.	LOCATION QUALIFIER	STATUS	LATITUDE	LONGITUDE
1	05-123-20363	3-29A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	5000 FT	ACTUAL LATLONG	SHUT IN	40.115112000	-104.916460000
2	05-123-07532	2 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5002 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.114725000	-104.917047000
3	05-123-11334	1 HELLEN RUSSELL PERRIN G.U.-TRUE	KERR MCGEE OIL & GAS ONSHORE LP	5013 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.113033000	-104.919278000
3	05-123-35027	21-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113051000	-104.919454000
3	05-123-35029	31-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113078000	-104.919454000
3	05-123-35030	30-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113105000	-104.919454000
3	05-123-35031	6-29X SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5016 FT	ACTUAL LATLONG	SHUT IN	40.113024000	-104.919454000
3	05-123-35032	4-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113132000	-104.919454000
3	05-123-35033	36-20 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5014 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.113159000	-104.919454000
3	05-123-35035	29-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5014 FT	ACTUAL LATLONG	SHUT IN	40.113186000	-104.919454000
4	05-123-09501	10 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4996 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118383000	-104.916984000
5	05-123-08947	31-29 EMERSON	EXTRACTION OIL & GAS INC	4993 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.114712000	-104.912001000
5	05-123-30590	31-29J EMERSON	SUNDANCE ENERGY INC	4996 FT	PLANNED LATLONG	ABANDONED LOCATION	40.114568000	-104.912001000
6	05-123-08815	7 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5013 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.111031000	-104.916910000
7	05-123-07503	1 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4985 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.118890000	-104.920691000
8	05-123-09045	8 BERNARD TEETS B	KP KAUFFMAN COMPANY INC	5005 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.114720000	-104.922363000
9	05-123-07271	1 BERNARD TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4985 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119439000	-104.920315000
9	05-123-21592	12-20A TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4990 FT	ACTUAL LATLONG	SHUT IN	40.119737000	-104.920514000
10	05-123-07625	32-29 EMERSON	EXTRACTION OIL & GAS INC	5010 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.111054000	-104.912041000
10	05-123-30589	32-29J EMERSON	SUNDANCE ENERGY INC	5012 FT	PLANNED LATLONG	ABANDONED LOCATION	40.110910000	-104.912041000
11	05-123-07569	4 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4984 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118226000	-104.912266000
11	05-123-20339	15-20A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4989 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.118262000	-104.912442000
12	05-123-20375	5-29A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	5040 FT	ACTUAL LATLONG	SHUT IN	40.110692000	-104.921663000
13	05-123-11399	2-29 J EMERSON	CRESTONE PEAK RESOURCES OPERATING LLC	5006 FT	ACTUAL LATLONG	SHUT IN	40.112215000	-104.909857000
14	05-123-07552	3 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5023 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.110134000	-104.921840000
15	05-123-08394	B #5 TEETS, BERNARD E	KP KAUFFMAN COMPANY INC	4985 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121482000	-104.917402000
16	05-123-08677	1 PERRIN B	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108094000	-104.916715000
16	05-123-35013	36-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108121000	-104.916550000
16	05-123-35018	35-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	SHUT IN	40.108139000	-104.916539000
16	05-123-35019	13-29X HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108175000	-104.916550000
16	05-123-35020	23-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108220000	-104.916538000
16	05-123-35022	22-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108310000	-104.916550000
16	05-123-35024	19-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108202000	-104.916550000

16	05-123-35025	25-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108283000	-104.916550000
16	05-123-35050	12-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108256000	-104.916550000
16	05-123-35055	14-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	SHUT IN	40.108085000	-104.916550000
17	05-123-19958	11-20A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4985 FT	ACTUAL LATLONG	SHUT IN	40.121906000	-104.916874000
19	05-123-19746	19-16JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4987 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.117911000	-104.925469000
20	05-123-07523	1 TOM L. RUSSELL	KP KAUFFMAN COMPANY INC	5007 FT	ACTUAL LATLONG	PRODUCING	40.115038000	-104.926082000
20	05-123-19978	1-30A HSR-RUSSELL	KERR MCGEE OIL & GAS ONSHORE LP	5007 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.115227000	-104.925812000
21	05-123-10239	41-29 EMERSON	EXTRACTION OIL & GAS INC	5004 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.114673000	-104.907366000
21	05-123-30123	41-29J EMERSON	SUNDANCE ENERGY INC	5006 FT	PLANNED LATLONG	ABANDONED LOCATION	40.114583000	-104.907495000
22	05-123-34151	21-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5011 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926118000
22	05-123-34153	7-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5012 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926082000
22	05-123-34155	8-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5012 FT	ACTUAL LATLONG	SHUT IN	40.114776000	-104.926047000
22	05-123-34156	2-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5011 FT	ACTUAL LATLONG	SHUT IN	40.114785000	-104.926153000
22	05-123-34158	28-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5010 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926223000
22	05-123-34159	27-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5010 FT	ACTUAL LATLONG	SHUT IN	40.114785000	-104.926188000
23	05-123-08814	2 COLORADO NATL BANK TRUSTE	KP KAUFFMAN COMPANY INC	5030 FT	ACTUAL LATLONG	PRODUCING	40.107971000	-104.920962000
24	05-123-09499	2 TEETS UNIT	KP KAUFFMAN COMPANY INC	4995 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121954000	-104.921779000
25	05-123-08948	42-29 EMERSON	EXTRACTION OIL & GAS INC	5014 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.111078000	-104.907370000
26	05-123-09503	9 B.E. TEETS B	KP KAUFFMAN COMPANY INC	4993 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118178000	-104.907549000
27	05-123-08781	33-29 EMERSON	EXTRACTION OIL & GAS INC	5030 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.107487000	-104.912057000
27	05-123-30588	33-29J EMERSON	SUNDANCE ENERGY INC	5031 FT	PLANNED LATLONG	ABANDONED LOCATION	40.107351000	-104.912057000
29	05-123-08816	2 TOM L. RUSSELL	KP KAUFFMAN COMPANY INC	5022 FT	ACTUAL LATLONG	PRODUCING	40.111533000	-104.926544000
30	05-123-09502	11 TEETS, BERNARD E B	KP KAUFFMAN COMPANY INC	4967 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121857000	-104.912332000
31	05-123-11009	2 BERNARD E. TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4975 FT	ACTUAL LATLONG	SHUT IN	40.120692000	-104.909047000

Oil & Gas Pits Report

MAP ID	FACILITY #	PIT #	OPERATOR NAME	WELL # AND NAME	FIELD NAME	STATUS	LATITUDE	LONGITUDE
7	118682	PIT# 118682	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.118890000	-104.920691000
14	118238	PIT# 118238	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.110134000	-104.921840000
18	118515	PIT# 118515	CRESTONE PEAK RESOURCES OPERATING LLC	NOT REPORTED	WATTENBERG	CLOSED	40.109611000	-104.909977000
28	118494	PIT# 118494	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	NOT REPORTED	40.111136000	-104.926262000
28	118495	PIT# 118495	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	NOT REPORTED	40.111136000	-104.926262000

Environmental Records Definitions - STATE (CO)

OG Oil and Gas Well Locations

VERSION DATE: 09/18/20

The Colorado Oil and Gas Conservation Commission maintains this database of active and plugged wells, including active and expired well permits. Some permitted locations were never drilled but locations are still included in the data.

PITS Oil and Gas Pit Locations

VERSION DATE: 09/18/20

This Colorado Oil and Gas Conservation Commission (COGCC) database maintains this list of oil and gas pit locations within Colorado. This data contains over 10,000 oil and gas related pit locations. The Colorado Department of Natural Resources (DNR) is not responsible and shall not be liable to the user for damages of any kind arising out of the use of data or information provided by the DNR, including the installation of the data or information, its use, or the results obtained from its use. Any data or information provided by the DNR is provided "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Appendix D: Historical Aerial Photographs

Historical Aerial Photographs

NEW: *GeoLens by Geosearch*

Target Property:

Columbine

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 149072
Job #: 359305
Project #: 603-128
Date: 7/8/2020

Target Property Summary

Columbine

Longmont, Weld, Colorado 80504

USGS Quadrangle: ***Frederick***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.918344000, 40.115175000), (-104.914956000, 40.115146000), (-104.914969000, 40.113529000), (-104.918356000, 40.113549000)

Aerial Research Summary

Date	Source	Scale	Frame
2019	USDA	1" = 500'	N/A
2017	USDA	1" = 500'	N/A
2015	USDA	1" = 500'	N/A
2013	USDA	1" = 500'	N/A
2011	USDA	1" = 500'	N/A
2009	USDA	1" = 500'	N/A
2006	USDA	1" = 500'	N/A
2005	USDA	1" = 500'	N/A
2004	USDA	1" = 500'	N/A
10/04/1999	USGS	1" = 500'	N/A
10/13/1984	USGS	1" = 500'	17-72
08/16/1978	USGS	1" = 500'	3-44
06/11/1975	USGS	1" = 500'	5-105
03/04/1970	USGS	1" = 500'	2-6
09/03/1963	ASCS	1" = 500'	PI-14
09/10/1953	AMS	1" = 500'	4940
09/25/1948	USGS	1" = 500'	4-93
11/03/1937	ASCS	1" = 500'	85-33

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Columbine
USDA
2019

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USDA
2017

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USDA
2015

GeoSearch

JOB #: 359305 - 07/08/2020



N
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Columbine
USDA
2013

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USDA
2011

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USDA
2009

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USDA
2006

GeoSearch

JOB #: 359305 - 07/08/2020



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USDA
2005

GeoSearch

JOB #: 359305 - 07/08/2020



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USDA
2004

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USGS
10/04/1999

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USGS
10/13/1984

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USGS
08/16/1978

GeoSearch

JOB #: 359305 - 07/08/2020



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USGS
06/11/1975

GeoSearch

JOB #: 359305 - 07/08/2020

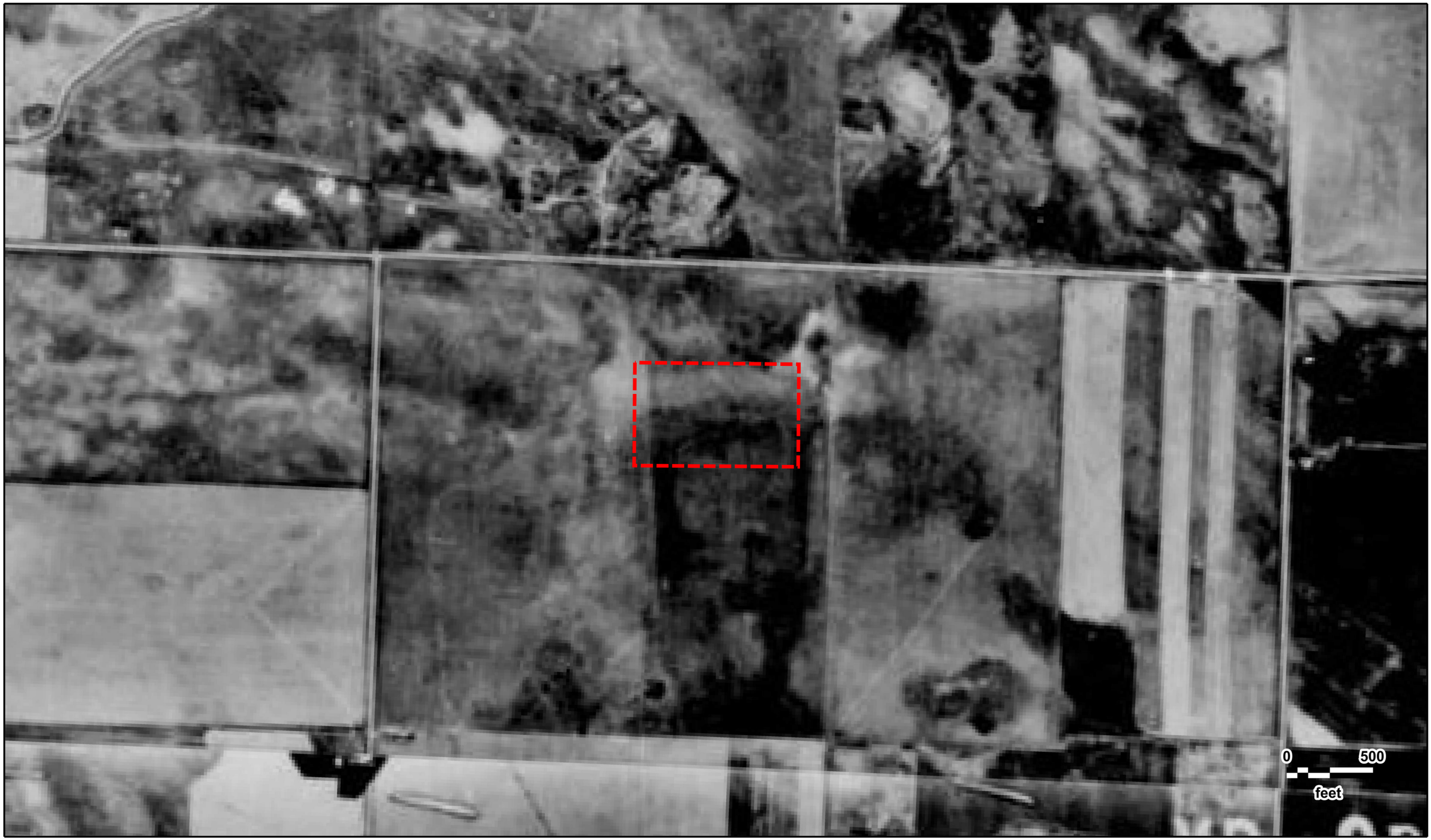


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Columbine
USGS
03/04/1970

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
ASCS
09/03/1963

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
AMS
09/10/1953

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
USGS
09/25/1948

GeoSearch

JOB #: 359305 - 07/08/2020



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Columbine
ASCS
11/03/1937

GeoSearch

JOB #: 359305 - 07/08/2020

Appendix E: Historical Topographic Maps

Historical Topographic Maps

NEW: *GeoLens by Geosearch*

Target Property:

Columbine

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 149072
Job #: 359304
Project #: 603-128
Date: 7/8/2020

Target Property Summary

Columbine

Longmont, Weld, Colorado 80504

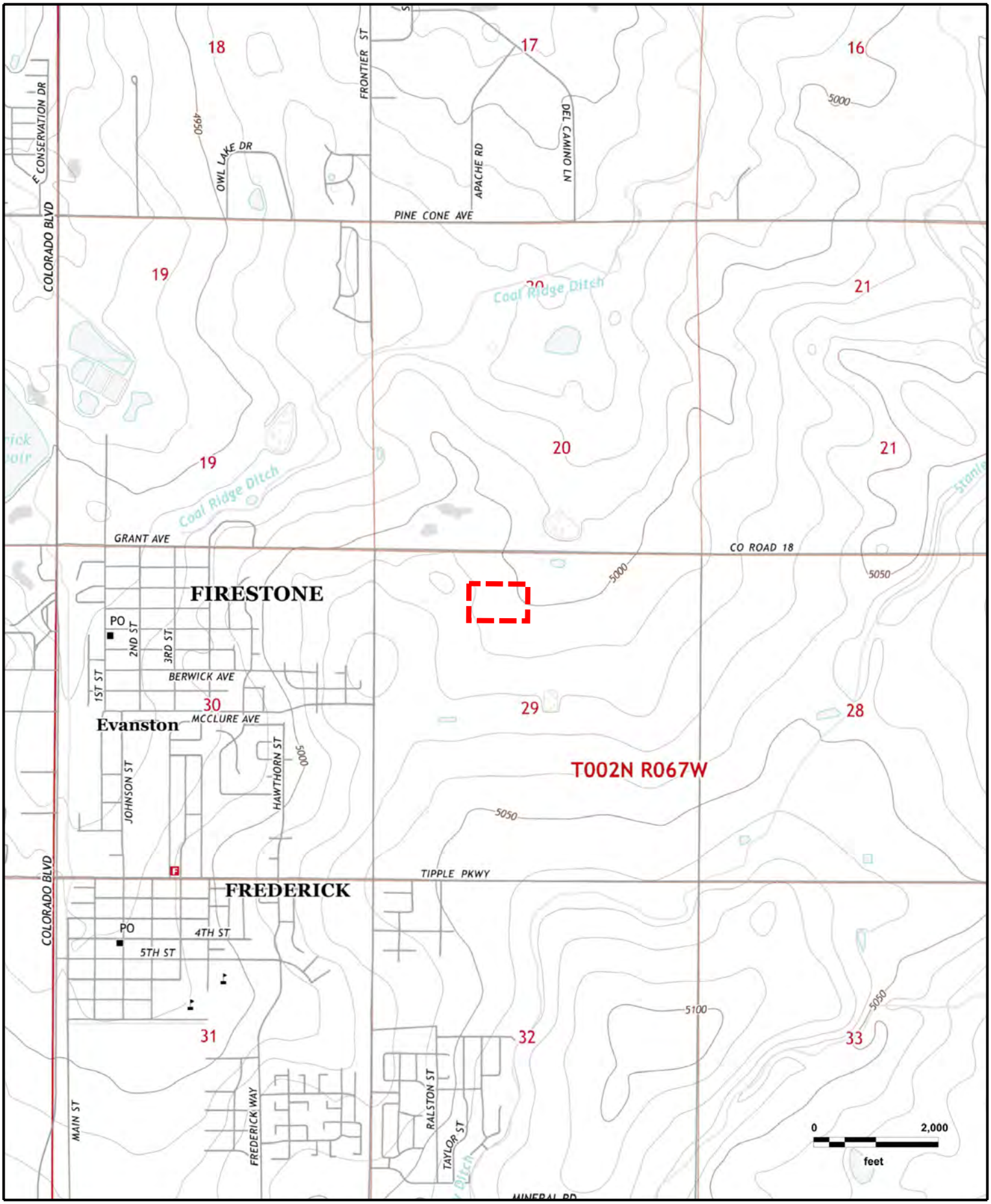
USGS Quadrangle: ***Frederick***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.918344000, 40.115175000), (-104.914956000, 40.115146000), (-104.914969000, 40.113529000), (-104.918356000, 40.113549000)

Topographic Map Summary

Date	Quadrangle	Scale
2013	FREDERICK, CO (2013) GOWANDA, CO (2013)	1" = 2000'
1950 REVISED 1994	FREDERICK, CO	1" = 2000'
1950 PHOTOREVISED 1979	FREDERICK, CO (1950) GOWANDA, CO (1949)	1" = 2000'
1950 PHOTOREVISED 1969	FREDERICK, CO (1950) GOWANDA, CO (1949)	1" = 2000'
1950	FREDERICK, CO (1950) GOWANDA, CO (1950)	1" = 2000'
1902	GREELEY, CO	1" = 10420'

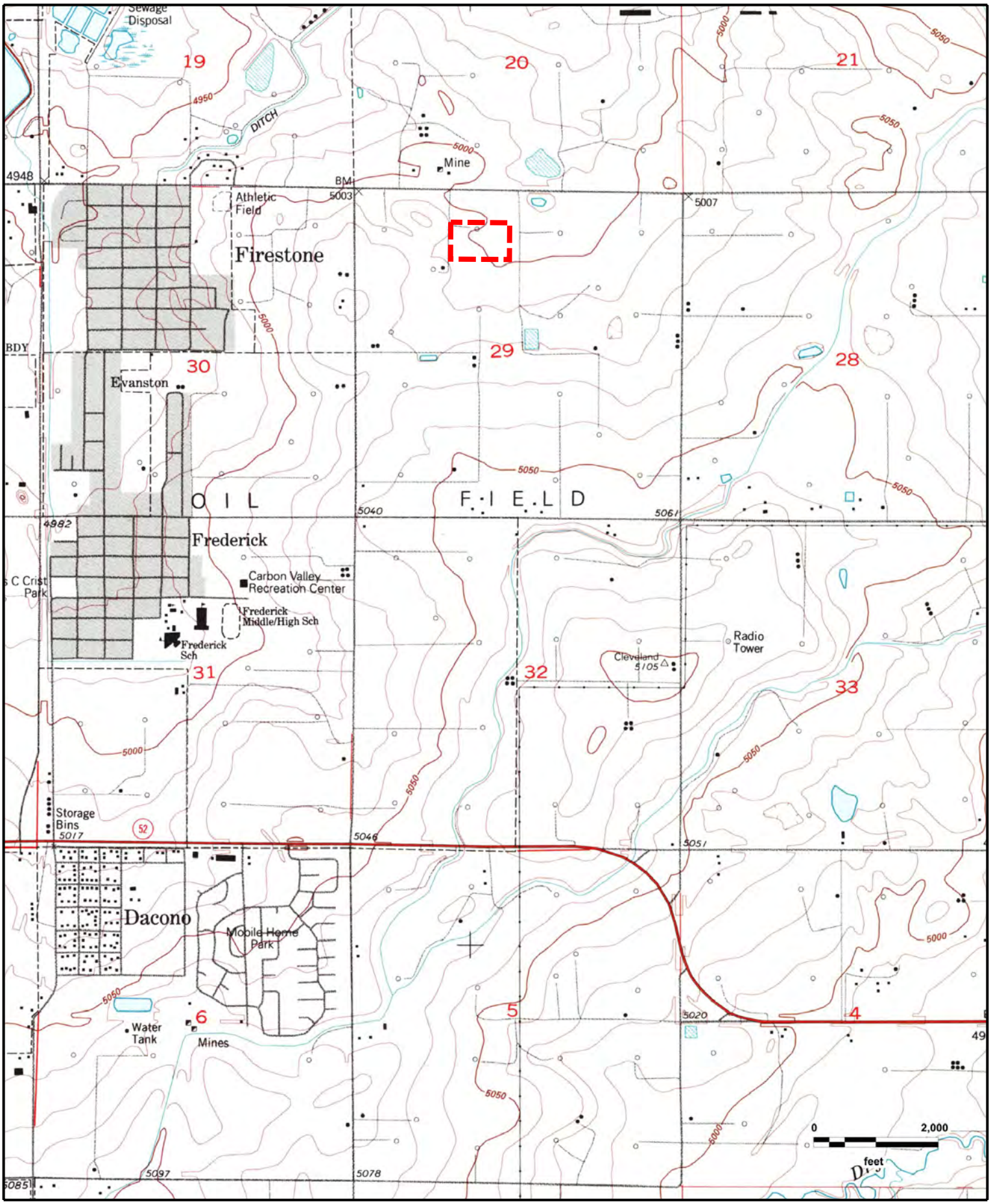
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Columbine
FREDERICK, CO (2013), GOWANDA, CO (2013)

GeoSearch

JOB #: 359304 - 07/08/2020

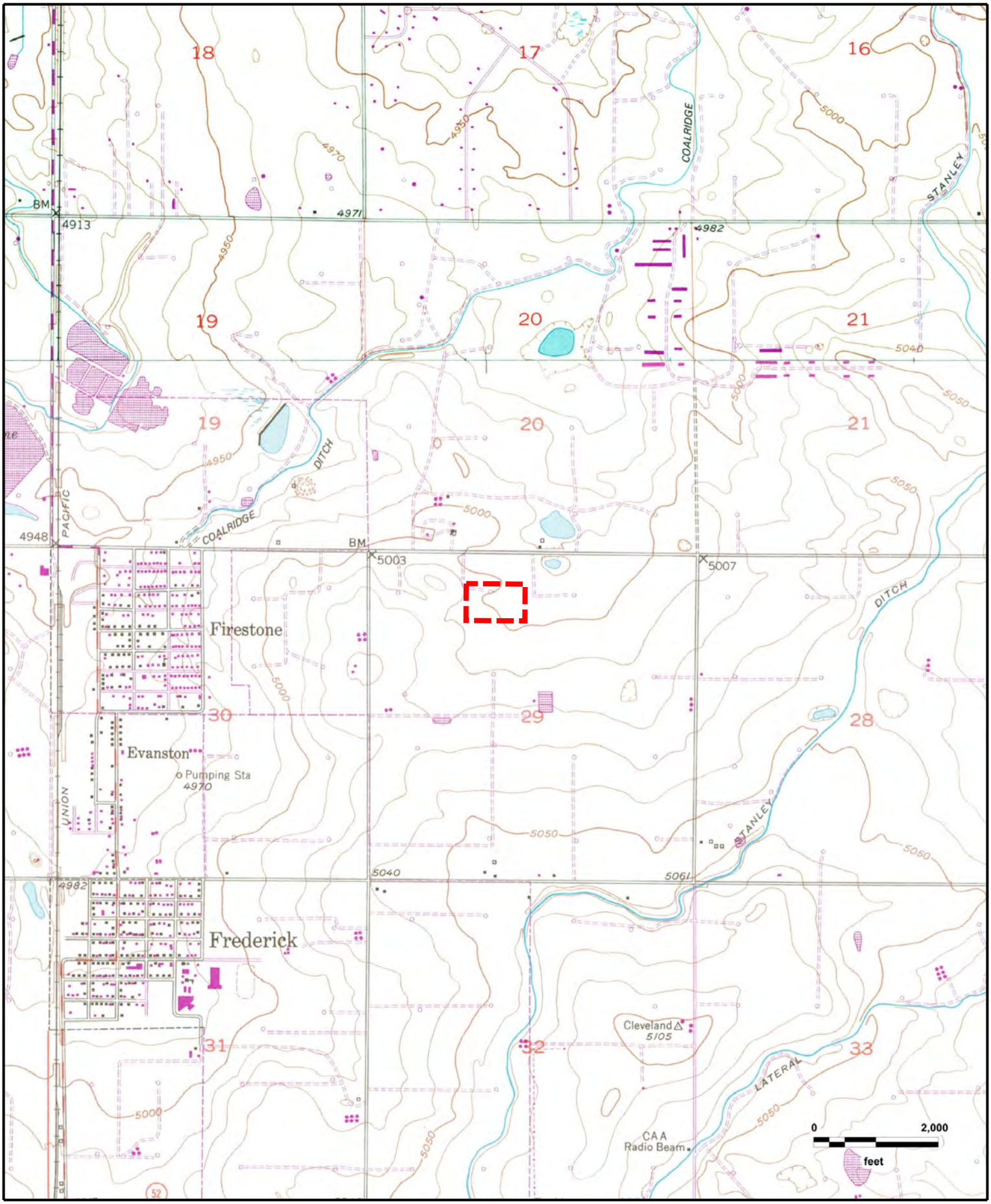


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Columbine
FREDERICK, CO (1994)

GeoSearch

JOB #: 359304 - 07/08/2020

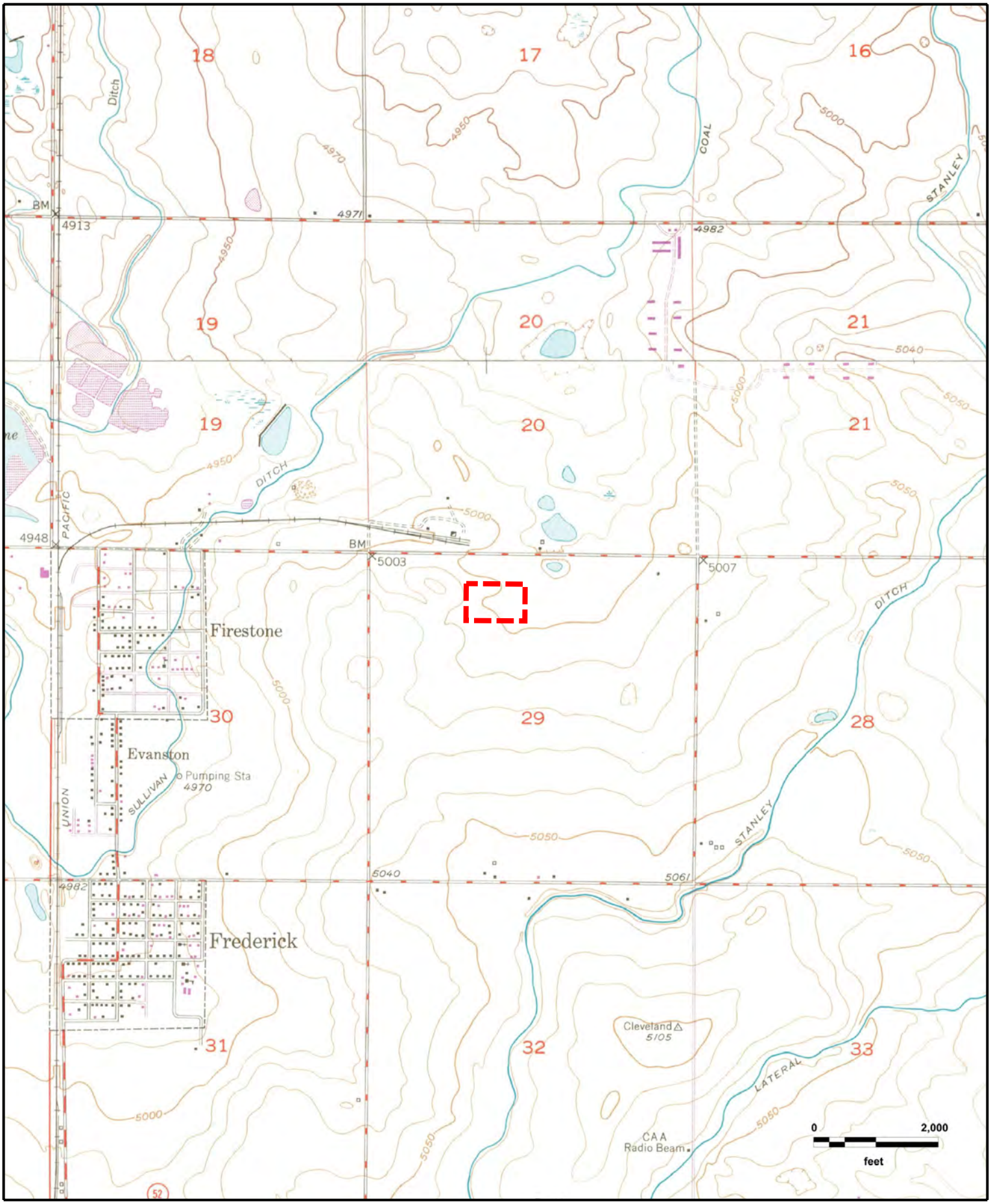


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1949)

GeoSearch

JOB #: 359304 - 07/08/2020

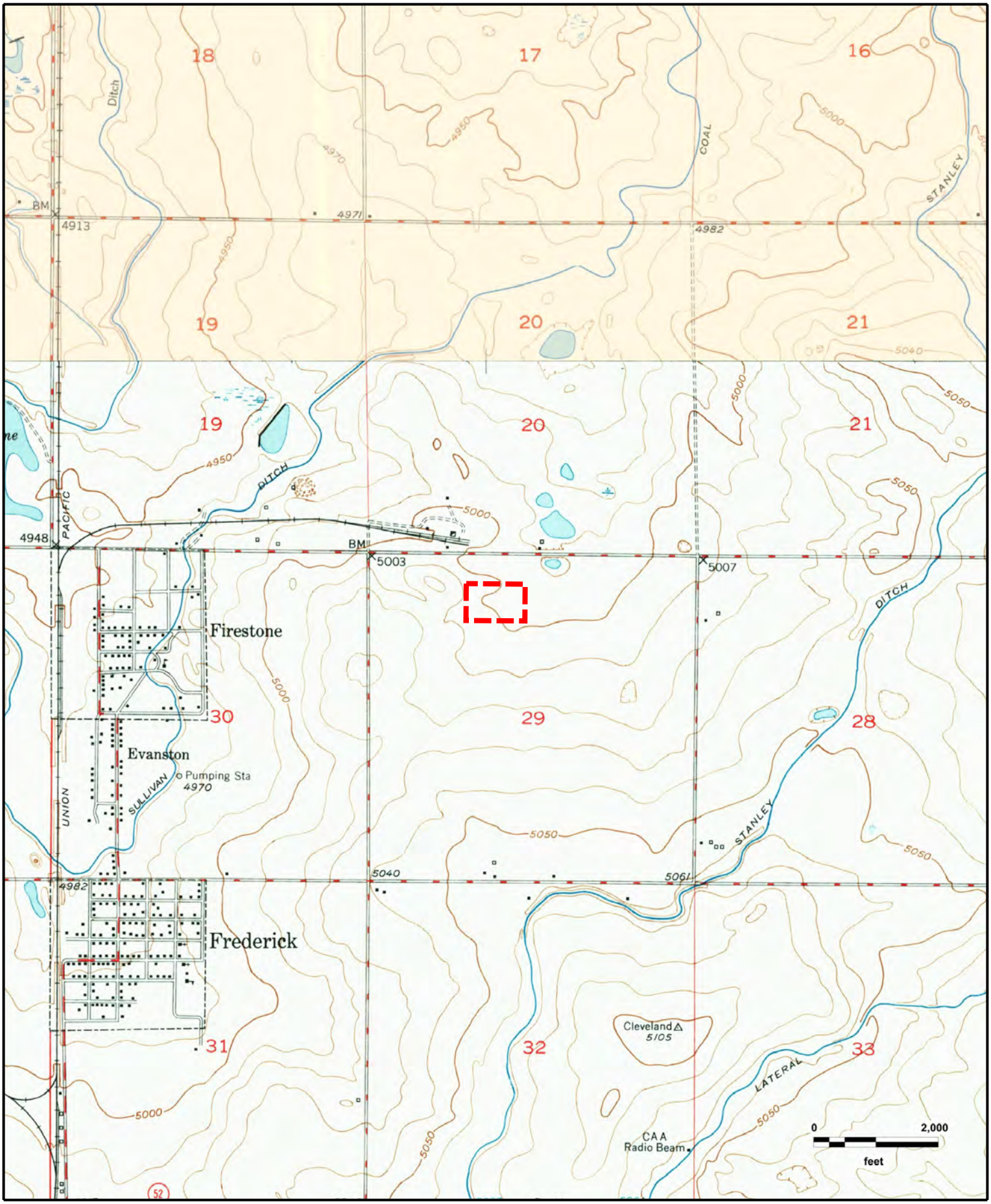


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1949)

GeoSearch

JOB #: 359304 - 07/08/2020

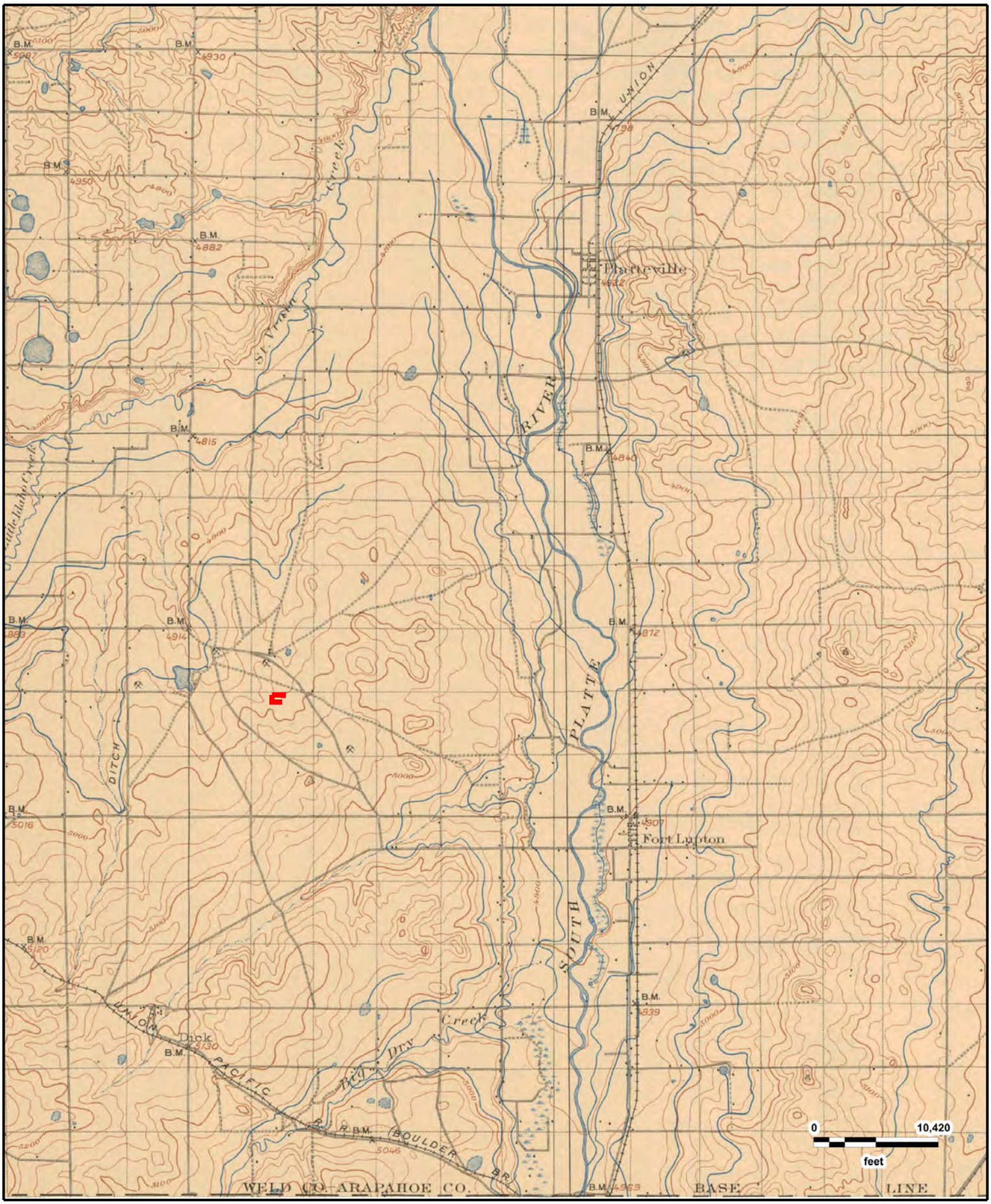


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1950)

GeoSearch

JOB #: 359304 - 07/08/2020



N
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Columbine
GREELEY, CO (1902)

GeoSearch

JOB #: 359304 - 07/08/2020

Appendix F: City Directory Report

City Directory Target Property Address

Target Property:

County Rd 15,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 149072

Project #: 603-128

Date: 7/2/2020

City Directory Target Property Address

County Rd 15, Longmont, CO 80504

1 COUNTY RD 15

2019	STREET BEGINS	INFOUSA	NORTH WEST
2014	STREET BEGINS	INFOUSA	NORTH WEST
2011	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 20 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 20 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS	COLE DIRECTORY	LONGMONT
2001	X [SIOUX CT INTS]	COLE DIRECTORY	LONGMONT
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT-BOULDER
1989-90	STREET NOT LISTED	US WEST	LONGMONT-BOULDER

9094 COUNTY RD 15

2019	NELSON KENNETH	INFOUSA	NORTH WEST
2014	NELSON KENNETH	INFOUSA	NORTH WEST
2011	KEN T NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	MERRI A NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	KEN T NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	MERRI A NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	KEN NELSON	COLE DIRECTORY	LONGMONT

9152 COUNTY RD 15

2019	MCCARTHY MICHAEL	INFOUSA	NORTH WEST
2011	FREEDY FREEDY MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAVID A GOSHEA	COLE DIRECTORY	LONGMONT-BOULDER
2001	SUSAN FERRIS	COLE DIRECTORY	LONGMONT
2001	MARK KIBLER	COLE DIRECTORY	LONGMONT

9216 COUNTY RD 15

2014	CLAPP ROBERT	INFOUSA	NORTH WEST

2011	LYNETTE F CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2011	ROBERT L CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2006	LYNETTE F CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2006	ROBERT L CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2001	ROBERT CLAPP	COLE DIRECTORY	LONGMONT

9385 COUNTY RD 15

2019	FARNSWORTH KIP	INFOUSA	NORTH WEST
2019	FINLEY TRACY	INFOUSA	NORTH WEST
2019	GARCIA DARIAN	INFOUSA	NORTH WEST
2019	JOHNSON SHARON	INFOUSA	NORTH WEST
2011	BRUCE D JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	SHARON A JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SIOUX CT INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	RAENA HENDRICKS	COLE DIRECTORY	LONGMONT
2001	X [SIERRA VISTA RD INTS]	COLE DIRECTORY	LONGMONT

9477 COUNTY RD 15

2019	OWEN JAMES	INFOUSA	NORTH WEST
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	ALAN K OWEN	COLE DIRECTORY	LONGMONT

9485 COUNTY RD 15

2014	FIGURELLI ARCHIE	INFOUSA	NORTH WEST
2014	WALSH SUSAN	INFOUSA	NORTH WEST
2014	WEAVER PAULA	INFOUSA	NORTH WEST
2011	JACQUELINE OWEN	COLE DIRECTORY	LONGMONT-BOULDER
2011	CAROLYN M WALSH	COLE DIRECTORY	LONGMONT-BOULDER
2011	SUSAN JOY WALSH	COLE DIRECTORY	LONGMONT-BOULDER
2011	MARY L WEAVER	COLE DIRECTORY	LONGMONT-BOULDER

2011	WILLIE WEAVER	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SHENANDOAH AVE INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	AL OWEN	COLE DIRECTORY	LONGMONT
10170 COUNTY RD 15			
2011	KATHY LARSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
2001	X [MAPLE ST INTS]	COLE DIRECTORY	LONGMONT
10182 COUNTY RD 15			
2019	DOBRAHNER JASLYN	INFOUSA	NORTH WEST
2019	HAUGHIAN JAMES	INFOUSA	NORTH WEST
2014	DOBRAHNER JASLYN	INFOUSA	NORTH WEST
2014	HAUGHIAN JAMES	INFOUSA	NORTH WEST
2011	JAMES MICHEAL HAUGHIAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JAMES M HAUGHIAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
10230 COUNTY RD 15			
2019	WILTS WENDELL	INFOUSA	NORTH WEST
2011	DAVID M FELIX SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAVID M FELIX SR	COLE DIRECTORY	LONGMONT-BOULDER
2001	D & D AUTO REPAIR	COLE DIRECTORY	LONGMONT
10286 COUNTY RD 15			
2019	MAAS STEVEN	INFOUSA	NORTH WEST
2014	MAAS STEVEN	INFOUSA	NORTH WEST
2011	BAMBI LYNN MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2011	STEVEN PETER MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [ELM STREET ENCHANTED HILL INTS]	COLE DIRECTORY	LONGMONT-BOULDER

2011	Y [ST VRAIN RANCH BLVD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	BAMBI LYNN MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEVEN PETER MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [ST VRAIN RANCH BLVD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STEVE MAAS	COLE DIRECTORY	LONGMONT

10450 COUNTY RD 15

2019	POST NICOLAS	INFOUSA	NORTH WEST
2014	BOYSEN JOHN	INFOUSA	NORTH WEST
2011	JOHN MARTIN BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN M BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	THELMA K BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

10500 COUNTY RD 15

2011	CRAIG A OWEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	CRAIG OWEN	COLE DIRECTORY	LONGMONT

10510 COUNTY RD 15

2014	GRIESCH JOHN	INFOUSA	NORTH WEST
2011	GAIL LEA GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2011	JOHN K GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN K GRISCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	TODD GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2001	V GUMSEY	COLE DIRECTORY	LONGMONT

10514 COUNTY RD 15

2011	VIRGINIA L GURNSEY	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SUMMERSET AVE INTS]	COLE DIRECTORY	LONGMONT-BOULDER

2006	VIRGINIA L GUMSEY	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

10558 COUNTY RD 15

2011	0 A A A 24 HR LOCKSMITH	COLE DIRECTORY	LONGMONT-BOULDER

10606 COUNTY RD 15

2019	GARCES JOSE	INFOUSA	NORTH WEST
2019	MENDEZ LEONEL	INFOUSA	NORTH WEST
2019	TREJO HEIDI	INFOUSA	NORTH WEST
2014	MENDEZ LEONEL	INFOUSA	NORTH WEST
2011	JOEL MENDEZ	COLE DIRECTORY	LONGMONT-BOULDER
2011	LEONEL MENDEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	ARMONDO LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	LUPE GARCIA	COLE DIRECTORY	LONGMONT

10652 COUNTY RD 15

2019	TRUITT JOE	INFOUSA	NORTH WEST
2014	HAISLIP DWAIN	INFOUSA	NORTH WEST
2014	WOOLF DEBBRA	INFOUSA	NORTH WEST
2011	DEBBRA CHRISTINE WOOLF	COLE DIRECTORY	LONGMONT-BOULDER
2006	DWAIN ELTON HAISLIP	COLE DIRECTORY	LONGMONT-BOULDER
2001	DWAIN HAISLIP	COLE DIRECTORY	LONGMONT

10698 COUNTY RD 15

2019	POPICK CLAYTON	INFOUSA	NORTH WEST
2019	RYAN COLLEEN	INFOUSA	NORTH WEST
2014	RYAN COLLEEN	INFOUSA	NORTH WEST
2011	BRYAN J ALLEN	COLE DIRECTORY	LONGMONT-BOULDER
2011	DENNIS P ALLEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	COLLEEN D RYAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAN E RYAN	COLE DIRECTORY	LONGMONT-BOULDER

2001	VERN WEST	COLE DIRECTORY	LONGMONT
10750 COUNTY RD 15			
2019	TODD JERRY	INFOUSA	NORTH WEST
2014	TODD JERRY	INFOUSA	NORTH WEST
2011	JERRY LEON TODD JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	JERRY LEON TODD JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	JERRY L TOOD	COLE DIRECTORY	LONGMONT
10810 COUNTY RD 15			
2019	FARMER GREGORY	INFOUSA	NORTH WEST
2014	FARMER GREGORY	INFOUSA	NORTH WEST
2011	GREG SCOTT FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2011	SHERI LYN FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2006	GREG SCOTT FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2006	SHERI LYN FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
10820 COUNTY RD 15			
2006	ROBERT L STEEN SR	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
10900 COUNTY RD 15			
2014	SCHRANZ ERNEST	INFOUSA	NORTH WEST
2011	ERNEST GOTTHOLD SCHRANZ	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2011	Y [WELD COUNTY RD 15 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	ERNEST GOTTHOLD SCHRANZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	ERNEST G SCHRANZ	COLE DIRECTORY	LONGMONT

10950 COUNTY RD 15

2019	KACIK BARBARA	INFOUSA	NORTH WEST
2019	SIMPSON DIANA	INFOUSA	NORTH WEST
2006	EUNICE M HAMILTON	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT

11359 COUNTY RD 15

2019	KRUISE DARREL	INFOUSA	NORTH WEST
2011	JULEE SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

11409 COUNTY RD 15

2006	CARLOS G GALLEGOS	COLE DIRECTORY	LONGMONT-BOULDER
2006	LISA GALLEGOS	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT

11455 COUNTY RD 15

2006	CRAIG MULLENAX	COLE DIRECTORY	LONGMONT-BOULDER

11755 COUNTY RD 15

2019	LOZINSKI MICHAEL	INFOUSA	NORTH WEST
2014	LOZINSKI MICHAEL	INFOUSA	NORTH WEST
2011	MICHAEL A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2011	TAMMY A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	MICHAEL A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMARA A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 26 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL LOZINSKI	COLE DIRECTORY	LONGMONT

11829 COUNTY RD 15

2019	LEFORGE DONALD		INFOUSA	NORTH WEST
2014	LEFORGE DONALD		INFOUSA	NORTH WEST
2011	DONALD MILTON LEFORGE		COLE DIRECTORY	LONGMONT-BOULDER
2006	DONALD MILTON LEFORGE		COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING		COLE DIRECTORY	LONGMONT

11843 COUNTY RD 15

2011	HANNAH OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SCOTT H OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	HANNAH OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	SCOTT OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2001	SCOTT OLIVER		COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 26 INTS]		COLE DIRECTORY	LONGMONT

11955 COUNTY RD 15

2019	MONTIERTH SALLY		INFOUSA	NORTH WEST
2019	NELSON HAROLD		INFOUSA	NORTH WEST
2019	SHULL BRETT		INFOUSA	NORTH WEST
2014	NELSON HAROLD		INFOUSA	NORTH WEST
2014	SHULL BRETT		INFOUSA	NORTH WEST
2014	H & J NELSON MANAGEMENT LLC	# 15	INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2011	HAROLD EDWARD NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2011	LAVEMA JUNE NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 26 INTS]		COLE DIRECTORY	LONGMONT-BOULDER
2006	H & J NELSON MANAGEMENT LLC		COLE DIRECTORY	LONGMONT-BOULDER
2006	HAROLD EDWARD NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	LAVERNA JUNE NELSON		COLE DIRECTORY	LONGMONT-BOULDER

2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 26 3/4 INTS]	COLE DIRECTORY	LONGMONT

12071 COUNTY RD 15

2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	BLAKE NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMMY SUE NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	NELSONS ARENA INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

12248 COUNTY RD 15

2019	L G EVERIST	INFOUSA	NORTH WEST
2019	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2001	M ARAGONEZ	COLE DIRECTORY	LONGMONT
2001	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT

Comment:

City Directory Target Property Address

Target Property:

County Rd 18,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 149072

Project #: 603-128

Date: 7/2/2020

City Directory Target Property Address

County Rd 18, Longmont, CO 80504

1 COUNTY RD 18

2019	STREET BEGINS	INFOUSA	NORTH WEST
2014	STREET BEGINS	INFOUSA	NORTH WEST
2011	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [OXFORD RD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS	COLE DIRECTORY	LONGMONT
2001	X [OXFORD RD INTS]	COLE DIRECTORY	LONGMONT
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT-BOULDER
1989-90	STREET NOT LISTED	US WEST	LONGMONT-BOULDER

390 COUNTY RD 18

2006	EMPIRE WAREHOUSE INC	COLE DIRECTORY	LONGMONT-BOULDER

517 COUNTY RD 18

2019	DELTUFO CARL	INFOUSA	NORTH WEST
2019	HARPER AMANDA	INFOUSA	NORTH WEST
2011	AMANDA ANNE HARPER	COLE DIRECTORY	LONGMONT-BOULDER
2011	FRANK R HARPER JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAWN MARIE MOSHER	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN ADEN MOSHER	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOHN MOSHER	COLE DIRECTORY	LONGMONT

520 COUNTY RD 18

2019	SCHNEIDER DALLAS	INFOUSA	NORTH WEST
2014	SCHNEIDER DALLAS	INFOUSA	NORTH WEST
2011	DALLAS L SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER
2011	MARGE A SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER
2006	DALLAS L SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER

2006	MARGE A SCHNEIDER		COLE DIRECTORY	LONGMONT-BOULDER
2001	DALLAS SCHNEIDER		COLE DIRECTORY	LONGMONT

547 COUNTY RD 18

2019	KRAFFT TERRY		INFOUSA	NORTH WEST
2019	AQUATIC & FITNESS PRO INTL	# 18	INFOUSA	NORTH WEST
2014	KRAFFT TERRY		INFOUSA	NORTH WEST
2014	AQUATIC & FITNESS PRO INTL	# 18	INFOUSA	NORTH WEST
2011	AQUATIC AND FITNESS PROFESSIONAL INT		COLE DIRECTORY	LONGMONT-BOULDER
2011	RACHEL ELIZABETH KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2011	TERY EDWARD KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2006	R KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2006	TERRY EDWARD KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2001	TERRY KRAFFT		COLE DIRECTORY	LONGMONT
2001	AMRCN ENG&SPLY		COLE DIRECTORY	LONGMONT

603 COUNTY RD 18

2019	SANDSTEAD DEAN		INFOUSA	NORTH WEST
2014	SANDSTEAD DEAN		INFOUSA	NORTH WEST
2011	CHARKEN CONSTRUCTION INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	CHARKEN CONSTRUCTION INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN A KENYON SR		COLE DIRECTORY	LONGMONT-BOULDER
2006	TANYA MICHELLE KENYON		COLE DIRECTORY	LONGMONT-BOULDER
2001	TANYA M KENYON		COLE DIRECTORY	LONGMONT

677 COUNTY RD 18

2019	WADDLE CINDY		INFOUSA	NORTH WEST
2019	FLYING PIGLET RANCH	# 18	INFOUSA	NORTH WEST
2014	WADDLE CINDY		INFOUSA	NORTH WEST
2014	FLYING PIGLET RANCH	# 18	INFOUSA	NORTH WEST
2011	CINDY A HEWITT		COLE DIRECTORY	LONGMONT-BOULDER

2011	WADDLE BOBBY & CINDY	COLE DIRECTORY	LONGMONT-BOULDER
2006	FLYING PIGLEY RANCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	CINDY A HEWITT	COLE DIRECTORY	LONGMONT-BOULDER
2001	FLYING PIGLET RNCH	COLE DIRECTORY	LONGMONT
757 COUNTY RD 18			
2019	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2019	FOSTER RICK	INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2014	FOSTER RICK	INFOUSA	NORTH WEST
2011	CHRISTINE R FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2011	RCK J FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2006	CHRISTINE R FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2006	RICK J FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2507 COUNTY RD 18			
2006	DAVID M BOETTCHER	COLE DIRECTORY	LONGMONT-BOULDER
2006	RHONDA K BOETTCHER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2877 COUNTY RD 18			
2006	CHARLA JIL RICHARDSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2880 COUNTY RD 18			
2006	HUMAN RESOURCE SOLUTIONS & DES	COLE DIRECTORY	LONGMONT-BOULDER
2006	SHARON ROSE SCHELLER	COLE DIRECTORY	LONGMONT-BOULDER
2001	SHARON SCHELLER	COLE DIRECTORY	LONGMONT
2001	HUMAN RESRC SLTNS	COLE DIRECTORY	LONGMONT

3601 COUNTY RD 18			
2001	RICHARD P WYATT	COLE DIRECTORY	LONGMONT
3801 COUNTY RD 18			
2001	CHLDRNS HSE WLD	COLE DIRECTORY	LONGMONT
3991 COUNTY RD 18			
2011	STEINBACHER TOOL	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEINBACHER STEIN	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [MILLER DR INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	MID AMER TL&MACH	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 11 INTS]	COLE DIRECTORY	LONGMONT
4300 COUNTY RD 18			
2006	DELPHI MEDICAL SYSTEMS	COLE DIRECTORY	LONGMONT-BOULDER
2001	PEAK INDSTRS INC	COLE DIRECTORY	LONGMONT
4967 COUNTY RD 18			
2006	CURTIS G HEDGE	COLE DIRECTORY	LONGMONT-BOULDER
5096 COUNTY RD 18			
2006	LAWRENCE D LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	LINDA LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	L D LOPEZ	COLE DIRECTORY	LONGMONT
5099 COUNTY RD 18			
2006	FRED D SCHLEGEL JR	COLE DIRECTORY	LONGMONT-BOULDER
5105 COUNTY RD 18			
2006	KEITH G FILLOON	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUZANNE H HARRIS	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

5106 COUNTY RD 18			
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5136 COUNTY RD 18			
2006	BARBARA GOLDENE CROW	COLE DIRECTORY	LONGMONT-BOULDER
2006	KELLY CHARIS CROW	COLE DIRECTORY	LONGMONT-BOULDER
2001	WIT SYSTEMS	COLE DIRECTORY	LONGMONT
5151 COUNTY RD 18			
2006	BETHANY A BRADY	COLE DIRECTORY	LONGMONT-BOULDER
2006	THOMAS PATRICK BRADY SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	EQUINE ENERGY WORKS LLC	COLE DIRECTORY	LONGMONT-BOULDER
2001	THOMAS P BRADY	COLE DIRECTORY	LONGMONT
5166 COUNTY RD 18			
2006	AMY M VIGIL	COLE DIRECTORY	LONGMONT-BOULDER
2006	DARLING B VIRGIL	COLE DIRECTORY	LONGMONT-BOULDER
2001	DARLING VIGIL	COLE DIRECTORY	LONGMONT
5206 COUNTY RD 18			
2006	CHRISTY GILBERT	COLE DIRECTORY	LONGMONT-BOULDER
2001	CHRISTY GILBERT	COLE DIRECTORY	LONGMONT
5227 COUNTY RD 18			
2006	DEANNA L MORA	COLE DIRECTORY	LONGMONT-BOULDER
2006	FAUSTINO MORA	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5236 COUNTY RD 18			
2006	FRANK J GARCIA JR	COLE DIRECTORY	LONGMONT-BOULDER
2001	FRANK GARCIA	COLE DIRECTORY	LONGMONT

5246 COUNTY RD 18

2006	ARNOLD MEYERS	COLE DIRECTORY	LONGMONT-BOULDER
2006	DALE A MEYERS	COLE DIRECTORY	LONGMONT-BOULDER
2001	DALE MEYERS	COLE DIRECTORY	LONGMONT

5257 COUNTY RD 18

2006	KIRK ALLEN STOOTHOFF	COLE DIRECTORY	LONGMONT-BOULDER
2006	MARY B STOOTHOFF	COLE DIRECTORY	LONGMONT-BOULDER
2001	P VANDEWALKER	COLE DIRECTORY	LONGMONT

5261 COUNTY RD 18

2006	CHARLES WILKERSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	JEAN ALICE WILKERSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	CHARLES WILKERSON	COLE DIRECTORY	LONGMONT

5266 COUNTY RD 18

2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

5306 COUNTY RD 18

2006	VIRGINIA E COWAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	COWAN FAMILY PROPERTIES LLC	COLE DIRECTORY	LONGMONT-BOULDER
2006	EDS ELECTRIC	COLE DIRECTORY	LONGMONT-BOULDER
2006	2 ASH COURT LLC	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL E COWAN	COLE DIRECTORY	LONGMONT

5327 COUNTY RD 18

2006	DOUG A HOBBS	COLE DIRECTORY	LONGMONT-BOULDER
2006	KJERSTEN L HOBBS	COLE DIRECTORY	LONGMONT-BOULDER
2006	MEDICINE HAT FARRIERS	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOE MARES	COLE DIRECTORY	LONGMONT

5336 COUNTY RD 18			
2006	ROSE MAXINE CONNER	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMRA M CONNER	COLE DIRECTORY	LONGMONT-BOULDER
2001	JEFFERY W HELSLEY	COLE DIRECTORY	LONGMONT
5357 COUNTY RD 18			
2006	LORI J YOHO	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEVE M YOHO	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5366 COUNTY RD 18			
2006	DOUBLE EAGLE SERVICES	COLE DIRECTORY	LONGMONT-BOULDER
2006	ARTHUR T WILLDEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JODI L WILLDEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5406 COUNTY RD 18			
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	DAVID W HEUSSMANN	COLE DIRECTORY	LONGMONT
5436 COUNTY RD 18			
2006	CANDICE ELIZABETH ROBERTSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	MARK EARL ROBERTSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	MARK ROBERTSON	COLE DIRECTORY	LONGMONT
5466 COUNTY RD 18			
2006	DAVID L JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	VALLEE JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	MATT RIESKE	COLE DIRECTORY	LONGMONT
5500 COUNTY RD 18			
2006	MICHAEL A MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER

2006	YOLANDA K MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL MARTINEZ	COLE DIRECTORY	LONGMONT
5558 COUNTY RD 18			
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5601 COUNTY RD 18			
2006	KASEY ELIZABETH LLOYD	COLE DIRECTORY	LONGMONT-BOULDER
2001	KASEY E LLOYD	COLE DIRECTORY	LONGMONT
5656 COUNTY RD 18			
2006	DWIGHT N SANDIN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5728 COUNTY RD 18			
2006	KATHLEEN LYNN SANDIN	COLE DIRECTORY	LONGMONT-BOULDER
2006	MIKE JAY WAITMAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	K L SANDIN	COLE DIRECTORY	LONGMONT
5806 COUNTY RD 18			
2006	VERA J SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2001	DONALD B SMITH	COLE DIRECTORY	LONGMONT
5830 COUNTY RD 18			
2001	J FINLEY	COLE DIRECTORY	LONGMONT
5846 COUNTY RD 18			
2006	DONNA H SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2006	DOUGLAS MALCOLM SMITH	COLE DIRECTORY	LONGMONT-BOULDER
5876 COUNTY RD 18			
2006	DAVID DEAN HONSTIEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUSAN A HONSTIEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	DAVID HONSTIEN	COLE DIRECTORY	LONGMONT

5906 COUNTY RD 18				
2006	BRIAN E KING		COLE DIRECTORY	LONGMONT-BOULDER
2006	LISA M KING		COLE DIRECTORY	LONGMONT-BOULDER
2001	BRIAN KING		COLE DIRECTORY	LONGMONT
5916 COUNTY RD 18				
2006	DENISE M THOMPSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	TRAYMOND SCOTT THOMPSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	X [END OF LISTINGS]		COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS		COLE DIRECTORY	LONGMONT
5976 COUNTY RD 18				
2001	GWEN J RUNGE		COLE DIRECTORY	LONGMONT
2001	C VANDEVENTER	18	COLE DIRECTORY	LONGMONT
2001	TRI TOWN NRSY LLC		COLE DIRECTORY	LONGMONT
2001	X [END OF LISTINGS]		COLE DIRECTORY	LONGMONT

Comment:

Appendix G: Site Photographs



Photograph 1. Center of the Project.



Photograph 2. Center of the Project.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Proposed wellhead locations within the Project.

Section 10

Cultural Assessment

The cultural assessment is included in the Phase I Environmental Study in Section 9

Section 11

Lighting Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Lighting Mitigation Plan

For



Kerr McGee Oil & Gas Onshore LP

Columbine 4 -29 HZ

Project Number: 21010

Originators:	D. Nowicki / L. Ohl	Date	6-8-21
Project Engineer Approval:	D. Nowicki	Date	6-8-21
Project Manager Approval:	B. Primeaux	Date	6-8-21
Client Approval:		Date	

Rev. No.	By	Revisions	Approval	Date
0	DN/LO	ISSUED FOR ATTACHMENT FOR PERMIT	BP	6-8-21
1	DN/LO	ISSUED FOR ATTACHMENT FOR PERMIT	BP	6-14-21

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1.0 EXECUTIVE SUMMARY

Kerr McGee Oil & Gas Onshore LP commissioned Samuel Engineering to develop a lighting mitigation plan for the Columbine 4 -29 HZ pad site. The purpose of this report is to demonstrate compliance with the various State and Local lighting regulations, predict lighting impacts for the different development phases, and to detail the various lighting mitigation techniques used to limit light pollution.

Specifically, the key points of the study are:

- Demonstrate compliance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 424.
- Identify the light level impacts associated with each phase of the facility operations on surrounding buildings.
- Demonstrate compliance with the total lighting used based on site working surfaces.
- Demonstrate the various lighting mitigation techniques that were implemented.

Site specific three-dimensional lighting models were developed for each of the phases to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems.

The following Table 1.0 summarizes the calculated maximum values compared to the regulatory limits:

Calculated Lighting Values and Regulatory Limits Summary			
	Calculated Value	**Regulatory Limit**	**Code Reference**
Max. Light Impact on Surrounding Building	0.34 lux	≤ 4.0 lux	*COGCC 424.f*
Pre-Production – Drilling Phase (Lumens / Hardscape)	11.2 lm/ft²	≤ 12 lm/ft²	
Pre-Production – Completions Phase (Lumens / Hardscape)	11.5 lm/ft²	≤ 12 lm/ft²	
Production (Lumens / Hardscape)	0.1 lm/ft²	≤ 2.5 lm/ft²	*COGCCC Rule 424.d.(2) for Agricultural/Commercial*

Table 1.0 - Calculated Lighting Values and Regulatory Limits

All calculated values are within prescribed regulatory limits.

2.0 INTRODUCTION AND DEFINITION OF TECHNICAL TERMS

2.1 INTRODUCTION

Light mitigation plans seek to quantify and prescribe methods to address the negative effects of multiple forms of light pollution. Effective lighting mitigation plans address light pollution by limiting the impacts on the surrounding communities, preserving the overall night-sky aesthetics, and maintaining existing ecosystems, all while maintaining a safe work environment.

There are a number of standards, best practices, and regulations which are used as guidelines when developing lighting plans for reducing the negative effects of artificial lighting. The applicable regulation used for this report is COGCC Rule 424.

2.2 DEFINITION OF TECHNICAL TERMS

A number of technical terms are used throughout this report and, as an aid to the reader, are defined below.

Illuminance (lx)

Illuminance is defined as the amount of light falling on a surface area. It is measured in Lux (lx). One lux is equal to one lumen per square meter. As an example, the photo in Figure 2.2 shows the lux levels decreasing on the sidewalk, as the distance from the light source increases.

Illuminance is often associated with values for lighting levels for safe operation in various standard codes. In addition, photometric plans are used to predict the illuminance on surfaces of an area to provide minimum lighting levels and for mitigation of light trespass into adjoining properties or areas. Most lighting meter units used today are in lux and used to measure these values at a given distance. It should be noted that the measured value is dependent on angle, sensitivity, and optics.

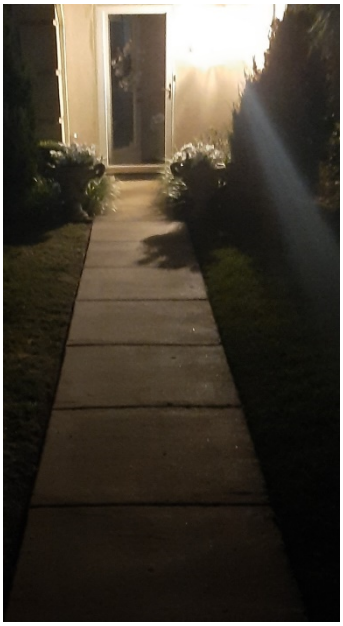


Figure 2.2–Illuminance (lx) level decreasing with distance from light source.

Table 2.2 below provides examples of typical Lux values.

Typical Lux Values	
Clear night, no moon:	0.002 lx
Clear night, full Moon:	0.27 to 1 lx
Family Living Room	50 lx
Sunrise/sunset	300-500 lx
Overcast day:	1000 lx
Daylight:	10,000-25,000 lx
Direct sunlight:	32,000-130,000 lx

Table 2.2 – Typical Lux Values

Luminous Flux(lm)

Luminous Flux is defined as the amount of light energy produced per unit time and is measured in Lumens (lm). It is a physical property of light and, in general terms, is a measurement of the total amount of light emanating from a source. It is important to note that the luminous flux value of a given source is independent of where a measurement is taken.

For example, a 60-watt light bulb produces approximately 800 lumens, regardless of if the measurement is taken at 1 foot, 10 miles, or 10,000 miles away from the source.

3.0 MODEL AND ANALYSIS DEVELOPMENT

Site-specific three-dimensional models were developed for each of the major project development phases. These phases being Pre-Production Drilling, Pre-Production Completions, and final Production. Elements incorporated into the models, among others, were the local site topographical information, major lighting obstructions (sound wall, large equipment, etc), individual luminaire lighting qualities, lighting mounting characteristics and surrounding building units.

The site geographical information was obtained using USGS topographical information to model the surrounding 1-mile landscape.

To determine the lighting impacts on local building units, a 25-foot vertical walls were modeled at the unit's locations, at the USGS identified elevations.

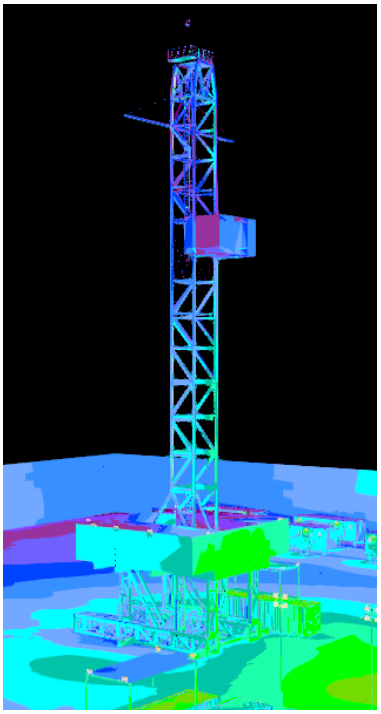


Figure 3.0–Screenshot from a representative 3-D model showing a false color rendering

Modeling of site-specific information (including large equipment, type of luminaire, and sound wall locations) were based on inspections of operational representative sites, provided vendor information, and research into various available lighting systems. The major pieces of equipment modeled included:

- Drilling: Drill rig floor, derrick, substructure, temporary lighting, sound barriers, backyard, and trailers.
- Completions: Temporary lighting, sound barriers, completion fleet equipment, and trailers.
- Production: LACT skids, separators, large tanks, and associated equipment.

Once site-specific topographical information and equipment were modeled, lighting characteristics were placed within the model. These characteristics were obtained from the various manufacturers and were specific to the make/model of the light to be used. The luminaires information included in the model were the type, quantity, mounting height, orientation, and tilt angle.

Models for each of the various project phases were developed in a similar manner and the resulting calculated lighting impacts were tabulated. An Excel spreadsheet was used to total the site lumens for each fixture and compared it to the site working pad surface (hardscape).

In the Pre-Production phases, temporary lighting fixtures were based on currently available rental units and on observations from representative sites. The temporary lighting system that will be used might vary based on rental availability at the time of procurement but is expected to be representative of the lumens values used in this analysis.

4.0 LIGHTING ANALYSIS RESULTS

4.1 CUMULATIVE LIGHTING IMPACTS

Applicable Code Reference: COGCC Rule 424.f:
"Operators will develop site lighting to reduce cumulative nighttime light intensity from all Oil and Gas Facilities to 4 lux at any Residential Building Unit or High Occupancy Building Unit within 1 mile of any Oil and Gas Facility, measured at 5.5 feet above grade in a direct line of sight to the brightest light fixture onsite."

Due to the large number of buildings units located within the 1-mile radius of the site, buildings were grouped into clusters and a representative "wall" location was selected for analysis. These analyzed "wall" locations were selected to determine an upper cumulative light impact limit for that clustered group, considering the local topography, orientation, and distance to the site.

Figure 4.1 shows the building units that are located within a 1-mile radius of the Columbine 4 -29 HZ site.

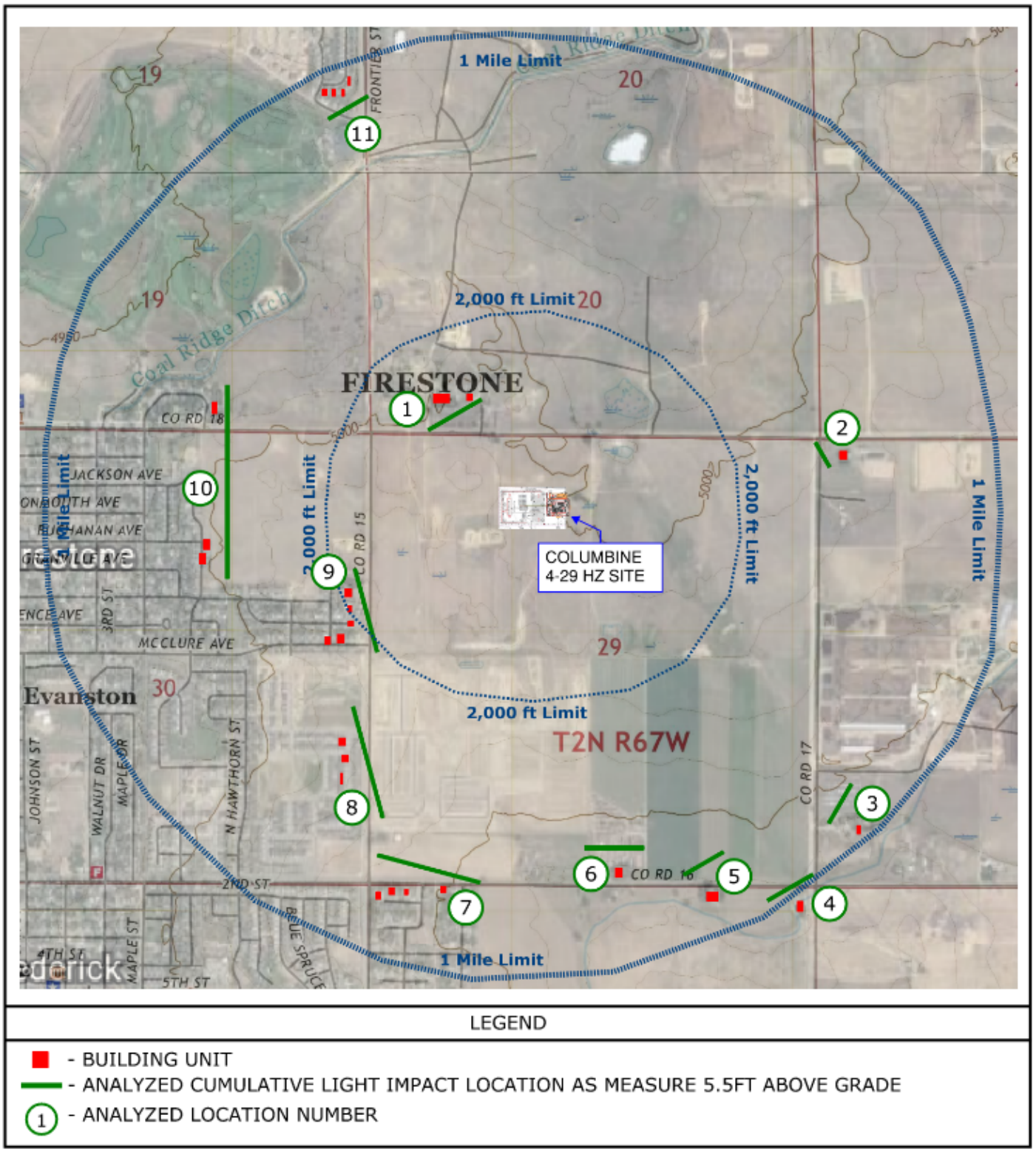


Figure 4.1 –Building Units Within a 1-Mile Radius of Columbine 4 -29 HZ

Calculated Lighting Impact Results Building Units				
Location Unit No.	Pre-Production Drilling	Pre-Production Completions	Production	Regulatory Limit
1	0.34 lux	< 0.1 lux	< 0.1 lux	4 lux
2	0.34 lux	0.14 lux	< 0.1 lux	4 lux
3	0.34 lux	0.28 lux	< 0.1 lux	4 lux
4	0.1 lux	0.14 lux	< 0.1 lux	4 lux
5	0.1 lux	0.14 lux	< 0.1 lux	4 lux
6	< 0.1 lux	0.14 lux	< 0.1 lux	4 lux
7	< 0.1 lux	0.28 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	0.14 lux	< 0.1 lux	4 lux
10	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
11	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux

Table 4.1 –Calculated Lighting Impact Results Building Units

Table 4.1 demonstrates compliance with COGCC Rule 424.f.

4.2 HARDSCAPE AND LUMEN LEVEL RESULTS

Lumens per Hardscape calculations were performed based on the number of exterior fixtures light output (lumens) and the working pad surface (hardscape).

4.2.1 PRE-PRODUCTION DRILLING LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Drilling Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	206,910 ft²	
Site Hardscape Acres:	4.75 Acres	
Site Total Lumens:	2,322,753 lm	See Section 5.2
Site Allowance Initial Lumens Total:	2,482,920 lm	
Calculated Site (Lumens / ft²):	11.2 lm/(ft²)	Construction Site is Verified

Table 4.2.1 –Pre-Production Drilling Operation Compliance Calculation

Based on the calculation shown in Table 4.2.1, the estimated site lighting during the Pre-Production Drilling operation phase is 11.2 lumens per square foot.

4.2.2 PRE-PRODUCTION COMPLETIONS LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Completions Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	206,910 ft²	
Site Hardscape Acres:	4.75 Acres	
Site Total Lumens:	2,373,328 lm	See Section 5.5
Site Allowance Initial Lumens Total:	2,482,920 lm	
Calculated Site (Lumens / ft²):	11.5 lm/(ft²)	Construction Site is Verified

Table 4.2.2 –Pre-Production Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.2, the estimated site lighting during the Pre-Production Completions operation phase is 11.5 lumens per square foot.

4.2.3 PRODUCTION LUMENS PER HARDSCAPE COMPLIANCE

Production Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	59,677 ft²	
Site Hardscape Acres:	1.37 Acres	
Site Total Lumens:	3,032 lm	See Section 5.6
Calculated Site Value:	0.1 lm/(ft²)	Production Site is Verified
Regulatory Allowed Limit:	2.5 lm/(ft²)	COGCC Rule 424.d.(2)

Table 4.2.3 –Pre-Production / Construction Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.3, the estimated site lighting during the Production operation phase is less than the regulatory maximum value and in compliance with COGCC Rule 424.d.(2) for Commercial/Agricultural.

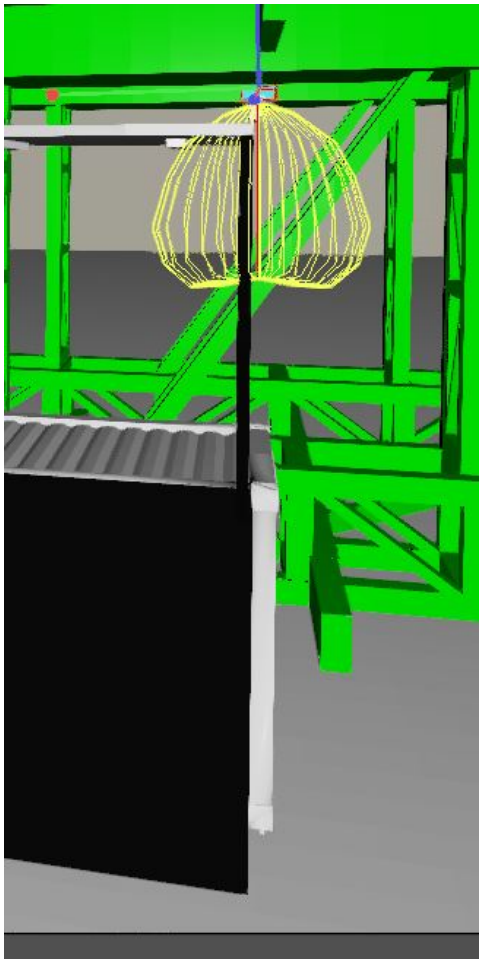
5.0 SITE LIGHTING POSITIONS AND ORIENTATION

5.1 SITE LIGHTING NOTES

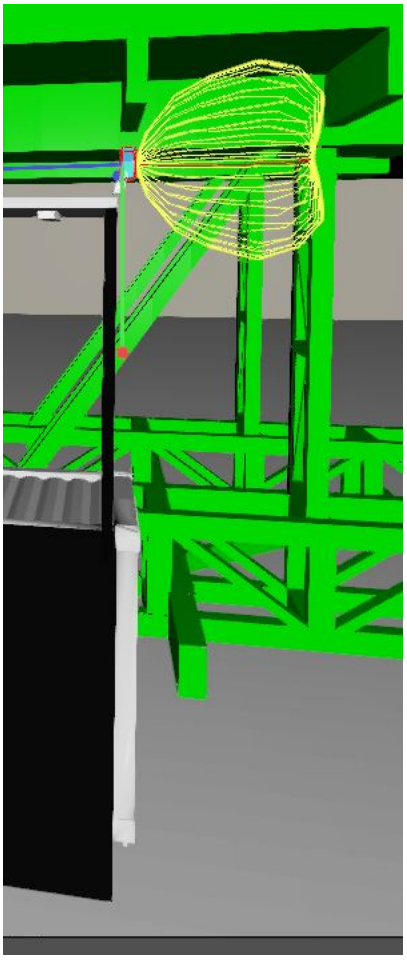
Applicable Code Reference: COGCC Rule 424(a)(2)(A)(ii)
Pertaining to Pre-Production activities: *"The proposed anticipated location, mounting, height, and orientation of all outdoor lighting fixtures on the site during pre-production activities"*

The following figures and tables in this section show the lighting location, mounting, height, and orientations for the Pre-Production Drilling, Completions, and Production Operations, in accordance with COGCC Rule 424(a)(2)(A)(ii). The following notes apply:

1) Stated tilt at zero (0) degrees represents a luminaire facing directly downward.



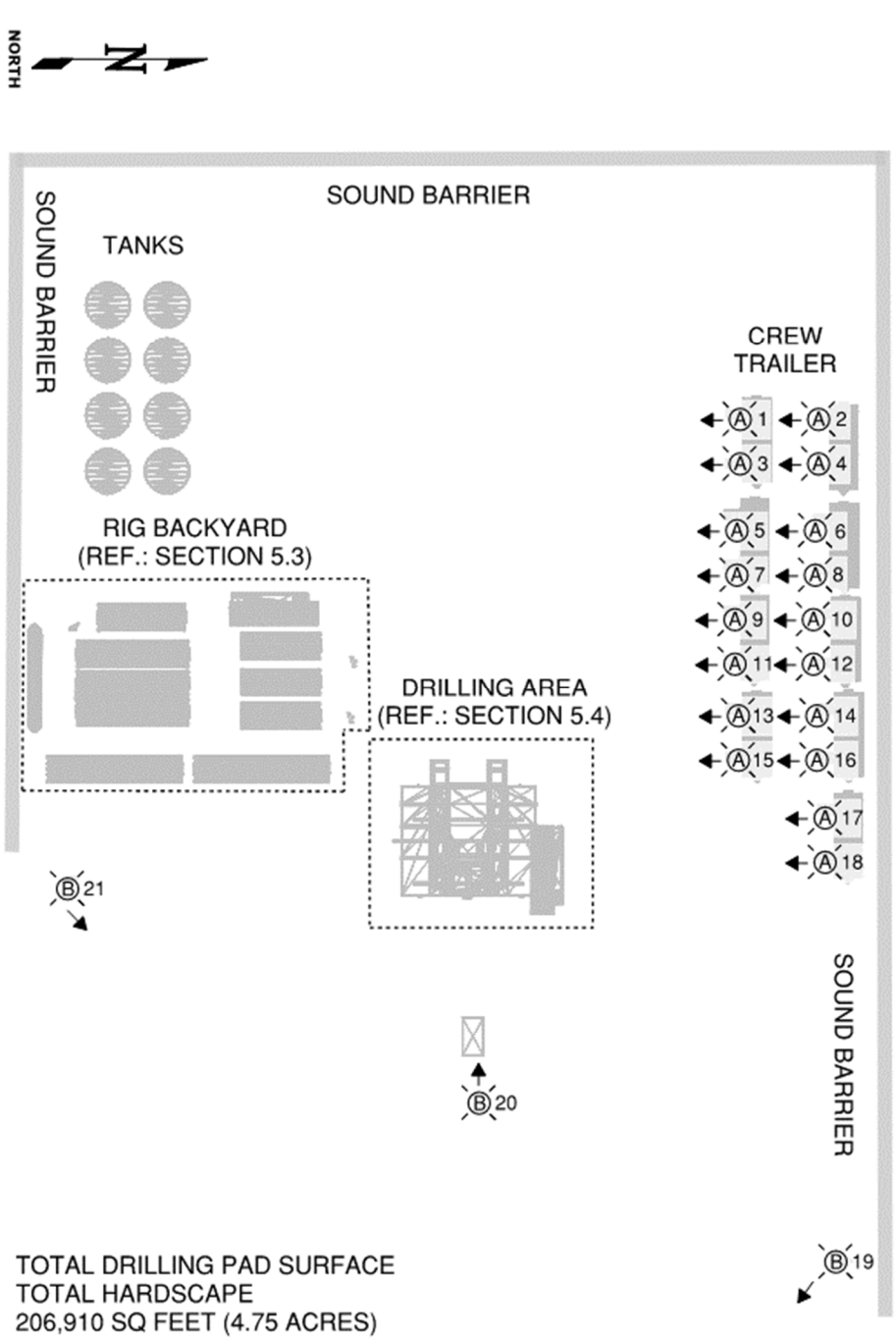
Example 0 degrees



Example 90 degrees

2) Intermittent sources of lights such as glow from on-site combustor and alarm lights are not included in this analysis.
3) Temporary lighting where necessary for safety reasons per COGCC 424.a.2.A.iii have not been modeled or accounted for in this analysis.
4) The quantity of lights and calculated values shown represents an estimated upper limit to the actual values that will be present on-site.
5) Refer to Attachment A for further lighting fixture information.

5.2 PRE-PRODUCTION - DRILLING SITE LAYOUT AND LUMINAIRE SCHEDULE



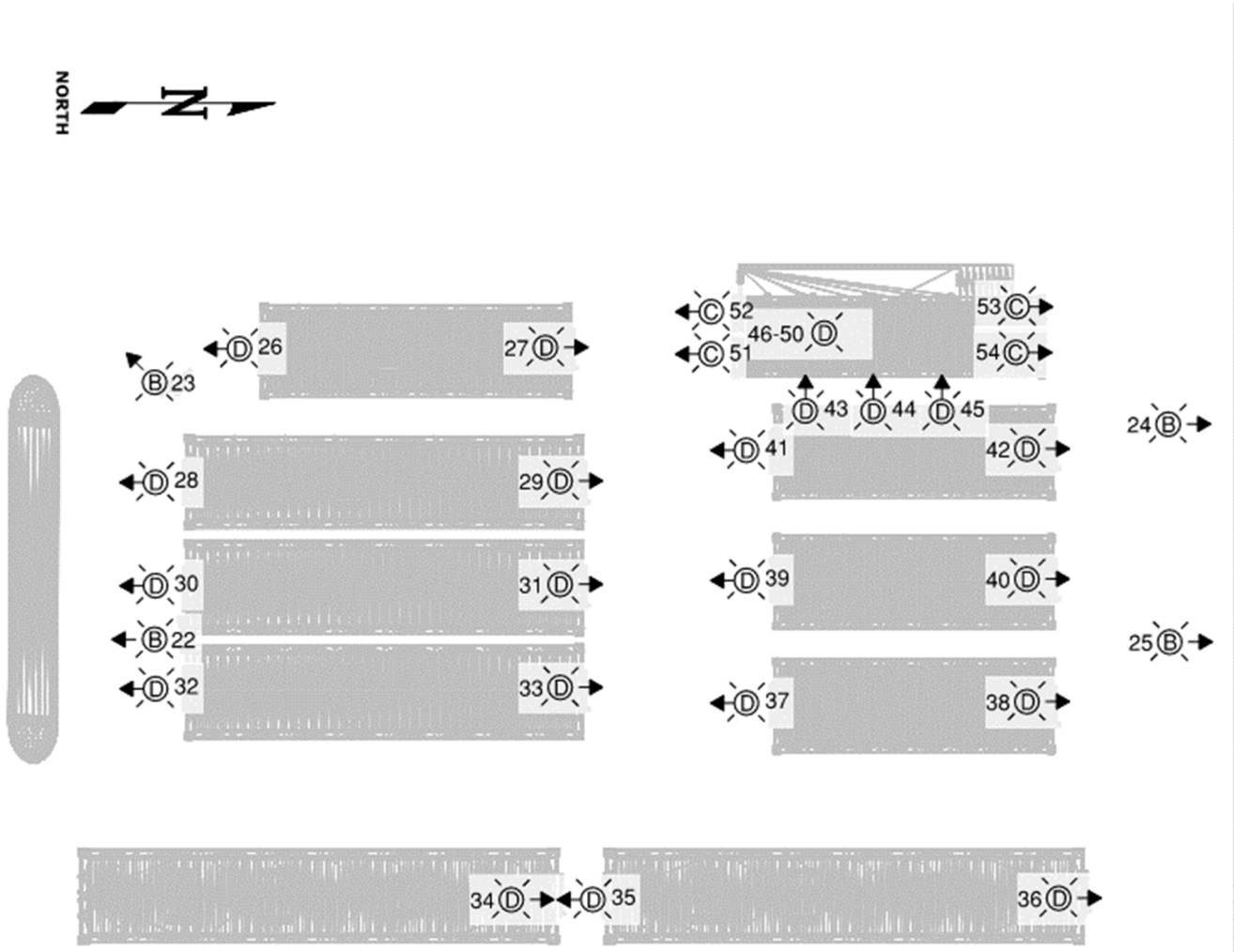
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – OVERALL PRE-PRODUCTION
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
1	11	90	A	5,800 lm
2	11	90	A	5,800 lm
3	11	90	A	5,800 lm
4	11	90	A	5,800 lm
5	11	90	A	5,800 lm
6	11	90	A	5,800 lm
7	11	90	A	5,800 lm
8	11	90	A	5,800 lm
9	11	90	A	5,800 lm
10	11	90	A	5,800 lm
11	11	90	A	5,800 lm
12	11	90	A	5,800 lm
13	11	90	A	5,800 lm
14	11	90	A	5,800 lm
15	11	90	A	5,800 lm
16	11	90	A	5,800 lm
17	11	90	A	5,800 lm
18	11	90	A	5,800 lm
19	30	75	B	213,648 lm
20	30	75	B	213,648 lm
21	30	75	B	213,648 lm

Total Lumens Calculation	
Subtotal Area Calculation:	745,344 lm
Total Section 5.3 Lumens:	1,141,431 lm
Total Section 5.4 Lumens:	435,978 lm
Total Area Lumens:	**2,322,753 lm**

5.3 PRE-PRODUCTION - DRILLING –RIG BACKYARD- SITE LAYOUT AND LUMINAIRE SCHEDULE



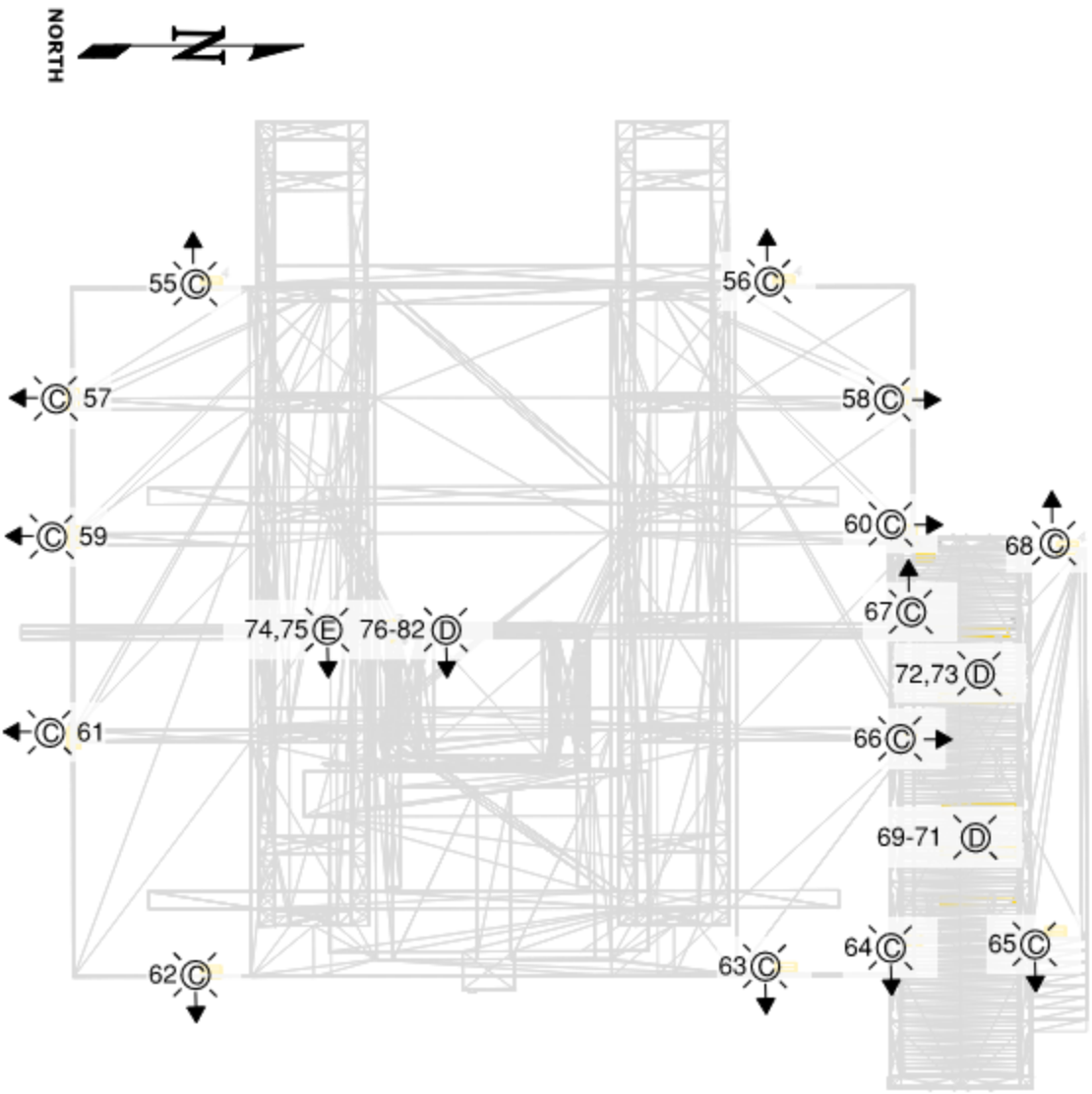
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – RIG BACKYARD
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091 lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
22	30	75	B	213,648 lm
23	30	75	B	213,648 lm
24	30	75	B	213,648 lm
25	30	75	B	213,648 lm
26	9	75	D	7,619 lm
27	9	75	D	7,619 lm
28	9	75	D	7,619 lm
29	9	75	D	7,619 lm
30	9	75	D	7,619 lm
31	9	75	D	7,619 lm
32	9	75	D	7,619 lm
33	9	75	D	7,619 lm
34	9	75	D	7,619 lm
35	9	75	D	7,619 lm
36	9	75	D	7,619 lm
37	9	75	D	7,619 lm
38	9	75	D	7,619 lm
39	9	75	D	7,619 lm
40	9	75	D	7,619 lm
41	9	75	D	7,619 lm
42	9	75	D	7,619 lm
43	14	75	D	7,619 lm
44	14	75	D	7,619 lm
45	14	75	D	7,619 lm
46	19	0	D	7,619 lm
47	19	0	D	7,619 lm
48	19	0	D	7,619 lm
49	19	0	D	7,619 lm
50	19	0	D	7,619 lm
51	20	75	C	24,091 lm
52	20	75	C	24,091 lm
53	20	75	C	24,091 lm
54	20	75	C	24,091 lm

Subtotal Lumens Calculation Section 5.3	
Subtotal Area Lumens:	**1,141,431 lm**

5.4 PRE-PRODUCTION - DRILLING –DRILL AREA - SITE LAYOUT AND LUMINAIRE SCHEDULE



LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – DRILL AREA
DRILLING OPERATIONS

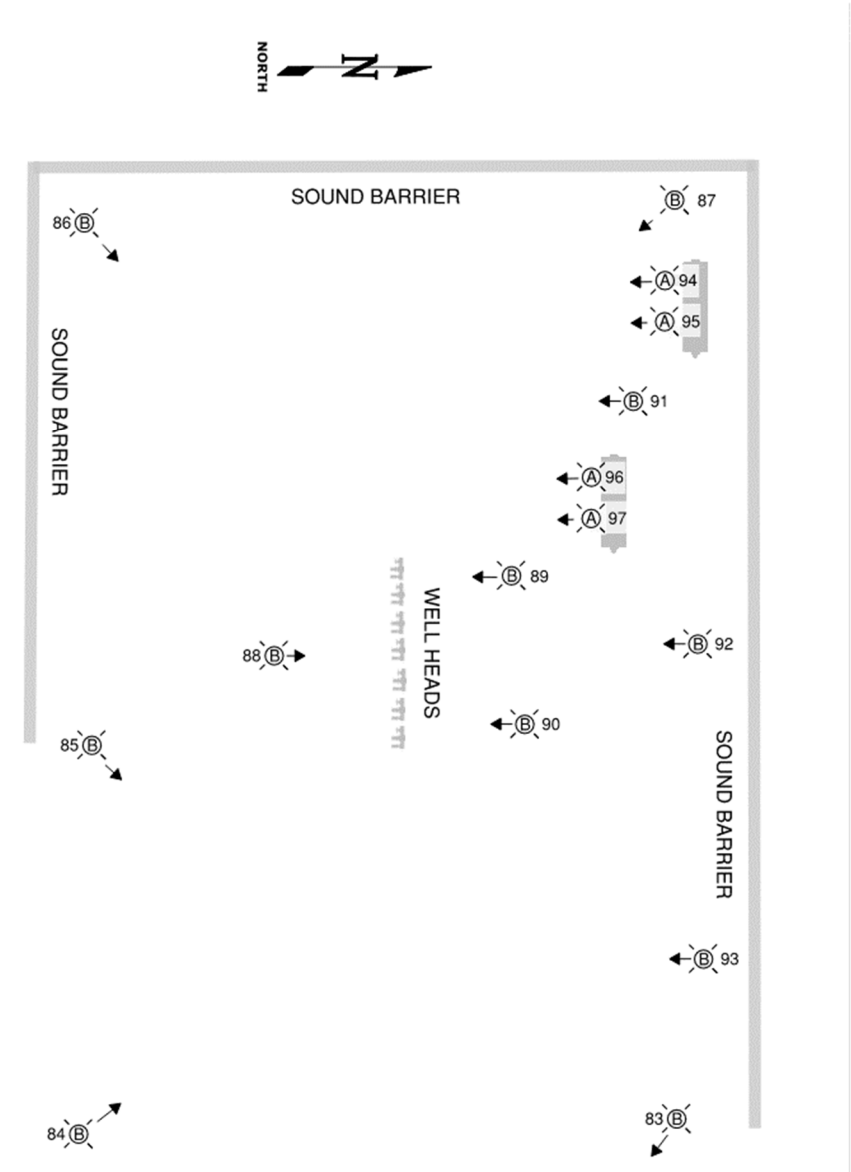
Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm
E	EATON – COOPER CROUSE HINDS	DLL2/UNV1S903	LED – 2FT LINEAR POLYCARBONATE	32 W	3,958 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
55	36	75	C	24,091 lm
56	36	75	C	24,091 lm
57	36	75	C	24,091 lm
58	36	75	C	24,091 lm
59	36	75	C	24,091 lm
60	36	75	C	24,091 lm
61	36	75	C	24,091 lm
62	36	75	C	24,091 lm
63	36	75	C	24,091 lm
64	36	75	C	24,091 lm
65	20	75	C	24,091 lm
66	20	75	C	24,091 lm
67	36	75	C	24,091 lm
68	20	75	C	24,091 lm
69	19	0	D	7,619 lm
70	19	0	D	7,619 lm
71	19	0	D	7,619 lm
72	19	0	D	7,619 lm
73	19	0	D	7,619 lm
74	40	90	E	3,958 lm
75	167	90	E	3,958 lm
76	52	90	D	7,619 lm
77	61	90	D	7,619 lm
78	73	90	D	7,619 lm
79	82	90	D	7,619 lm

Luminaire Position and Tilt *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
80	92	90	D	7,619 lm
81	149	90	D	7,619 lm
82	158	90	D	7,619 lm

Subtotal Lumens Calculation Section 5.4	
Subtotal Area Lumens:	435,978 lm

5.5 PRE-PRODUCTION - COMPLETIONS - SITE LAYOUT AND LUMINAIRE SCHEDULE



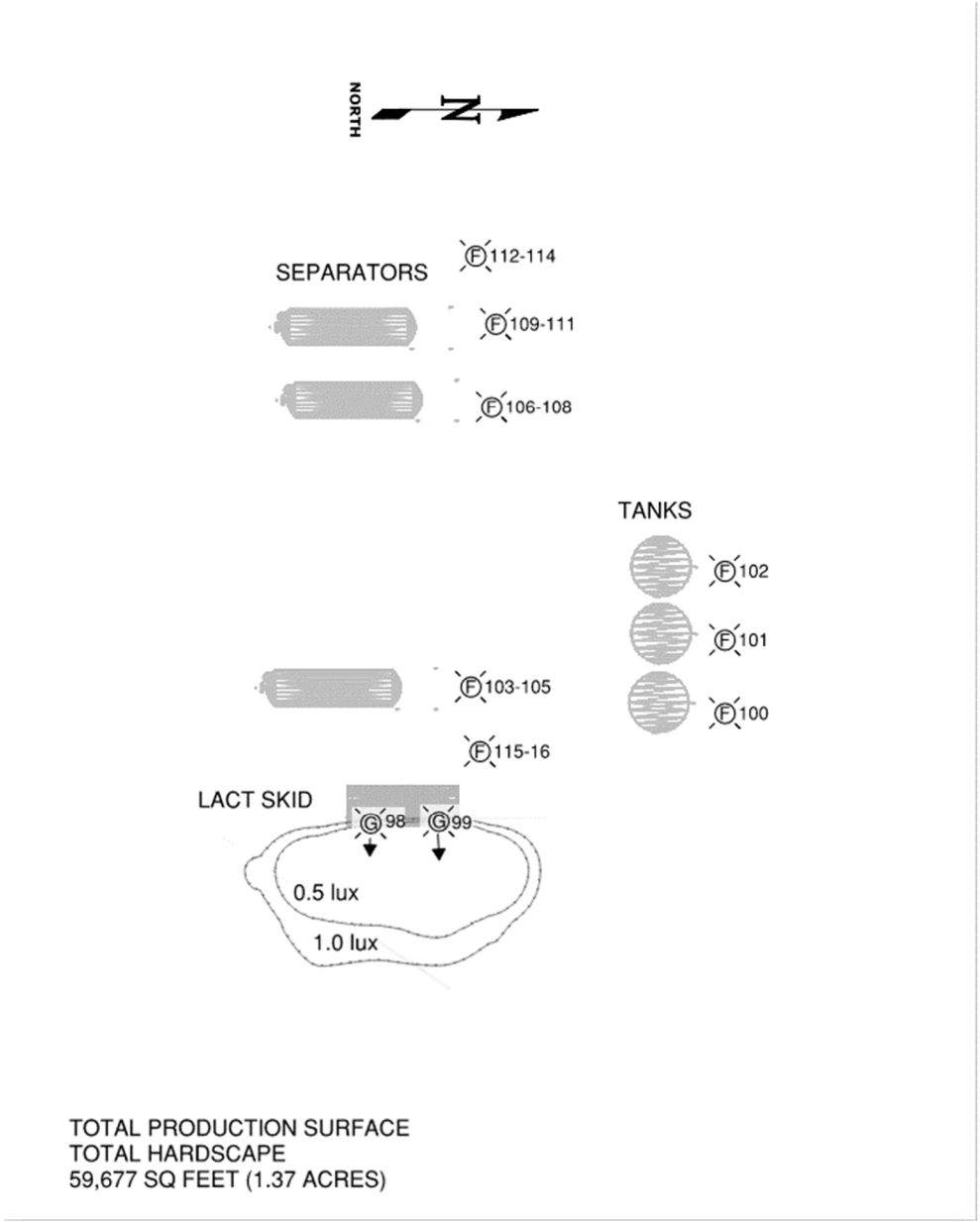
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – COMPLETIONS AREA
COMPLETIONS OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800 lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
83	30	75	B	213,648 lm
84	30	75	B	213,648 lm
85	30	75	B	213,648 lm
86	30	75	B	213,648 lm
87	30	75	B	213,648 lm
88	30	75	B	213,648 lm
89	30	75	B	213,648 lm
90	30	75	B	213,648 lm
91	30	75	B	213,648 lm
92	30	75	B	213,648 lm
93	30	75	B	213,648 lm
94	11	90	A	5,800 lm
95	11	90	A	5,800 lm
96	11	90	A	5,800 lm
97	11	90	A	5,800 lm

Total Lumens Calculation	
Total Area Lumens:	2,373,328 lm

5.6 PRODUCTION - SITE LAYOUT, LUMINAIRE SCHEDULE, AND PHOTOMETIC



LUMINAIRE LAYOUT& PHOTOMETRIC
COLUMBINE 4 -29 HZ – PRODUCTION AREA
PRODUCTION OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
F	RAYCHEM	E-100	LED HEAT TRACE END SEAL KIT	2 W	60 lm
G	PHOENIX	CL	LED CUBE LIGHT	13 W	1006 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
98	9	0	G	1,006 lm
99	9	0	G	1,006 lm
100	4.5	180	F	60 lm
101	4.5	180	F	60 lm
102	4.5	180	F	60 lm
103	4.5	180	F	60 lm
104	4.5	180	F	60 lm
105	4.5	180	F	60 lm
106	4.5	180	F	60 lm
107	4.5	180	F	60 lm
108	4.5	180	F	60 lm
109	4.5	180	F	60 lm
110	4.5	180	F	60 lm
111	4.5	180	F	60 lm
112	4.5	180	F	60 lm
113	4.5	180	F	60 lm
114	4.5	180	F	60 lm
115	4.5	180	F	60 lm
116	4.5	180	F	60 lm
		Total Lumens Calculation		
		Total Area Lumens:		3,032 lm

6.0 SITE MITIGATION NOTES AND BEST MANAGEMENT PRACTICES

The following mitigation notes and techniques apply:

1) To the extent possible, LED fixtures are used to reduce skyglow. This is based on the calculated results of the relative impact versus traditional lighting methods using DOE Skyglow comparison tool PNNL-SA-138348.

2) All lights have been positioned to point in a downward direction where vertical lighting is not required. Where it is required, lights are angled in a vertical direction to provide task lighting for safety and operations involving personnel.

3) Luminaire Type E and D used on the Derrick mast in Section 5.4 are facing horizontally to provide adequate lighting for safe operations.

4) To the extent possible, design considerations have been made regarding the type of light fixtures used, quantity, and positioning to reduce various forms of lighting pollution. Examples include:

   - Lighting is angled away from surrounding off site buildings.
   - Lighting within the Production area has been reduced to provide a minimum acceptable value for safe operations.
   - Light masts are automatically switched off/on based on lighting sensors.
   - Lights are switched off when not required.
   - Lights are directed to task areas only.
   - Low power (63W) LED lights are used for the drill rig.
   - Sound barriers are positioned to reduce lighting trespass to surrounding off-site buildings.
   - The calculated cumulative light impacts, as indicated in Section 4.1, on surrounding buildings within a one-mile radius area below 4 lux when measured 5.5 feet above grade.

5) Lighting Cut Sheet Notes for Attachment A

   1. Type A Fixtures
      - Type A fixtures are construction trailer lights. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. Lights varied significantly during site inspections. A representative model was selected based on a lumen output for a trailer.

   2. Type B fixtures
      - Type B fixtures are portable construction light towers with vertical masts. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. HP Winner M4 Model was selected for this analysis based on site inspections and current available units; however specific site units may vary based on time of construction. The model for these portable light towers consisted of a LED light source with 4 fixtures. Each of these fixtures were comprised of 4 LED modules mounted in a rectangular arrangement. The attached cut sheet for HP Winner represents 1 LED module. 16 total modules were modeled for each light mast.

- The typical light pole center of fixtures is raised approximately 30 feet from grade and pointed downward toward work area.

- The fixture mounting for portable light towers are articulated mountings which allows for both vertical and horizontal plane adjustments. For this analysis, the light mast fixtures were modeled at indicated angles.

3. Type F Fixtures
    - Type F Fixtures is an estimation of heat trace end kits. Photometric data from the manufacturer is not available. These lights are low power LED's mounted on the pipe where heat trace is installed. Mounting height, and location vary based on final design and installation.

7.0 ATTACHMENT

Attachment A – 21010 Columbine 4 -29 HZ Lighting Fixture Cut Sheets Attachment

END OF REPORT

SAMUEL ENGINEERING
WE PROVIDE SOLUTIONS

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Greenwood Village, Colorado 80111

Phone: 303-714-4840
Fax: 303-714-4800

ATTACHMENT A

FIXTURE CUT SHEETS TYPES A,B,C,D,E,F,G

LIGHTING MITIGATION PLAN

FOR

KERR MCGEE OIL & GAS ONSHORE LP

COLUMBINE 4-29 HZ

Project Number: 21010

Fixture Cut Sheet
Type A

STANPRO

Project: _____ Type: _____

Drawn by: _____ Catalogue #: _____ Date: _____

Series Spec Sheet

WPS GEN 4

CLASSIC WALL PACK

Selectable color temperature (3 000 K / 4 000 K / 5 000 K)[1]
Power selectable[1]
Integrated photocell[1]
Multi-Voltage (120-347 V)[1]

This wall pack series is a classic and familiar design integrated with modern LED technology to promote better energy efficiency and long life. Certain configurations come with integrated photocell, selectable power and/or selectable color temperature. It is best suited for entrances, underpasses or anywhere controlled security lighting is required, the series luminaire is a great addition to any commercial or industrial outdoor wall mount application. The tough die cast aluminum housing is moisture and dustproof. [1]



FEATURES AND SPECIFICATIONS

- **Construction**

  Housing
  - This luminaire is made of aluminum die cast and comes standard in a bronze powder coat finish.
  - The housing has four conduit entries of 1/2" on each sides and some of the configurations comes with a button type photocell that can be turned off by using the internal switch if needed.[1]

  Lens

  Prismatic tempered glass lens is standard in this product series.

- **Electrical**
  - The drivers allows an input voltage from 120-277 V or 120-347 V AC 50/60 Hz and are 0-10 V dimmable. They are coming with an onboard surge protection:
    - NS29: 2.5kV standard
    - NS40, NS60, NS80, PS40, PS100: 2kV standard
    - NS120: 4kV standard
  - This wall pack series is suitable for ambient temperature range of -40°C to +50°C. Available in color temperatures of 4 000 K, 5 000 K or 3CCT selectable (3 000/4 000/5 000 K) with a lumen per watt ratio of 140 lm/W to 152 lm/W depending on the lumen package.
  - The color temperature of the fixture is set by default at 4 000 K and can be changed on the field.

- **Compliances**
  - Wet location
  - IP65
  - Meets requirements of ICES-005 issue 5 for class B products
  - cULus
  - IK06
  - BC Hydro

OVERVIEW

Light source	LED
Watts (W)	25/30/40, 60/80/100 30, 40, 60, 80, 120
Lumens output (lm)	3 625 - 17 885
Efficiency (lm/W)	140 - 152
Color temperature (K)	3CCT (3 000/4 000/5 000) 4 000, 5 000
CRI	> 80

[1] Integrated photocell, multi-volt driver, CCT and Power selectable on some configurations. Consult Quick ship and technical specification table for more details.

5 yrs warranty

quick ship

LED fixture

power selectable [1]

3 CCT TCC [1]
3000 K / 4000 K / 5000 K

dimmable fixture

wet location

IP 65

ICES 005

IK06

DLC QPL LISTED PREMIUM

cULus

Not all products are qualified on the DLC QPL. To view our DLC qualified products, please consult the DLC Qualified Products List at www.designlights.org/search.

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STANPRO

QUICK SHIP AND TECHNICAL SPECIFICATION TABLE [1]

Order code	Model number	DLC unique ID	Watts (W)	Volts (V)	Color temp. (K)[2]	Lumen output (lm)[3]	Effi-ciency (lm/W)	Photo-cell[6]	CRI	Life L70 (hrs)[5]	Tested hours LM-80 (hrs)[5]	Calculated TM21 (hrs)[5]	Finish	Dim-ming	B.U.G.	LED current (mA)	Power factor	THD (%)	Case qty (master)
Power Select, CCT Select and Integrated Photocell[6]																			
68314	WPS-PS40-Q-3C	PLW61NEJG50K	25/30/40	120-347	3000/4000/5000	3875/4500/5800[4]	141	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	850	≥0.9	≤20	1
68315	WPS-PS100-Q-3C	PLE7PYF9LCSH	60/80/100	120-347	3000/4000/5000	9300/12000/14500[4]	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	2 100	≥0.9	≤20	1
Single Power, Single CCT and Integrated Photocell[6]																			
68524	WPS-NS30-W-40K/P127		29	120-277	4 000	4 200	150	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
68525	WPS-NS30-W-50K/P127		29	120-277	5 000	4 300	148	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
Single Power and Single CCT																			
68490	WPS-NS40-W-40K	PLVM09BUX07G	40	120-277	4 000	6 004	142	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68491	WPS-NS40-W-50K	PL3ULW7TEV5H	40	120-277	5 000	6 034	144	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68492	WPS-NS60-W-40K	PL6EFOUTBPWB	60	120-277	4 000	8 458	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68493	WPS-NS60-W-50K	PL01JETYSQ80	60	120-277	5 000	8 611	147	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68497	WPS-NS80-W-40K	PLVXL8TOP2UF	80	120-277	4 000	11 242	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
68498	WPS-NS80-W-50K	PL2AZJG3L0RQ	80	120-277	5 000	11 446	148	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
Single Power, CCT Select and Integrated Photocell[6]																			
68316	WPS-NS120-Q-3C	PLYRMZYS3AY3	120	120-277	3000/4000/5000	16 943	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B2U4G5	2 600	≥0.9	≤20	1

[1] **QUICK SHIP:** Product availability is subject to change without notice. Please contact your Stanpro customer service representative to confirm inventory levels at time of order.
[2] Typical color temperature range: +/- 5 %.
[3] Lumen values are derived from photometric testing. Initial lumens range: +/- 10 %.
[4] Lumen values are based on 4 000 K default settings. Please refer to Quick ship Technical Specification Table for more details on other color temperatures.
[5] Life hours are derived from IESNA LM-80-08 testing report and projected per IESNA TM-21-11 extrapolations.
[6] Integrated ON/OFF photocell that can be easily disabled.

ACCESSORIES (order separately)

Order code	Description
68370	18'' Bronze metal backplate
68371	Bronze glareshield
68372	Stainless Steel wireguard





ORDERING GUIDE

WPS — ____ — ____ — ____ — ____ / ____

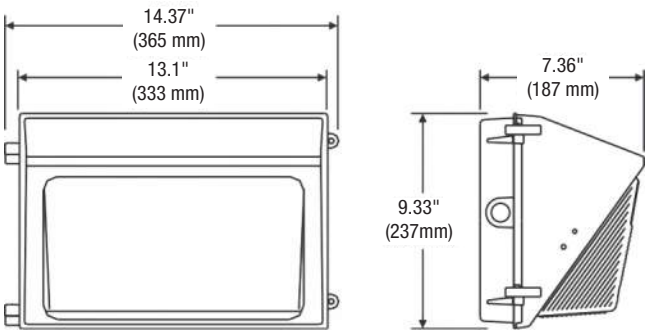
Series	Lumen package (W)	Volts (V)	Color temp. (K)	Casting color	Options
WPS	**PS40 -** 25/30/40 **PS100 -** 60/80/100 **NS120 -** 120	**Q -** 120-347	**3C -** 3 000/4 000/5 000	**BR -** Bronze (standard) **BK -** Black **WH -** White **SP-** Special color	**KV -** 10 kV surge Protection **PC -** Polycarbonate lens
	NS30 [1] **-** 29 **NS40 -** 40 **NS60 -** 60 **NS80 -** 80	**W -** 120-277	**40K -** 4 000 **50K -** 5 000		**KV -** 10 kV surge Protection **P127** [1] **-** Button type photocell 120-277 V **PC -** Polycarbonate lens

[1] Button type photocell 120-277 V comes standard with the ''NS30'' lumen package.

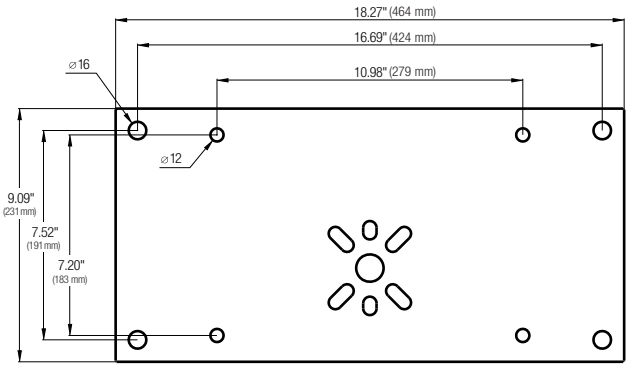
Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
All products are subject to change or may be discontinued any time without notice.

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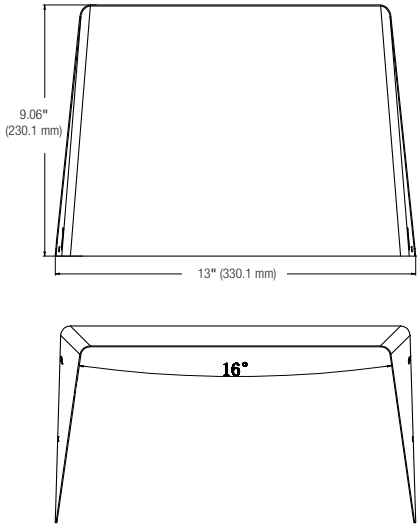
DIMENSIONS



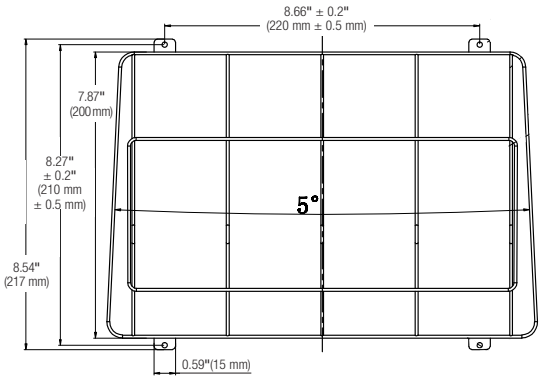
BACKPLATE



GLARESHIELD



WIREGUARD

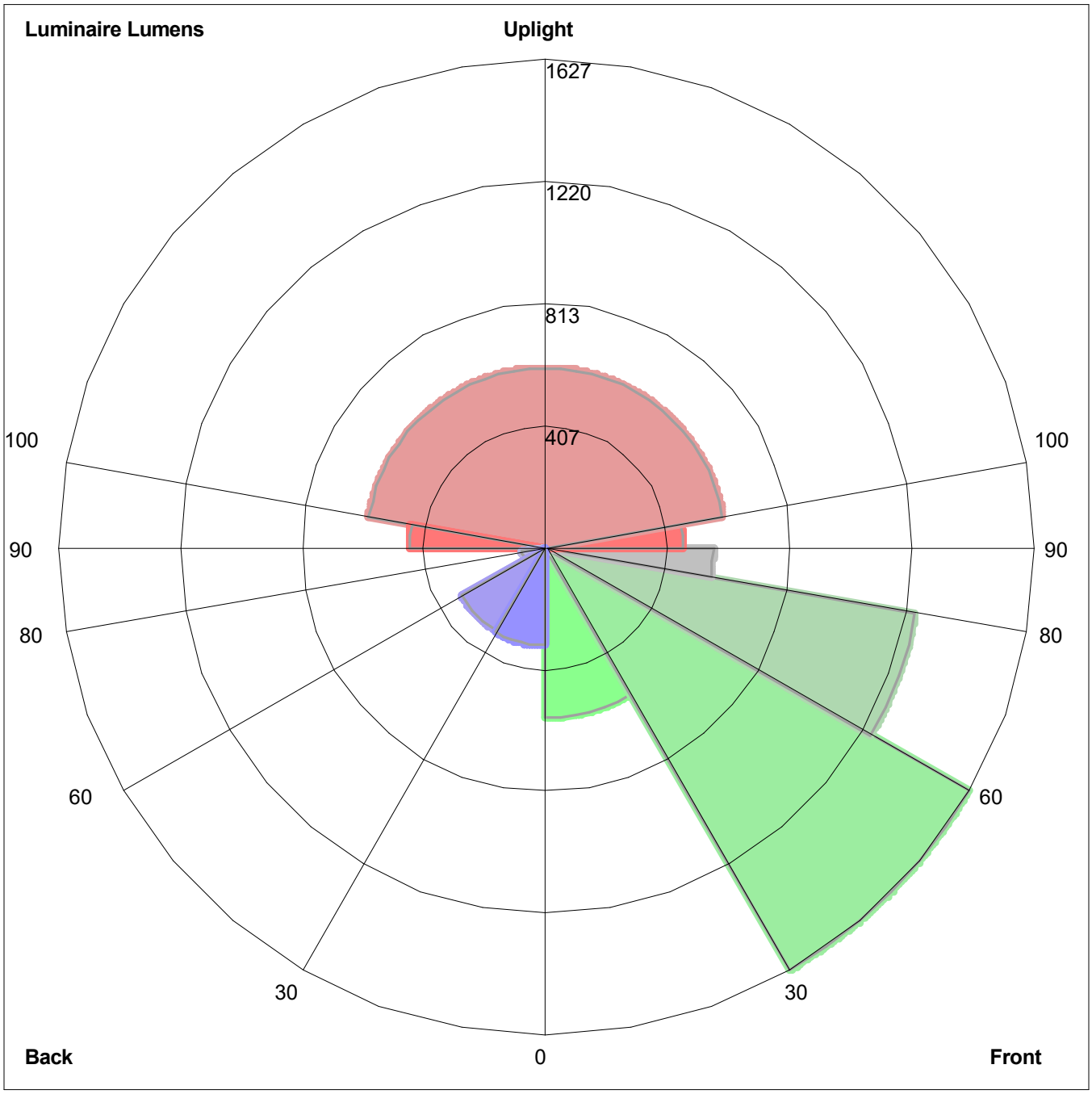


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IES ROAD REPORT
PHOTOMETRIC FILENAME : WPS-PS40-Q-3C-40W-40K-68314.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=566.0, Medium=1626.5, High=1251.8, Very High=558.0
Back: Low=327.7, Medium=323.2, High=79.4, Very High=11.6
Uplight: Low=456.3, High=599.7

BUG Rating : B1-U4-G4

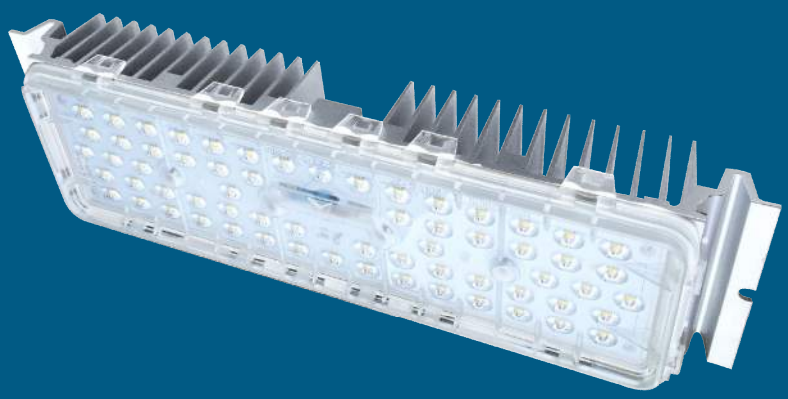
Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type B

Example Used



LED Module
M8B
Series



Specification

Working Environment: -40℃~+50℃

Storage Temperature: -40℃~+50℃

Relative humidity: 10%~90%RH

Typical value of pad temperature[1]: 70℃

IP Rating of LED Light Engine: IP68

Impact Protection Level: IK09

Color Temperature (CCT)[2]: 3000K, 4000K, 5000K, 5700K

Main Material: Aluminum 6063

Module N.W.: 0.67±0.04 kg

Note :

[1] Typical values of pad temperature is obtained based on 60W with a ambient temperature of 25℃.

[2] Efficacy of 3000K is 5% lower than other CCTs.

Features

- Lumileds Luxeon 3030;
- Super long lifetime(Lumen maintenance);
- Multiple lighting distributions available;
- Wide applicability for complex situations;
- High versatility apply for all sorts of lamps retrofit.

Application

- Street lighting retrofit and application;
- Factory lighting retrofit and application;
- Tunnel lighting retrofit and application;
- Sports lighting retrofit and application.

Ordering Information

For example: M8B-VCA-63 -1321-7040-LU

Module Model	Interface	Dimension of LEDS	Wire Material	LED Qty	Lens Model		Ra & CCT	LED Brand
M8B	**V:** V-shape Groove	**C:** 3030	**A:** CCC+VDE	**49** 49PCS	**1324** Type II Short	**1325** 25 DEG	**7030:** Ra≥70, 3000K	**LU:** Lumileds
			C: PSE	**63** 63PCS	**2322** Type II Short (V)	**2360** 60 DEG	**8040:** Ra≥80, 4000K	**SN:** Sanan
			H: UL		**5321** Type II Short	**5340** 40 DEG	...	**XX:** Others
			X: Others		**2321** Type II Short	**5390** 90 DEG		
					1321 Type III Medium	**1310** Lambert Type		
						1390 Tunnel Lighting		

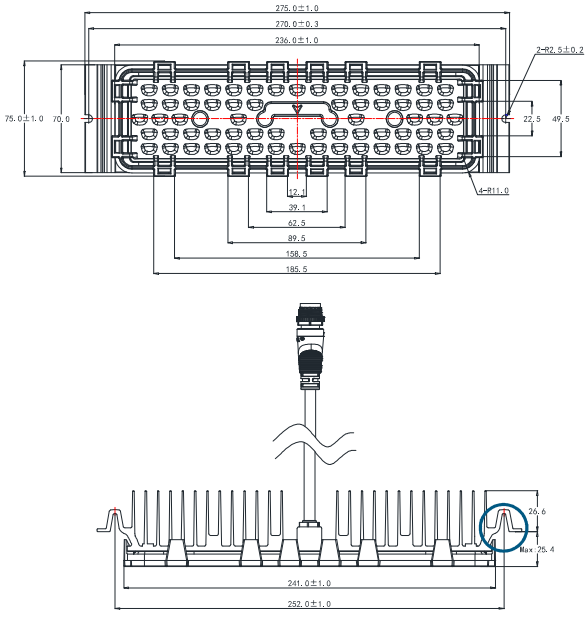
Performance

Model	Power (W)	Driving current (mA)	Input voltage (Vdc)	Efficacy (lm/W)	Lumens (lm)
M8B-VCA-63	40	700	48~61	140	5600
M8B-VCA-49	50	1050	38~48	127	6350
M8B-VCA-63	50	860	48~61	135	6750
M8B-VCA-63	60	1050	48~61	127	7620

Note : Values shown are subject to ±5%~±8% tolerance; Cable default A type;

Efficacy above is based on calculated @92% power efficiency ; Light efficacy of 3000K is 5% lower than other CCTs.

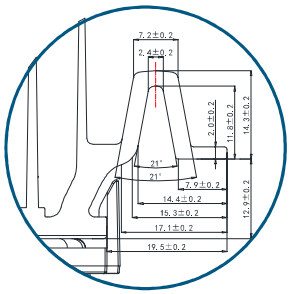
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

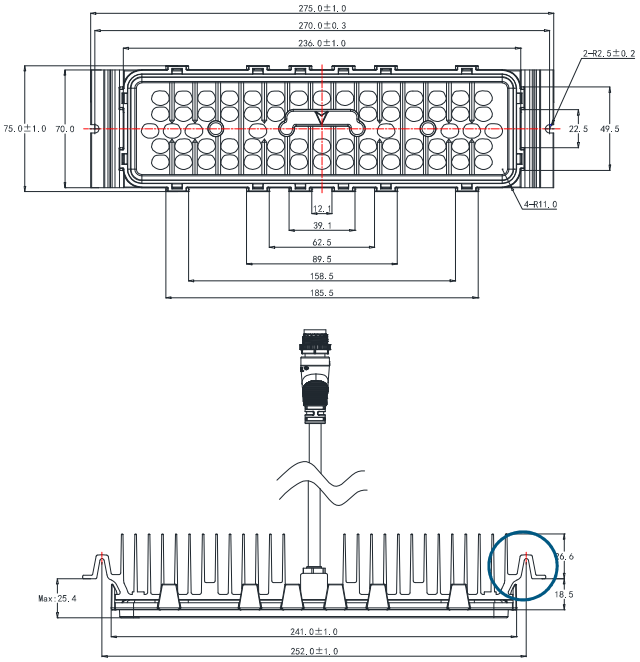
Tolerance: ±0.5mm



Available Lens Model

1321	1324	1390
1232	2322	5321

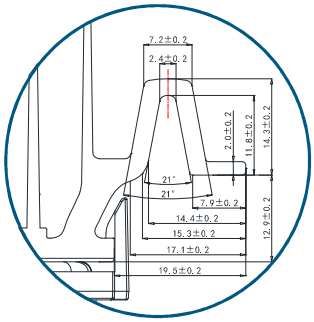
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

Tolerance: ±0.5mm



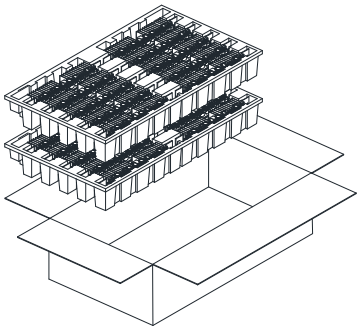
Available Lens Model

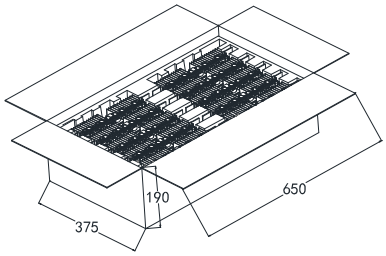
1310	1325	5340	2360
5390			

Package Information

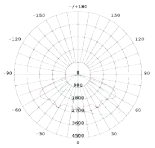
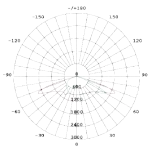
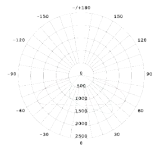
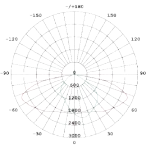
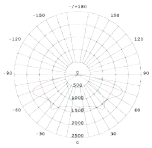
L (mm)	W (mm)	H (mm)	Module pcs/carton (PCS)	Package weight (kg)
650	375	190	20	14.9

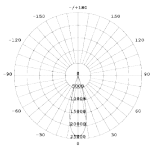
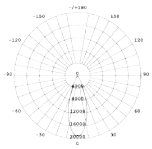
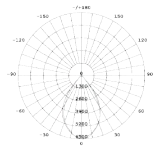
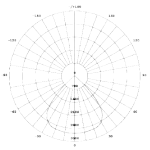
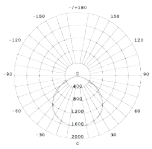
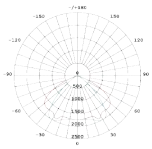
Values shown are subject to ±5% tolerance.





Lighting distributions

T2S1324	T2S(V)2322	T2S5321	T2S2321	T3M1321
				

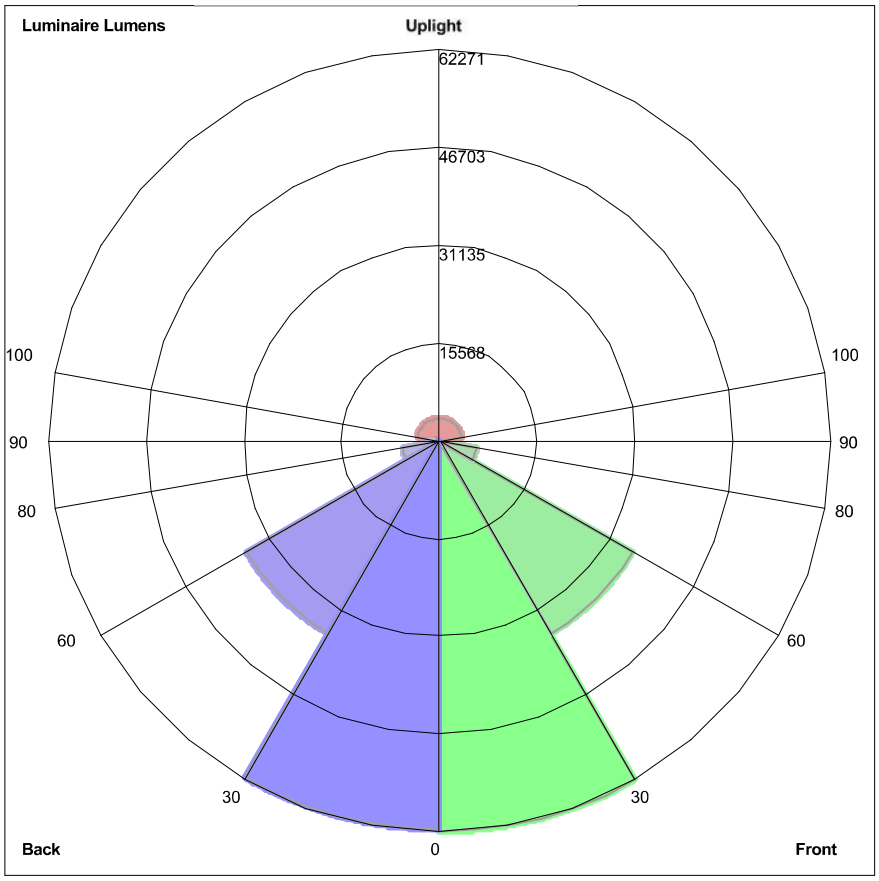
25D1325	40D5340	60D2360	90D5390	LBN1310	Tunnel lighting 1390
					

Version History

Change Date	Version	Description of Change		
		Item	From	To
20190905	Ver2.0	Data sheets release (new version)		
		Update of luminous efficacy		
		Optimized G.W of Module package	16.2kgs	14.9kgs

IES ROAD REPORT
PHOTOMETRIC FILENAME : 3560-400W 16 BANKS ESTIMATE.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=62270.6, Medium=35421.7, High=5946.3, Very High= 1328.0
Back: Low= 61920.0, Medium=35466.8, High=5958.8, Very High=1320.7
Uplight: Low=493.0, High=3564.5

BUG Rating : B5-U5-G5

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type C

Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Applications:

- Onshore drilling and exploration
- Pipeline compressor and storage
- Corrosive environments
- Façade security lighting

Features:

- 150-400W high pressure sodium or 175-400W metal halide
- AEx nR, Ex nR restricted breathing rating is standard – restricted breathing offers cooler T-numbers for increased hazardous locations suitability
- NEMA 7x6 butterfly beam floodlight pattern – wide, uniform and far reaching to provide excellent efficiency and more light where you need it
- NEMA Type 4X and IP66 heavy duty, die cast copper-free aluminum construction is designed for use indoors and outdoors in marine and wet locations with stainless steel external hardware suitable for saltwater and corrosive applications
- 40°C, 55°C and 65°C ambient suitability – addresses high ambient common at industrial facilities
- Low ambient capability to -40°C – perfect for colder climates
- Hinged door frame assembly – has captive cover screws for ease of relamping
- Yoke mount design – standard construction provides the greatest mounting flexibility; can be mounted vertically (wall), horizontally (rooftop or floor) or any angle in between
- 3-axis resonance withstand and UL844 vibration compliant – can stand up to the tough jobs
- Precision formed aluminum reflector – superior beam control, distribution and efficiency
- High light output with a low cost of operation – cost-effectiveness in a high wattage floodlight
- Slipfitter adapter for pole mounting and wall mounting bracket available

Certifications and compliances:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx nR II
- Class II, Division 1, Groups F, G (250W maximum)
- Ex nR II
- UL/cUL844 – Hazardous Locations
- UL/cUL1598 – Luminaires
- UL/cUL1598A – Supplemental Requirements for Luminaires for Installation on Marine Vessels
- 60079-15
- NEMA Type 4X
- IP66
- Marine and wet locations
- ABS



Standard materials and finishes:

- Housing and lens frame – heavy duty die cast copper-free aluminum with Corro-free epoxy powder coat finish
- Lens – heat- and impact-resistant tempered glass
- Gasket – one-piece silicone
- Mounting brackets – aluminum with Corro-free epoxy powder coat finish
- Reflector – precision formed aluminum
- Lamp holder – porcelain
- Hardware – stainless steel

Technical specifications:

- Entries – one ¾" AEx/Ex gland
- Wind rating – EPA: 2.90 at vertical
- Lamp type – high pressure sodium; probe start metal halide[A]; pulse start metal halide (lamps not provided)
- Lamp holder – mogul base
- Ballast – multi-tap 120/208/240/277V, 60 Hz (standard); 220-240V, 50 Hz (optional); tri-tap 120/277/347V (optional); 480V (optional)

Mounting option:

- Yoke mount

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

[A] Not available in the U.S.

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Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Options:

Description	Suffix
• Lamps included	L[B]
• 480V	480
Replace /MT in catalog number with /480	
• 230V	230
Replace /220 ONLY in catalog number with /230	

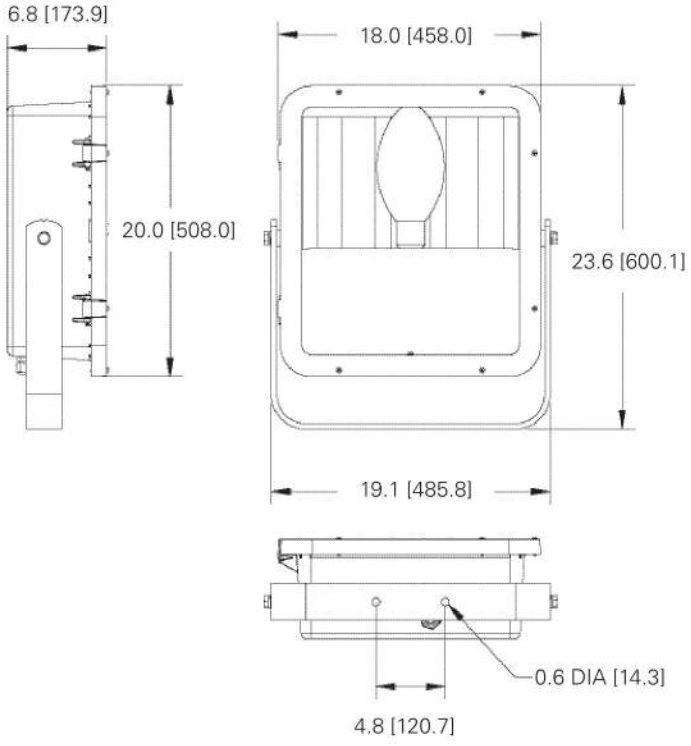
Accessories (ordered separately):

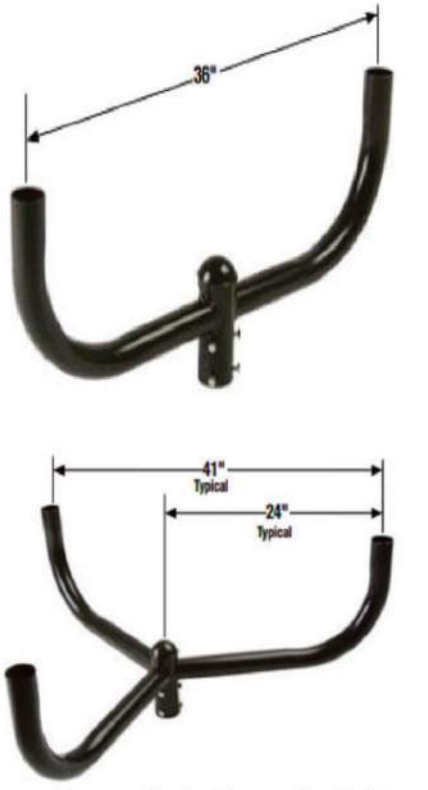
Description	Cat. #
• Pole mount slipfitter adapter	SFA6
• Wall mount bracket adapter	SWB6
• Bull horn, 2 tenon, gray	BLHN2
• Bull horn, 3 tenon, gray	BLHN3

Ordering information:

Cat. #	Lamp type	Watts	Weight (lbs.)	ANSI lamp type	Zone T-code	Division T-code	Ambient temperature °C	Supply wire °C
DFLMY250/MT 76 S828	Pulse start metal halide	250	42.0	M153	T3	T1	40/55/65	90/90/105
DFLMY400/MT 76 S828	Pulse start metal halide	400	44.0	M155	T3	T1	40/55	105/105
DFLMY320/MT 76 S828	Pulse start metal halide	320	44.0	M154	T3	T1	40/55	105/105
DFLMY250/TT 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/TT 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLMY250/220 50 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/220 50 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLSY250/MT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/MT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/TT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/TT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/220 50 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/220 50 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105

Dimensions (in inches):





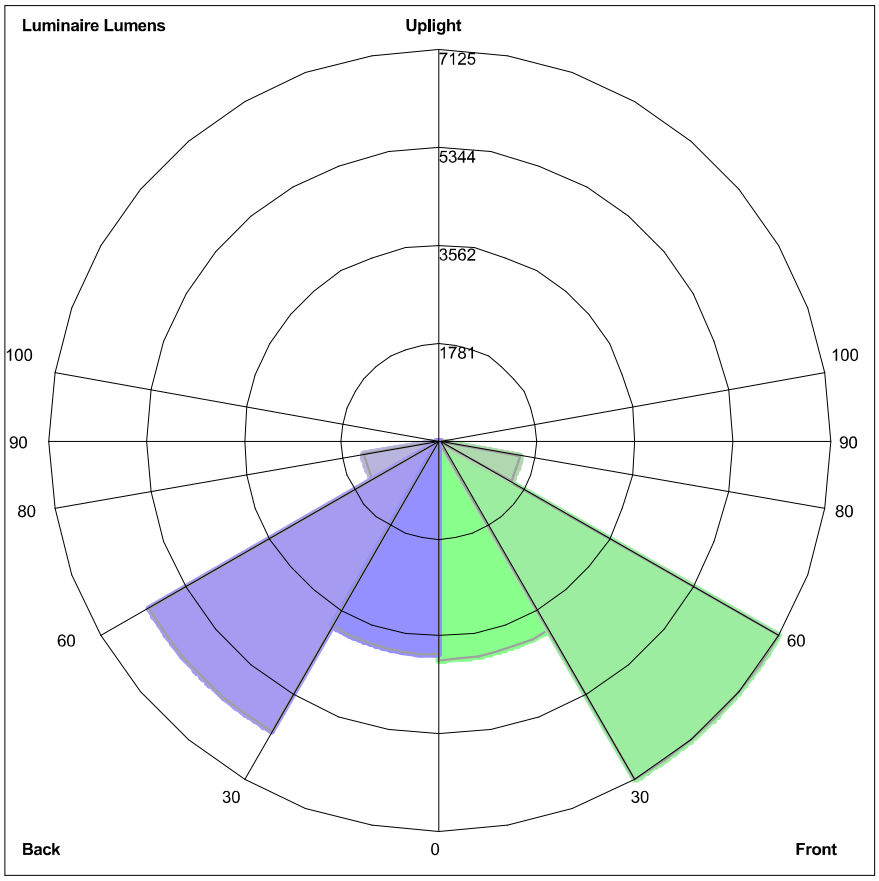
Bull horns – provided with 2 3/8" pole tenon

[B] Lamp is not included unless option 'L' is selected.
[C] Not available in the U.S.

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IES ROAD REPORT
PHOTOMETRIC FILENAME : DFLMYM400.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=3985.6, Medium= 7125.0, High=1500.3, Very High=28.6
Back: Low=3894.8, Medium=6102.1, High=1404.5, Very High=40.2
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G3

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type D

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%



Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5

Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

Ⓐ One year warranty.

Ⓑ Refer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

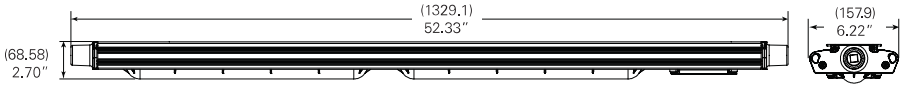
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

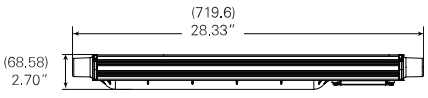
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

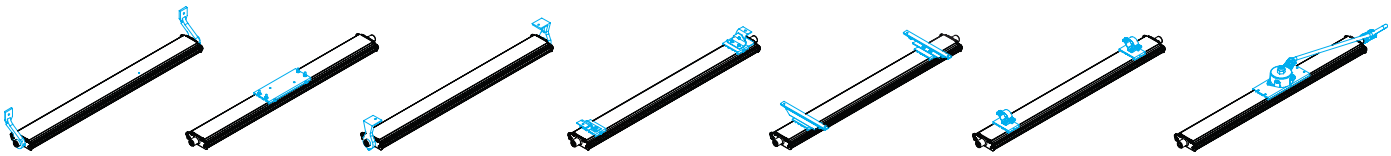
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

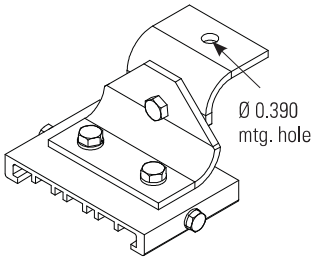
For land-based drilling

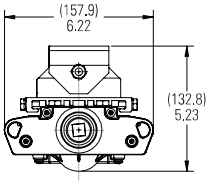
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

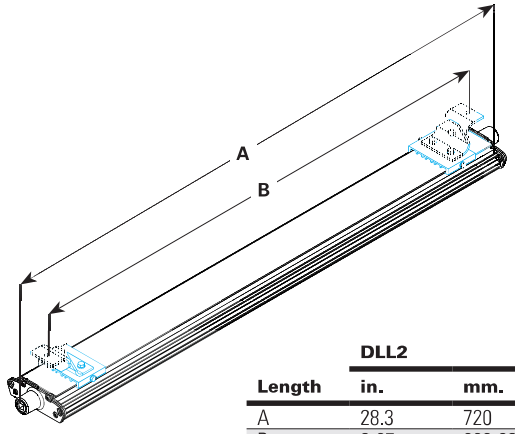
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

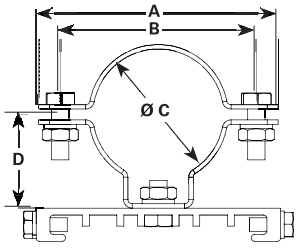




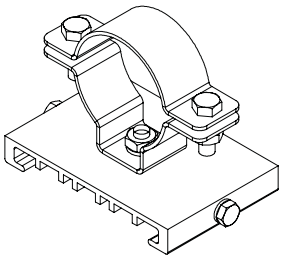


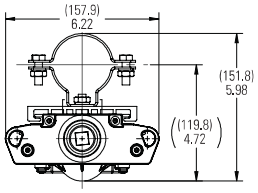
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

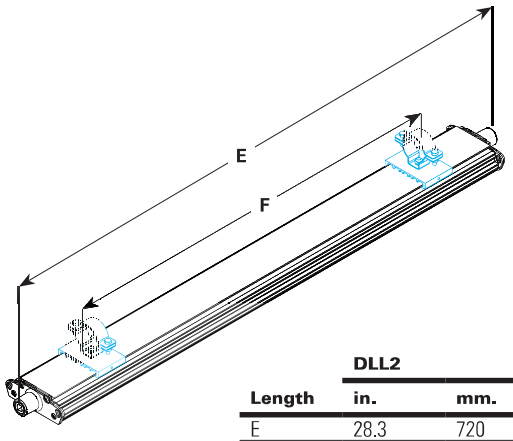
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

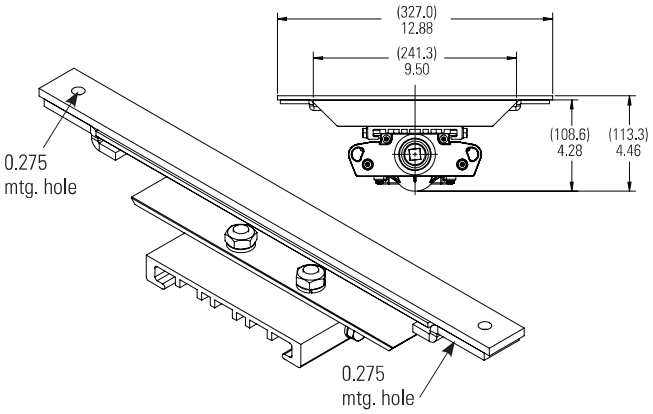


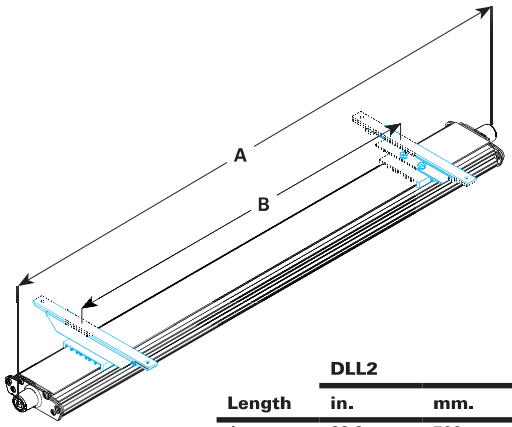




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



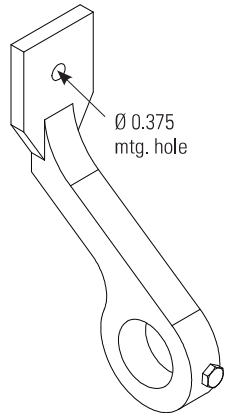


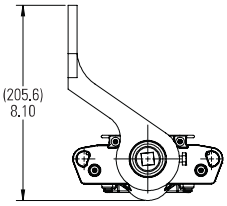
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Length	in.	mm.	in.	mm.
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B	12-22	305-559	24-46	610-1168

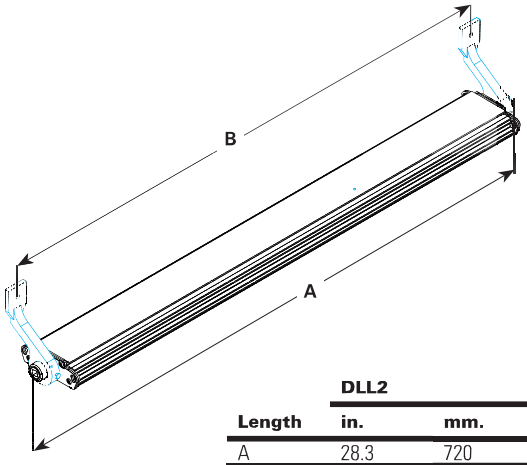
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Mounting options (continued):

Offset wall
DP1052MTK

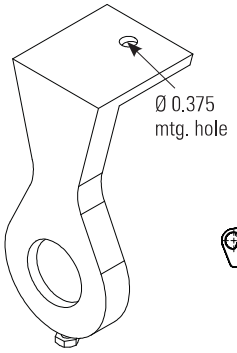


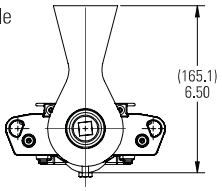


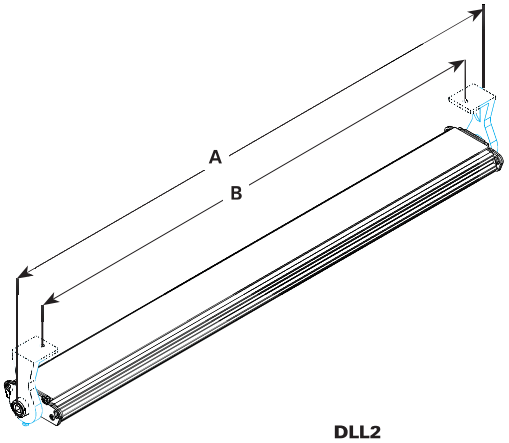


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

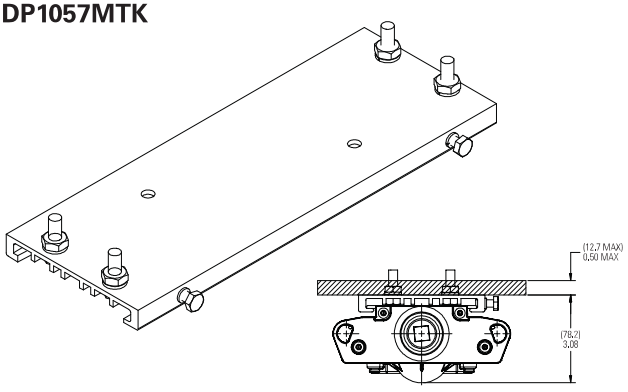


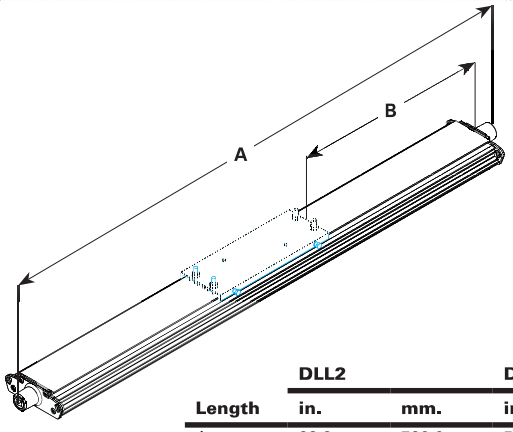




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



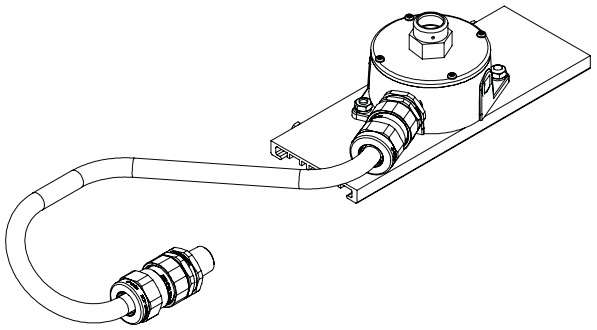


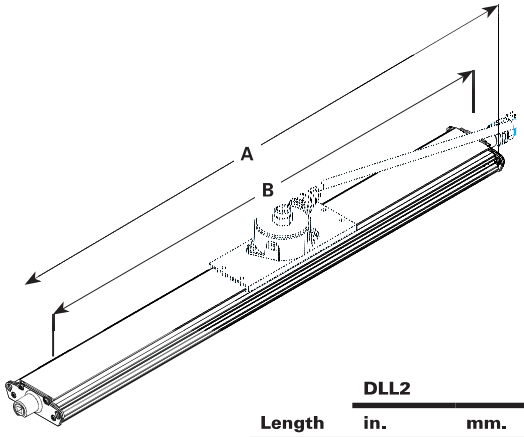
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

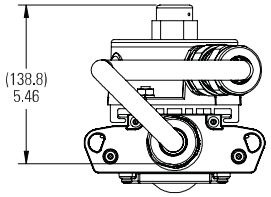
www.crouse-hinds.com US: 1-866-764-5454 CAN: 1-800-265-0502 Copyright® 2019 Eaton

Mounting options (continued):

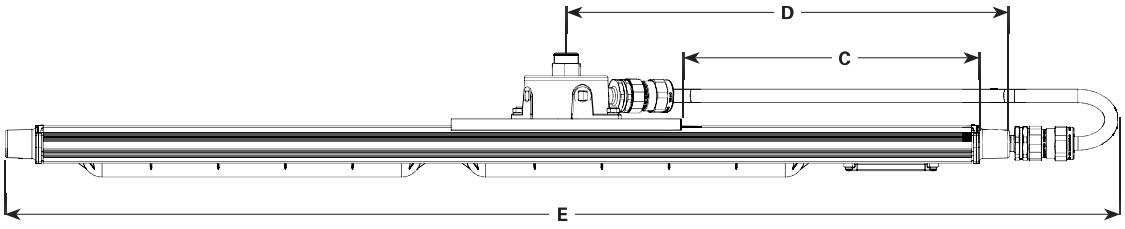
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

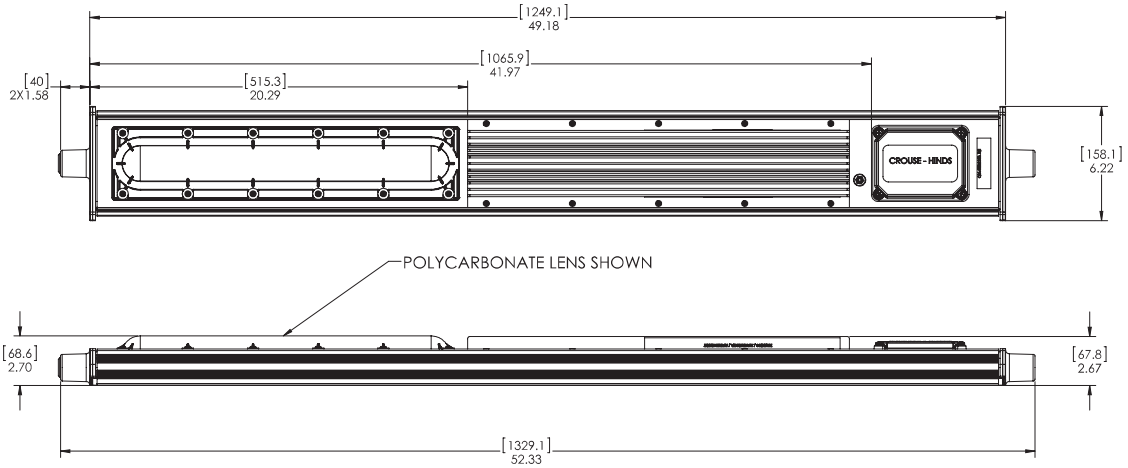
Temperature performance data:

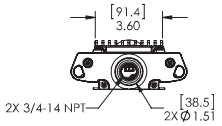
				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Dimensions:

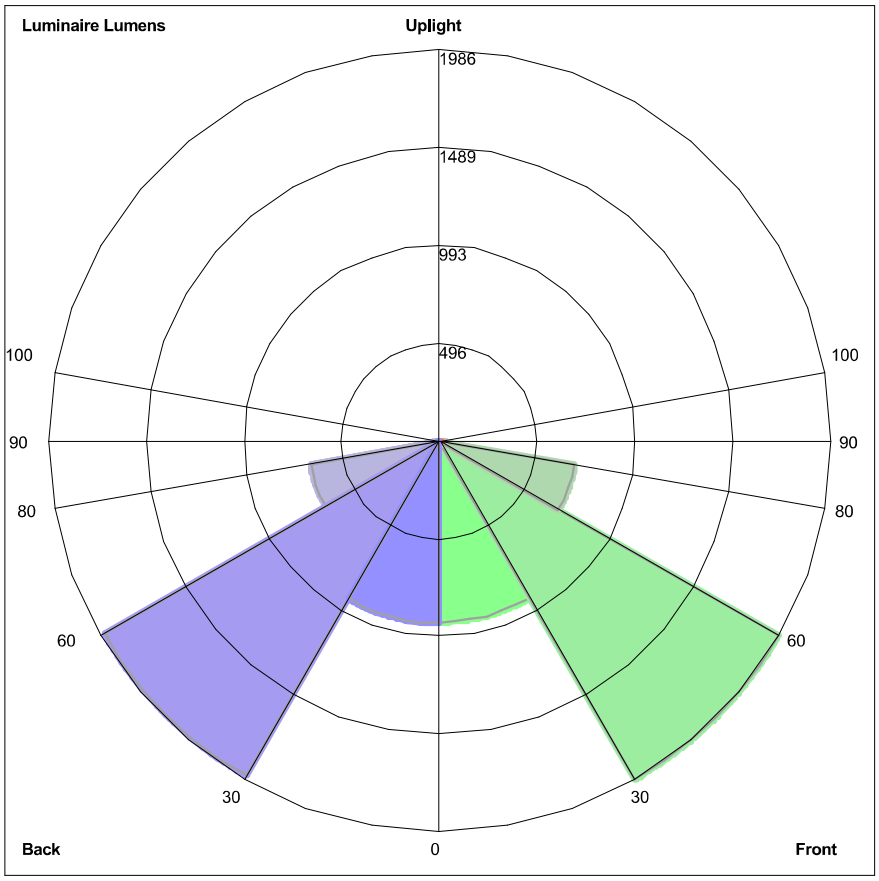




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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL4 UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=921.0, Medium=1985.6, High=698.7, Very High=29.2
Back: Low=925.1, Medium=1963.4, High=664.7, Very High=26.5
Uplight: Low=4.7, High=1.2

BUG Rating : B2-U1-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type E

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%

Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5



Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

ⒶOne year warranty.

ⒷRefer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

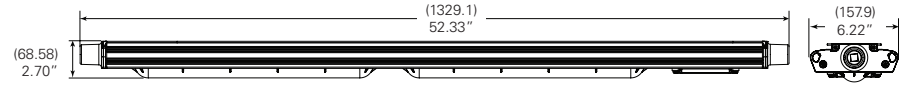
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

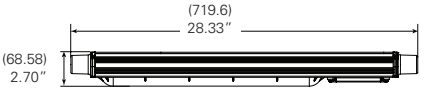
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

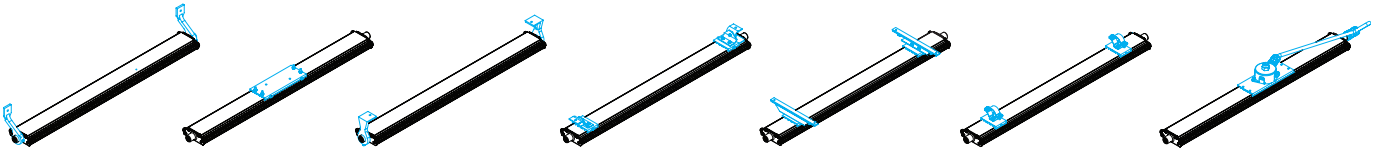
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

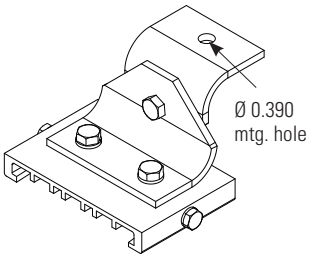
For land-based drilling

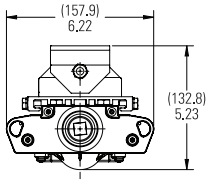
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

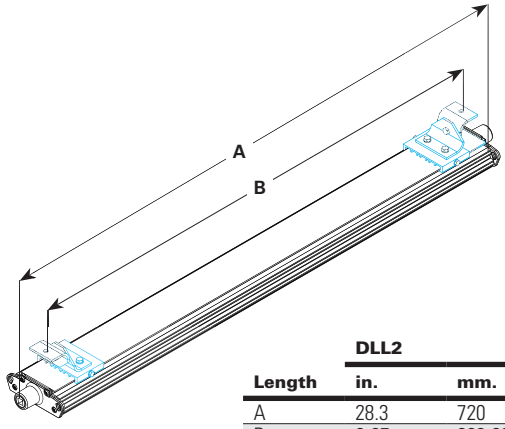
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

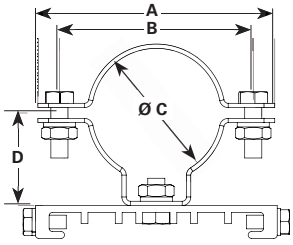




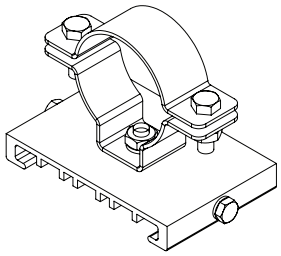


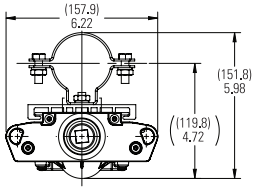
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

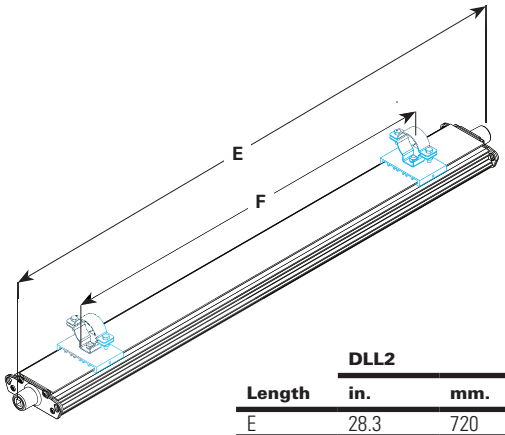
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

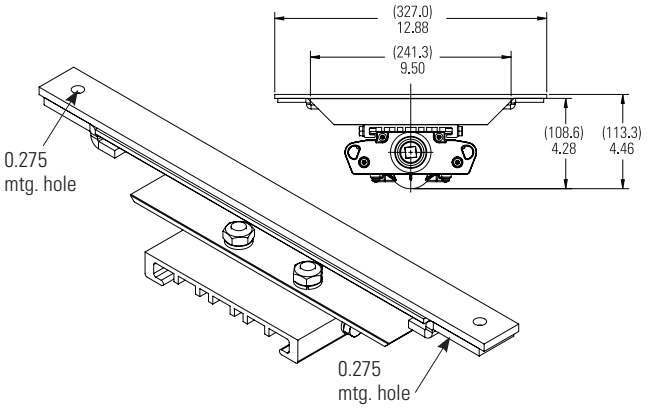


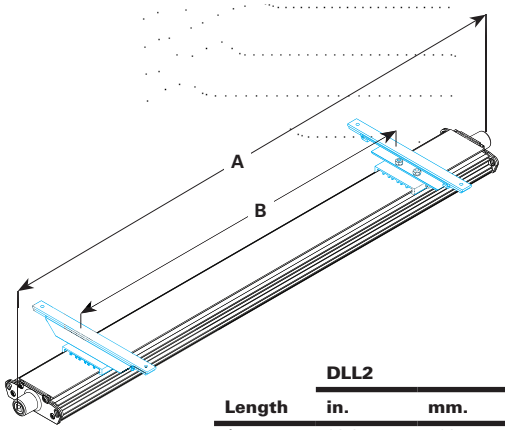




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



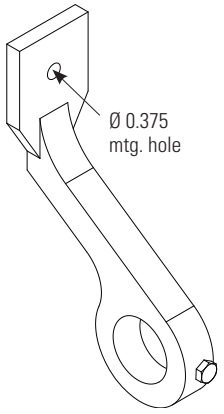


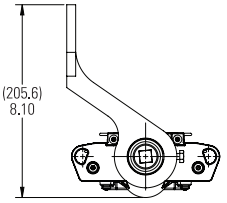
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

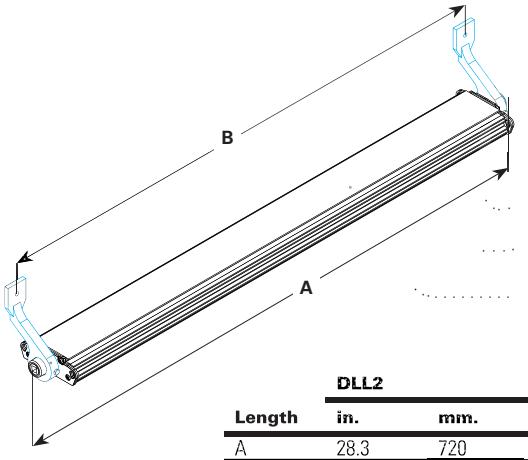
Copyright© 2019 Eaton

Mounting options (continued):

Offset wall
DP1052MTK

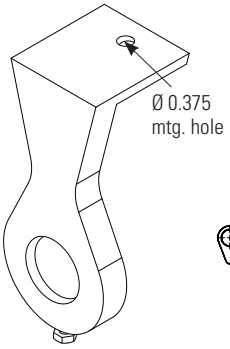


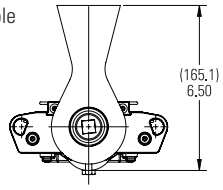


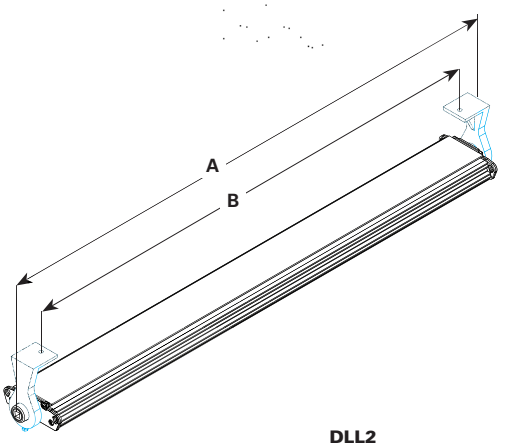


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

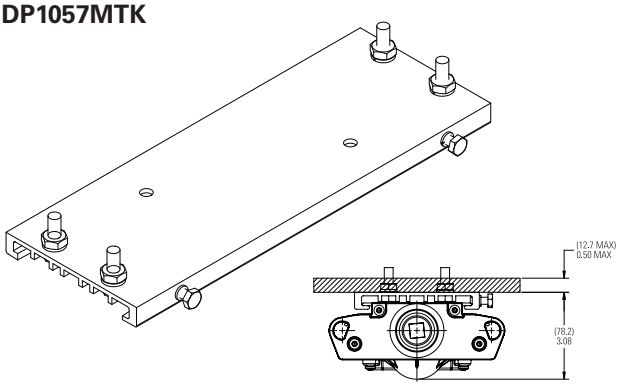


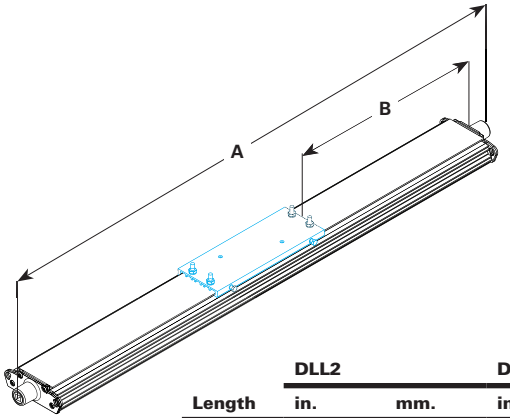




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



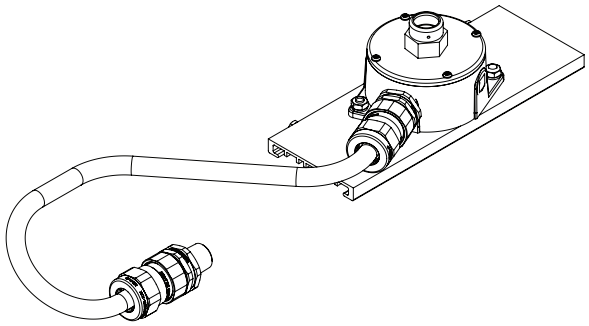


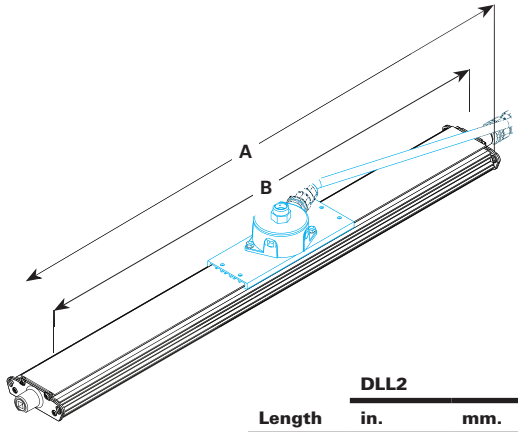
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

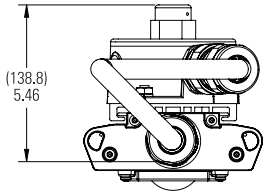
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Mounting options (continued):

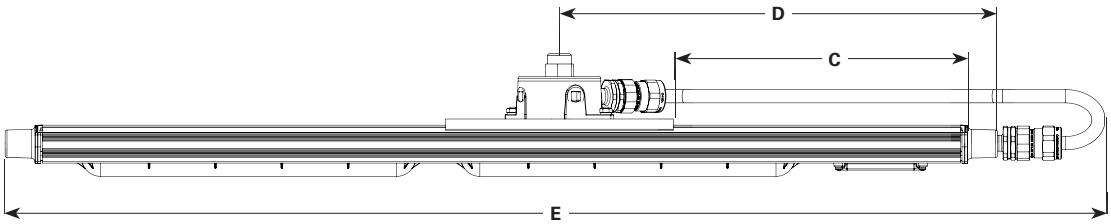
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

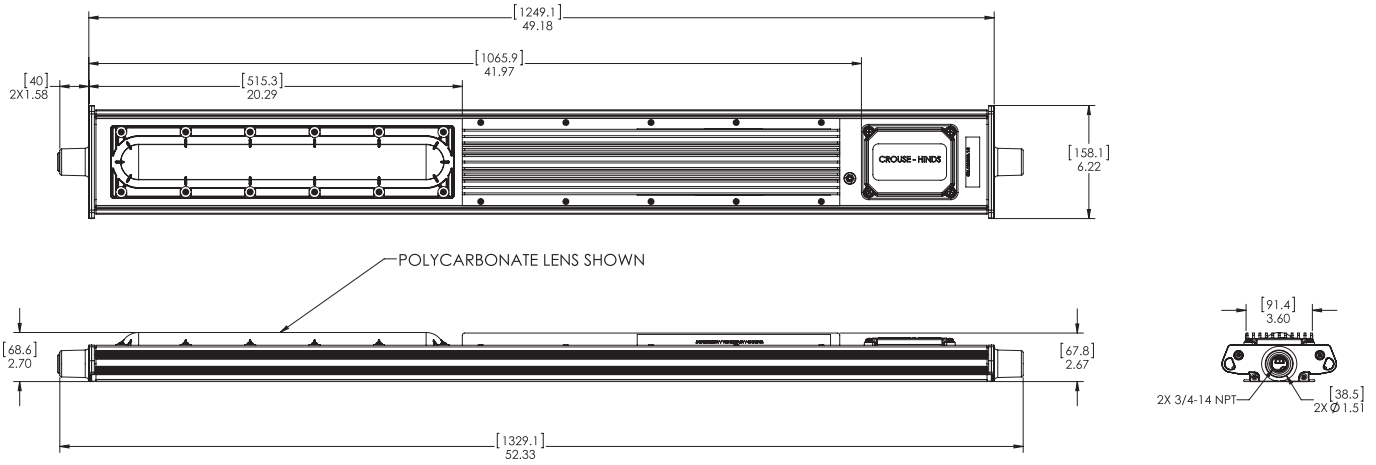
Temperature performance data:

				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

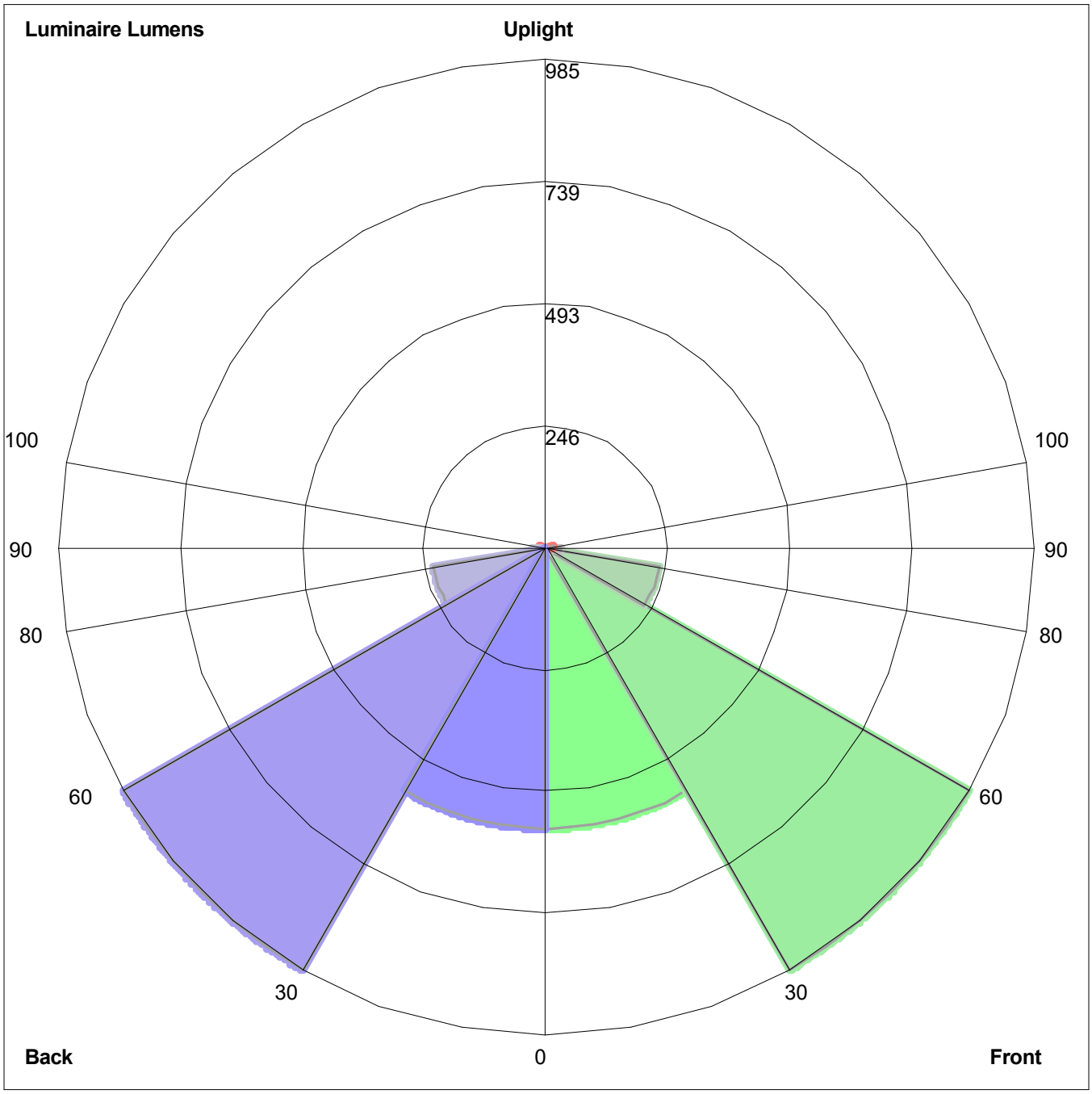
Dimensions:



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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL2-UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Back: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Uplight: Low=12.8, High=0.3

BUG Rating : B2-U2-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type F



Mounting: Vertical Green LED Heat Trace End Seal Kit

Mounting Height: Piping Height Varies.

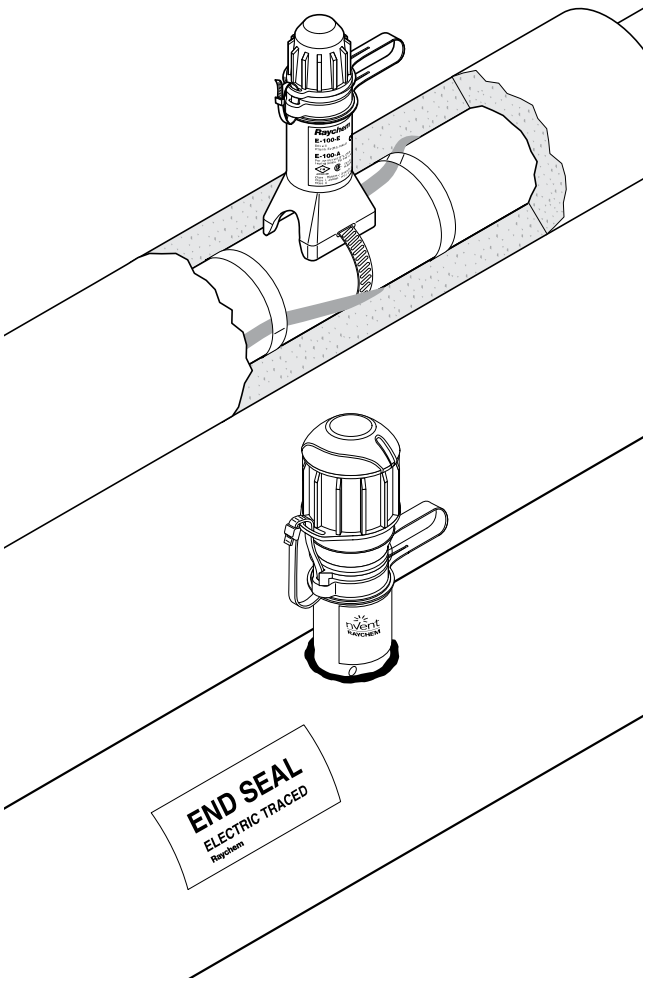
Part Number: E-100-L-A

Manufacturer: Raychem

Wattage: 2 watts at 60 Lumens/watt LED. 120 Lumens per end seal

E-100-E AND E-100-L-E

END SEAL AND LIGHTED END SEAL



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTV, KTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

KIT CONTENTS

	E-100-E	E-100-L-E
	1 end seal 1 cable tie 1 polywater sachet 1 installation instruction	1 end seal with indicator light 1 cable tie 1 polywater sachet 2 insulated parallel crimps 1 core sealer 1 installation instruction

APPROVAL DATA

Area of use	Hazardous or ordinary (indoors and outdoors)

APPROVALS

E-100-E	E-100-L-E
PTB 09 ATEX 1060 U Ⓔx II 2G Ex e II II 2D Ex tD A21 IP66 IECEx PTB 09.0038U Ex e II Ex tD A21 IP66 SP Ex e II T*	Sira 14ATEX3015X Ⓔx II 2GD Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C IECEx SIR 14.0007X Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C FM CLI, ZN1, AEx e mb IIC T* Gb (1) ZN21 AEx tb IIIC T* SP Ex e mb IIC T* Gb Ex tb IIIC T***°C Db

DNV Certificate No. E-11564 and E-11565
*For T-rating, see heating cable or design documentation
(1) Except VPL

EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"
EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"

PRODUCT SPECIFICATIONS

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	480 V*	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	−50°C to +56°C*	−40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the summary the certificate or installation instructions for full details.	
Min. installation temperature	−50°C	−40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

LIGHT SOURCE

Type	Green LEDs
Voltage rating range	110-277 Vac, 50/60 Hz
Power consumption	< 2 W
Electromagnetic immunity/emissions	Complies with IEC61000-6 and IEC61000-4

INSTALLATION DATA

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers

ORDERING DETAILS

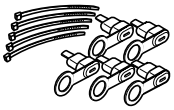
End seal		
Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied) PTB, DNV and EAC approved product

ACCESSORIES

Small pipe adaptor	JBS- SPA, required for pipes ≤ 1" (DN 25), E 90515-000 (bag of 5 adaptors)

SPARE PART

Boot pack for E-100-E



Part description	E-100-BOOT-5-PACK
PN (Weight)	281053-000 (140 g)
Pack size	5 sealant filled boots and 5 cable ties

Replacement indicator light for E-100-L

Part description:	E-100-LR-E
PN	P000001586

North America
Tel +1.800.545.6258
Fax +1.800.527.5703
thermal.info@nVent.com

Europe, Middle East, Africa
Tel +32.16.213.502
Fax +32.16.213.604
thermal.info@nVent.com

Asia Pacific
Tel +86.21.2412.1688
Fax +86.21.5426.3167
cn.thermal.info@nVent.com

Latin America
Tel +1.713.868.4800
Fax +1.713.868.2333
thermal.info@nVent.com

nVent

nVent.com

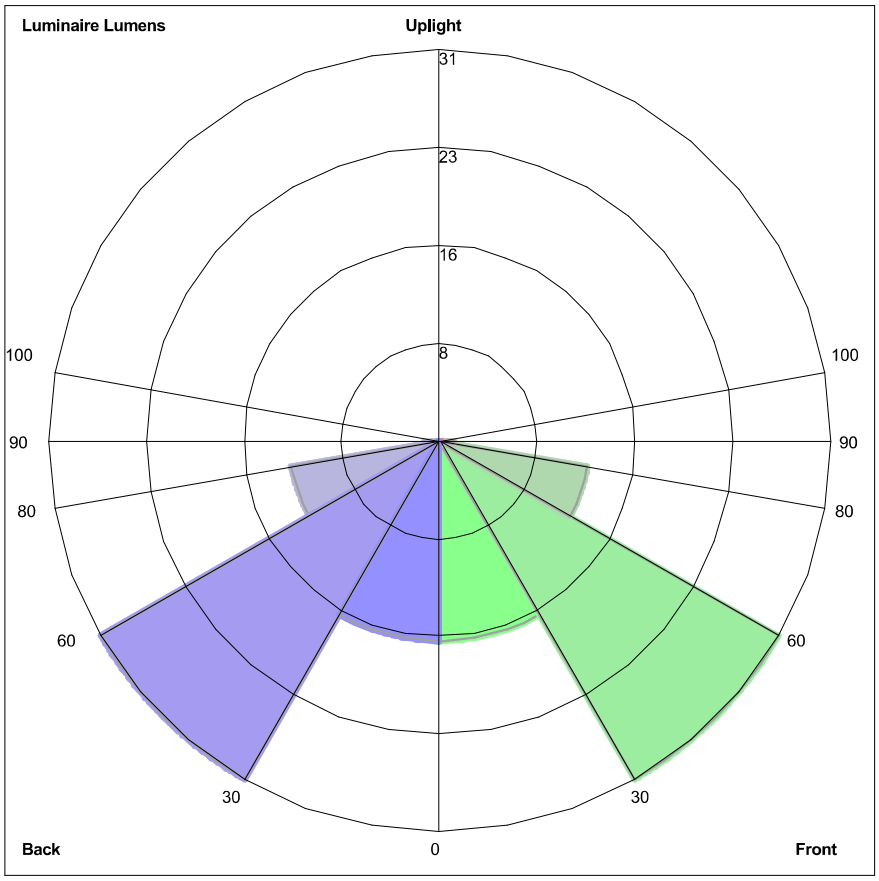
Our powerful portfolio of brands:
CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER

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nVent reserves the right to change specifications without notice.

RAYCHEM-DS-EU1421-E100EE100LE-EN-1911

IES ROAD REPORT
PHOTOMETRIC FILENAME : APPROXIMATION RAYCHEM END KITS.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH

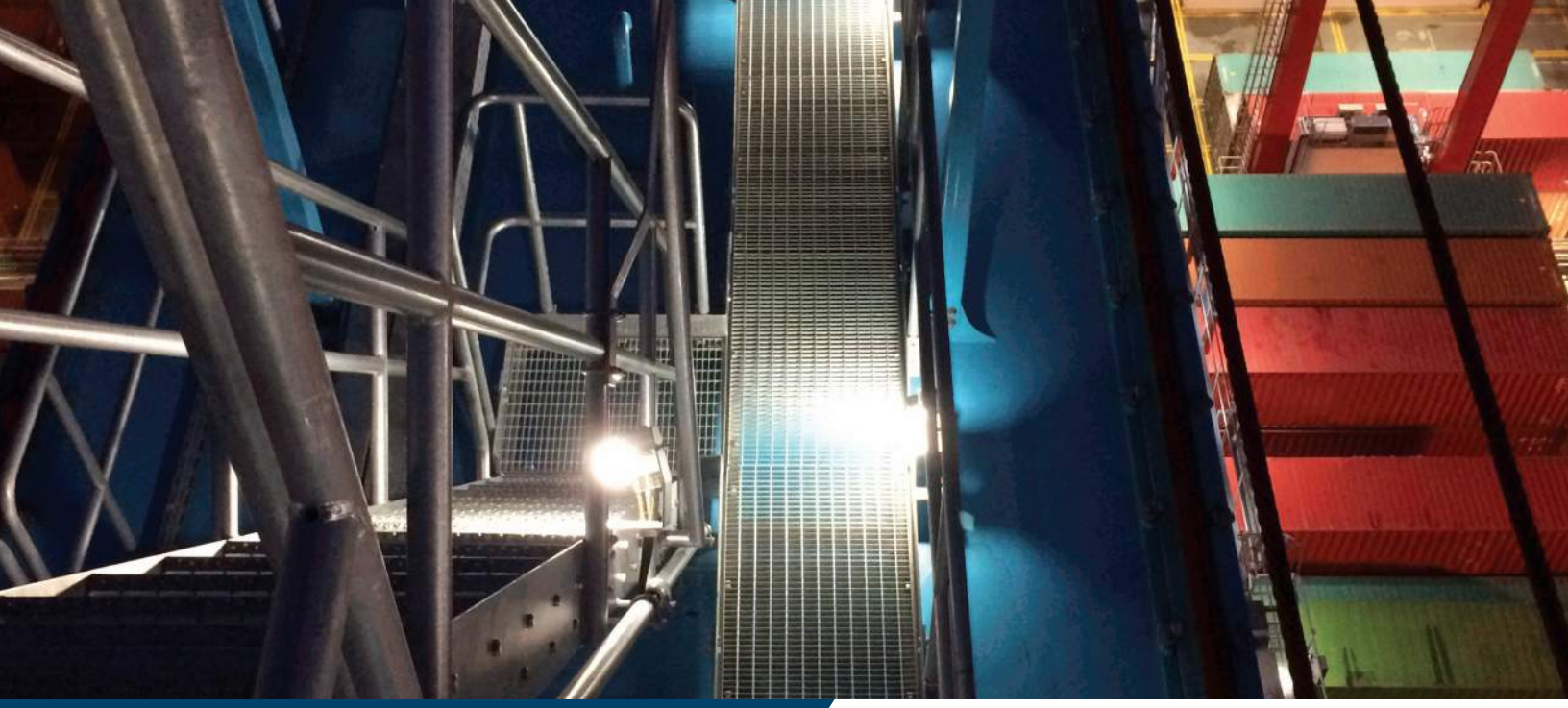


Luminaire Lumens:
Front: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Back: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type G



PHOENIX®
DURABILITY X DESIGN™

Cube-Light

Compact LED Area Light



Australian Design No. 359170
US Patent No. D762,321 S

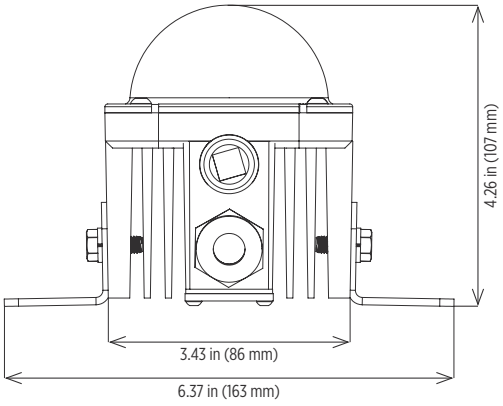
Delivers up to 1000 lumens to doorways, walkways, cabins or other small areas

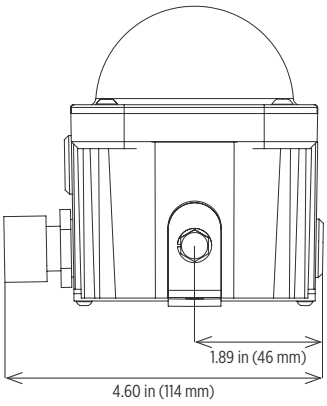
Competitive pricing with short lead times

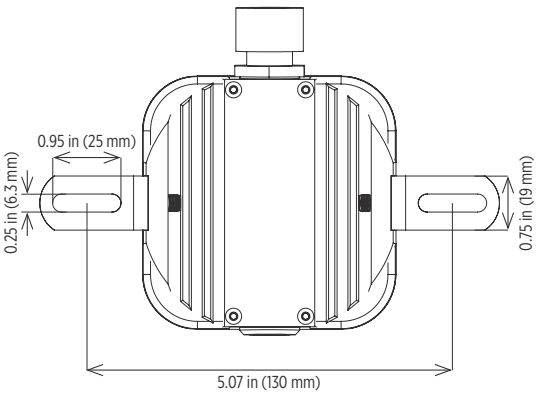
Various mounting options for maximum versatility

LED technology increases efficiency, eliminates maintenance and supports green initiatives

Dimensions







Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Cube-Light

Compact LED Area Light

Specifications

Construction	Cast aluminum housing
Finish	White thermoset powder coat
Hardware	Marine grade (316) stainless steel
Lens	Impact-resistant, diffuse polycarbonate Diffuse red, green, blue and amber lens accessories available (AMB-CL, BLU-CL, GRN-CL, RED-CL)
Light source	13W, up to 1000 lumens Conformal coated CRI ≥ 70 CCT 5000K 50,000 hour rated life
Power source	120-240V, 50/60Hz 240V, 50/60Hz 13-27V DC
Wiring	Stranded wires Cord not included - standard 72.00 inch (1829 mm) cord with pigtail option (CD) NEMA 5-15 plug (120V only) sold separately (PLG-515)
Through wiring	Continuous row mounting option (TW)
Ambient operating temperature	-30°C to +50°C
Mounting	Flush mount brackets - standard Harp mount available Rail mount available - 2.00 inch overall diameter Fixture can be mounted in any orientation
Weight	2.0 lb (0.9 kg)
Warranty	3 years

For IES files, see website or contact factory

Compliances

ETL/cETL Listed to:

- UL 1598 Suitable for Wet Locations
- UL 1598A Marine Outside Type (Saltwater)
- CSA C22.2 No. 250.0

CE
ABS
IP66 rated
LM79 and LM80 reports available



The Cube-Light on an STS crane

Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Ordering Information

Example: CL-13LED-120-240

Fixture	Wattage/Type	Voltage	Options
CL	13LED	120-240 [1,2]	CD
		240 [2]	TW
		DC [3]	

Wattage/Type

13LED	13W, up to 1000 lumens

Voltage

120-240 [1,2]	120-240V, 50/60Hz
240 [2]	240V, 50/60Hz
DC [3]	13-27V DC

Options

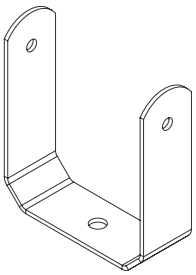
CD	72.00 inch (1829 mm) cord with pigtail option
TW	Continuous row mounting

Notes

1	ETL/cETL listed
2	CE
3	No certifications

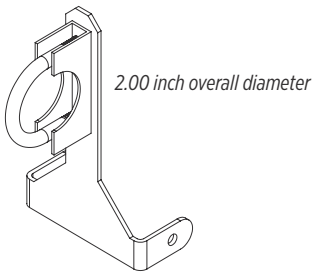
Special Projects: We may be able to accommodate your special projects, so please don't hesitate to ask about additional options. Minimum order quantities and/or extended lead times will apply. Contact your Phoenix representative with specific inquiries.

Mounting (order separately)



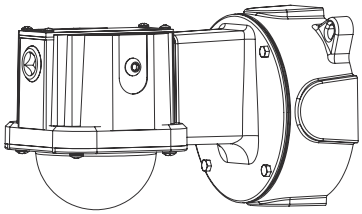
Harp Mount

HRP-CL



Rail Mount

RLMT-CL
Contact factory

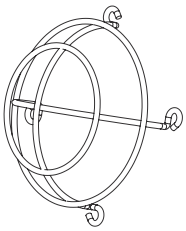


Wall Mount

Complete fixture sold separately
Refer to Cube-Light Wall Mount spec sheet

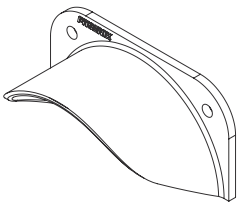
Flush mount comes standard with fixture

Accessories (order separately)



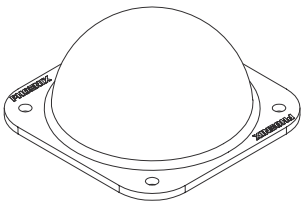
Wire Guard Kit

WG-CL



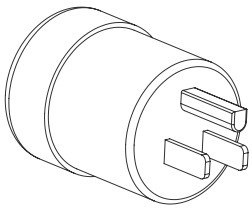
Visor Kit

VSR-CL



Color Lens Kits

AMB-CL	amber lens kit
BLU-CL	blue lens kit
GRN-CL	green lens kit
RED-CL	red lens kit

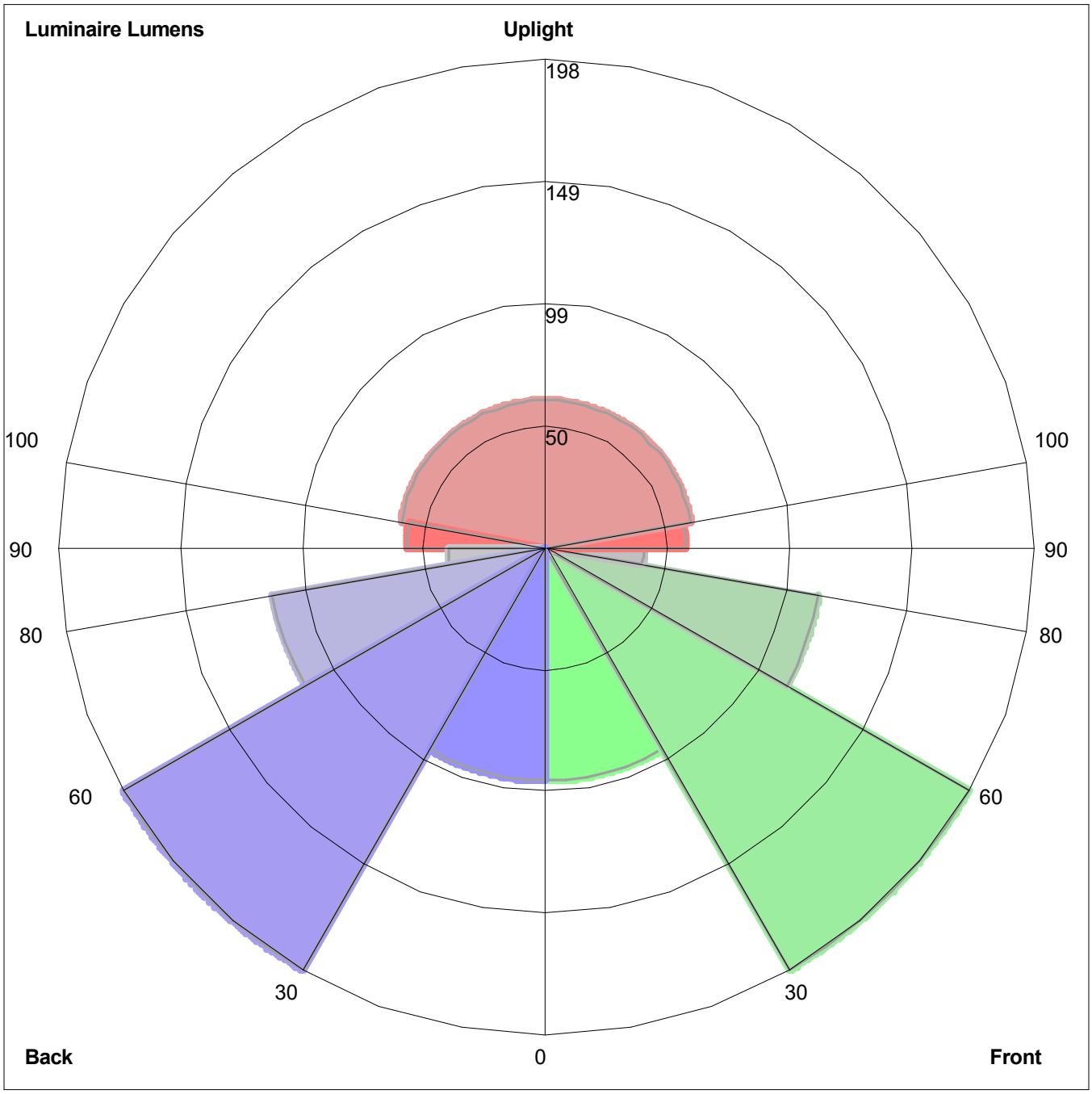


NEMA 5-15 plug (120V only)

PLG-515

IES ROAD REPORT
PHOTOMETRIC FILENAME : CL-13LED (CUBE 120V ITL TESTED).IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Back: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Uplight: Low=56.4, High=59.7

BUG Rating : B1-U3-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Section 12

Noise Mitigation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Columbine 4-29HZ Pad - Noise Mitigation and Monitoring Plan

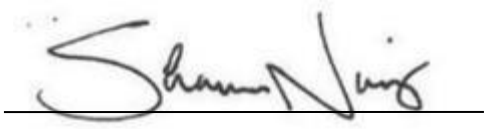
June 28, 2021

Prepared for:

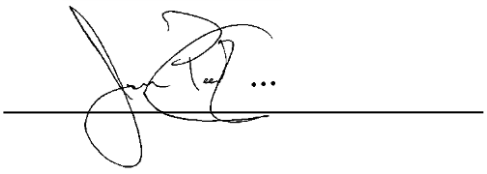
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1. Executive Summary

The following Noise Mitigation and Monitoring Plan (NMP) was prepared by Behrens and Associates Environmental Noise Control (BAENC) for the planned operations associated with the proposed Columbine 4-29HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG). Predictive noise models representing the planned operations for the site were developed and assessed against the maximum permissible noise levels described in Rule 423 of the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The following tasks were completed during development of the NMP:

- Completion of a 4-location, 72-hour ambient sound level survey at the site
- Development of a site-specific drilling noise model representing the Precision 461 rig
- Development of a site-specific completions noise model representing a Haliburton Quiet Fleet crew
- Development of a site-specific production noise model

The ambient sound level survey was conducted to document the existing ambient sound levels at the site and determine if an increase in maximum permissible sound levels was appropriate per Rule 423.d.(2).

The site-specific noise models were developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the COGCC and CDA maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, buildings, barriers, and ground cover. Both A-weighted (dBA) and C-weighted (dBC) noise levels were measured during the ambient survey and considered during the noise modeling assessment.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

Additionally, the area surrounding the site was evaluated to establish noise points of compliance per Rule 423.a.(5). The need for continuous noise monitoring was also evaluated per Rule 423.c.(1) and the CDA. Table 1-1 below summarizes the analysis and mitigation findings in the noise mitigation and monitoring plan and presents them in the form of best management practices.

Table 1-1 Site Mitigation and Best Management Practices

Task	Result of Analysis/Recommended Action
Ambient Survey	• Ambient survey conducted to document noise levels in area around the site (May 2021) • Max permissible noise levels adjusted

Drilling Noise Model	• Developed noise model representing drilling to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Optional perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad
Completions Noise Model	• Developed noise model representing completions to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad
Production Noise Model	• Developed noise model representing production to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Noise mitigation not recommended
Land Use Evaluation	• Residential building units located within 2,000 ft • Planned Unit Development zoning (Firestone)
Continuous Monitoring Evaluation	• Noise points of compliance proposed (where applicable) • Continuous monitoring proposed at 3 locations

Based on the noise modeling analysis, with the implementation of the best management practices outlined in Table 1-1, the drilling, completions, and production operations are predicted to comply with the COGCC dBA and dBC noise limits and associated requirements of the Firestone CDA.

2. Introduction

The following report provides a noise modeling assessment of the proposed activities at the Columbine 4-29HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG) in relation to the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The assessment includes a modeling analysis of the Precision 461 production rig, Halliburton Quiet Fleet completion crew and Columbine 4-29HZ production facility. The Columbine 4-29HZ pad (40.114122, -104.917317) is located approximately 0.3 miles southeast of the intersection of County Road 18 and County Road 15, Colorado as shown in Figure 2-1. The Weld County GIS portal indicates that the parcel in question, parcel # 131129200002, has been assigned a zoning designation of Planned Unit Development (PUD) by Firestone, and an image depicting the parcel as defined by Weld County is shown in Figure 2-2 below.

To assess the operational noise levels of the proposed Columbine 4-29HZ pad, file noise level data previously measured and typical of the Precision 461 production rig, and Halliburton Quiet Fleet completion crew and production facility equipment were utilized in the noise modeling. The noise models were developed using SoundPLAN 8.1 software.

PD 461 drilling operations are scheduled to occur for 75 days, Haliburton completions operations are scheduled to occur for 45 days, flowback operations are scheduled to occur for 48 days and production operations are scheduled to occur for 360 months.

The following is provided in this report:

- Documentation of ambient sound level survey results
- A review of applicable COGCC noise standards and the CDA with the Town of Firestone
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to the COGCC noise limits
- Proposed continuous noise monitoring procedure

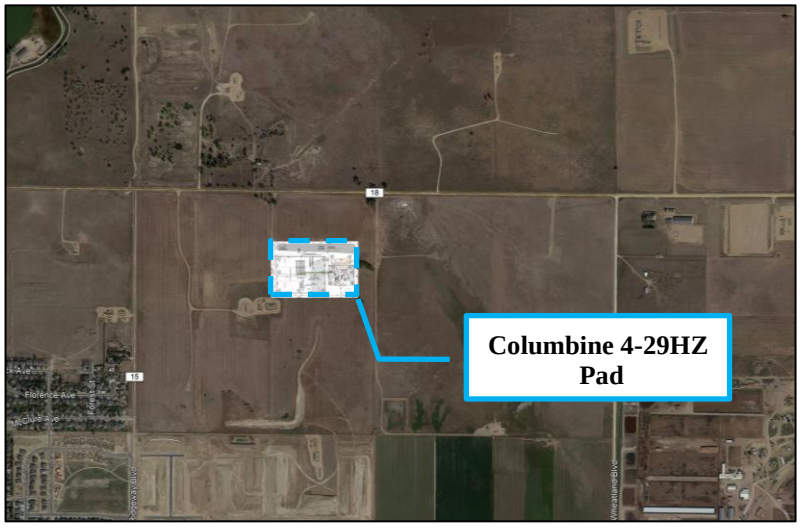


Figure 2-1 Columbine 4-29HZ Pad Location

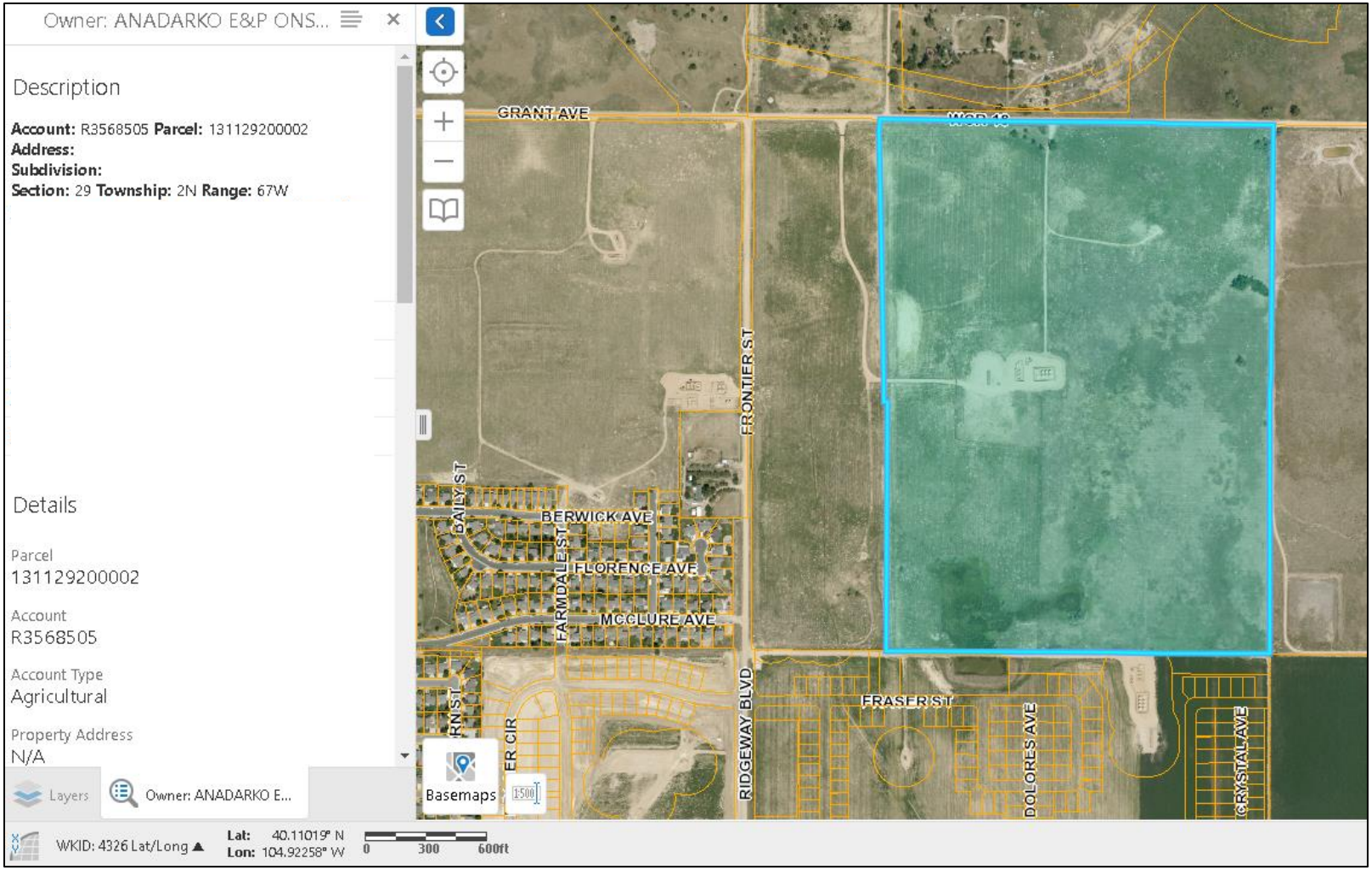


Figure 2-2 Weld County Geographic Information Systems (GIS) Parcel # 131129200002

3. Noise Fundamentals

Sound is most commonly experienced by people as pressure waves passing through air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. The rate at which sound pressure changes occur is called the frequency. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear range from approximately 20 Hz to 20,000 Hz. Toward the lower end of this range are low-pitched sounds, including those that might be described as a “rumble” or “boom”. At the higher end of the range are high-pitched sounds that might be described as a “screech” or “hiss”.

Environmental noise generally derives, in part, from a combination of distant noise sources. Such sources may include common experiences such as distant traffic, wind in trees, and distant industrial or farming activities. These distant sources create a low-level "background noise" in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment but varies slowly from hour to hour as natural forces change or as human activity follows its daily cycle.

Superimposed on this low-level, slowly varying background noise is a succession of identifiable noisy events of relatively brief duration. These events may include the passing of single-vehicles, aircraft flyovers, screeching of brakes, and other short-term events. The presence of these short-term events causes the noise level to fluctuate. Typical indoor and outdoor A-weighted sound levels are shown in Figure 3-1.

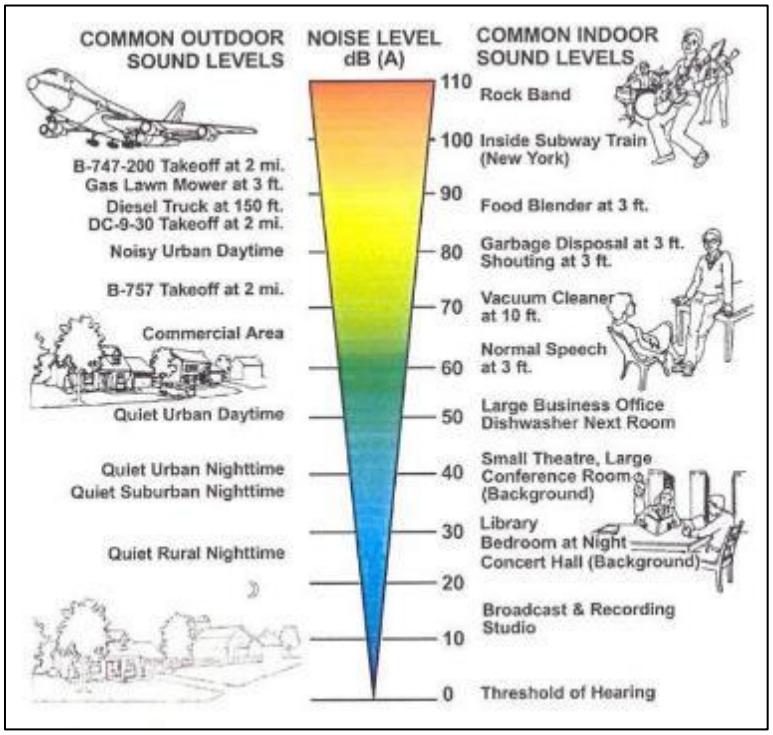


Figure 3-1 Typical Indoor and Outdoor A-Weighted Sound Levels

4. Noise Standards

The pad is located in Firestone in the state of Colorado and is subject to the regulations of the Colorado Oil and Gas Conservation Commission (COGCC) and the Cooperative Development Agreement with the Town of Firestone. The COGCC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423.

4.1 Colorado Oil and Gas Conservation Commission (COGCC)

The COGCC Code lists noise limits for oil and gas operations. "All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423." The noise limits are provided in Table 4-1.

Table 4-1 COGCC Table 423-1 – Maximum Permissible Noise Levels

Zone	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential / Rural / State Parks & State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2):

(2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:

A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 db(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(A) in the hours between 7:00 a.m. to 7:00 p.m.; and

B. In all zones maximum permissible noise levels will be 65 db(C) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(C) in the hours between 7:00 a.m. to 7:00 p.m.

To demonstrate compliance with the sound level limits, Rule 423.c.(2).A states:

> A. In response to a complaint or at the Director's request, Operators will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dbC) indicated issues. For high frequency (dbA) measurement will be at the nearest point of compliance. For equipment installed at Oil and Gas Locations subject to a Form 2A approved prior to January 15, 2021, after the Commencement of Production Operations, no single piece of equipment will exceed the maximum permissible noise levels listed in Table 423-1 as measured at a point 350 feet from the equipment generating the noise in the direction from which the complaint was received.

Defining noise points of compliance, Rule 423.a.(5) states:

> (5) For proposed Oil and Gas Locations with a Working Pad Surface within 2,000 feet of one or more Residential Building Units, at least one, and no more than six noise points of compliance where monitors will be located. Operators will identify noise points of compliance using the following criteria:
>
> A. Provide one noise point of compliance in each direction in which a Residential Building Unit is located within 2,000 feet of the proposed Working Pad Surface.
>
> B. Noise points of compliance will be located at least 350 feet from the Working Pad Surface, and no less than 25 feet from the exterior wall of the Residential Building Unit that is closest to the Working Pad Surface. If a Surface Owner or tenant refuses to provide the Operator with access to install a noise monitor, then the noise point of compliance will be located at either the next-closest Residential Building Unit or an alternative location approximately the same distance and direction from the Working Pad Surface.

With regards to adjusting maximum permissible noise levels based on measured ambient sound levels, Rule 423.d. states:

> d. Cumulative Noise. All noise measurements will be cumulative.
>
> (1) Noise measurements taken at noise points of compliance designated pursuant to Rule 423.a.(5) will take into account ambient noise, rather than solely the incremental increase of noise from the facility targeted for measurement.
>
> (2) At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m. This Rule 423.d.(2) does not allow Operators to increase noise above the maximum cumulative noise thresholds specified in Table 423-2 after the Commencement of Production Operations.

(3) After the Commencement of Production Operations, if ambient noise levels already exceed the maximum permissible noise thresholds identified in Table 423-1, under no circumstances will new Oil and Gas Operations or a significant modification to an existing Oil and Gas Operations raise cumulative ambient noise above:

Table 423-2 – Maximum Cumulative Noise Levels

LAND USE	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential /Rural/State Parks/State Wildlife Areas	65 db(A)	60 db(A)
Commercial/Agricultural	70 db(A)	65 db(A)
Light Industrial	80 db(A)	75 db(A)
Industrial	90 db(A)	85 db(A)
All Zones	75 db(C)	70 db(C)

4.2 Cooperative Development Agreement (CDA)

Kerr-McGee Oil & Gas Onshore, LP (KMOG) and the Town of Firestone have entered into a Cooperative Development Agreement (CDA) to develop and implement a Noise Mitigation and Monitoring Plan. The Operational Standards identified in the CDA state:

(2) **Noise Mitigation**. To reduce the noise effects of the Town and its residents during drilling, and provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at last 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

4.3 Summary of COGCC Maximum Permissible Noise Levels

Notwithstanding any influence or adjustments due to ambient noise or maximum cumulative noise levels of Rule 423 – Table 423-2, based on COGCC Rule 423, the allowable noise level limits applicable to the site are as follows:

Table 4-2 Unadjusted Maximum Permissible Noise Levels

Operation	Applicable Zoning	Noise Limits (dBA)	Noise Limits (dBC)
Drilling	Agricultural/Commercial	65 day / 60 night	65 day and night
Completions	Agricultural/Commercial	65 day / 60 night	65 day and night
Production	Agricultural/Commercial	60 day / 55 night	60 day and night

5. Ambient Sound Level Survey

5.1 Ambient Sound Level Survey Procedure

Four Type 1 SVANTEK SVAN 971 sound level meters were utilized to conduct an ambient sound level survey adjacent to the Columbine 4-29HZ pad. The sound level meters conform to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meters were calibrated prior to deployment. The sound level monitoring period began on Friday, April 30, 2021 with the meters programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, May 3, 2021. The locations of the sound level meters and weather station used to conduct the ambient sound level survey can be seen in Figure 5-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

Per COGCC Rule 423.c.(2), the measurements were conducted at an approximate height of 5 feet. When calculating the ambient average sound levels shown in Table 5-1 and Table 5-2, the weather data collected during the survey was used to exclude periods from the calculation when winds exceeded 5 mph. The graphed ambient survey results show the measurement data before periods of wind above 5 mph were removed.

5.2 Ambient Sound Level Survey Results

The measured A-weighted and C-weighted hourly average Leq for each monitoring location can be seen in Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5, respectively. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1 and 2 are shown in Table 5-1 below. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 3 and 4 are shown in Table 5-2 below.

Table 5-1 Ambient Sound Level Survey Results for Monitoring Locations 1 & 2

Day	Location 1				Location 2			
	Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels		Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	52	72	47	61	53	66	47	59
2	52	70	46	65	51	66	45	62
3	53	65	51	63	52	66	48	61
4	54	62	-	-	54	62	-	-
Overall L_{eq}	52	70	48	63	52	66	47	61

Note: Day 1 Daytime is an L_{eq} from 12pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 1pm.

Table 5-2 Ambient Sound Level Survey Results for Monitoring Locations 3 & 4

Day	Location 3				Location 4			
	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	59	67	52	62	50	74	42	67
2	57	78	57	82	56	73	53	75
3	60	86	58	84	57	73	46	73
4	59	74	-	-	62	75	-	-
Overall Leq	59	81	55	80	56	74	50	72

Note: Day 1 Daytime is an L_{eq} from 12pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 1pm.

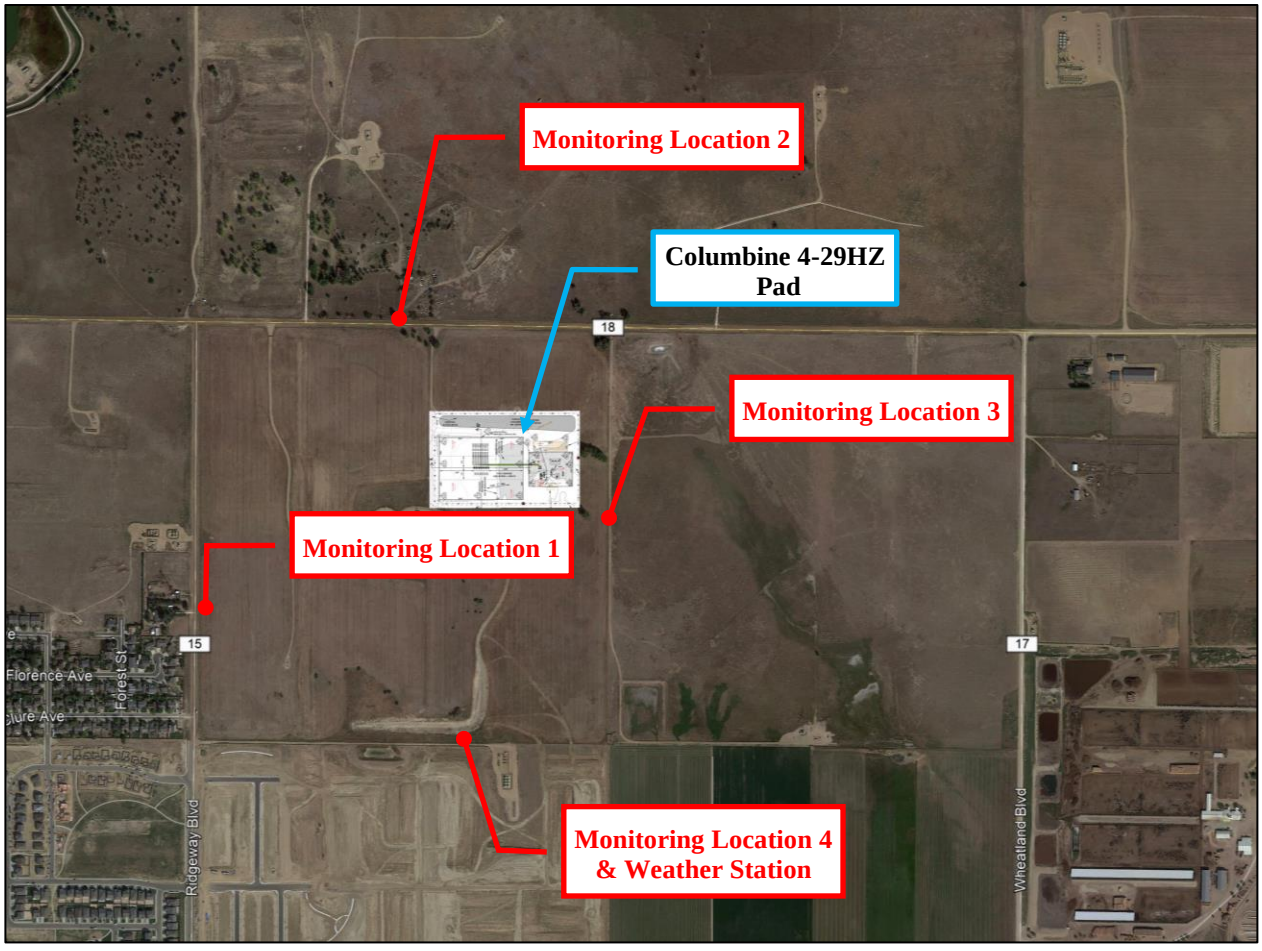


Figure 5-1 Ambient Monitoring Locations

5.3 Maximum Adjusted Noise Levels

The measured ambient sound levels already exceed the maximum permissible noise thresholds identified in COGCC Table 423-1 at multiple locations. Based on COGCC Rule 423.d.(2), for drilling and completions operations, the operational noise levels at the site will be limited to the measured ambient noise level plus 5 dBC during nighttime and 7 dBC during daytime. The following table presents the adjusted allowable noise levels for the site.

Table 5-3 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Drilling and Completions (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 3 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	81/80 dBC	88/85 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	74/72 dBC	81/77 dBC

Table 5-4 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	70/63 dBC	75/68 dBC
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	66/61 dBC	73/66 dBC
Location 3 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 3)	81/80 dBC *	75/70 dBC *
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	74/72 dBC	75/70 dBC

Note: Maximum adjusted production cumulative noise levels capped at 75/70 day/night dBC
* Maximum adjusted cumulative noise levels at location 3 are below the measured ambient noise levels.

The drilling, completions, and production operations are planned to occur 24 hours a day, as such, the stricter nighttime allowable level will be utilized in the noise modeling analysis.

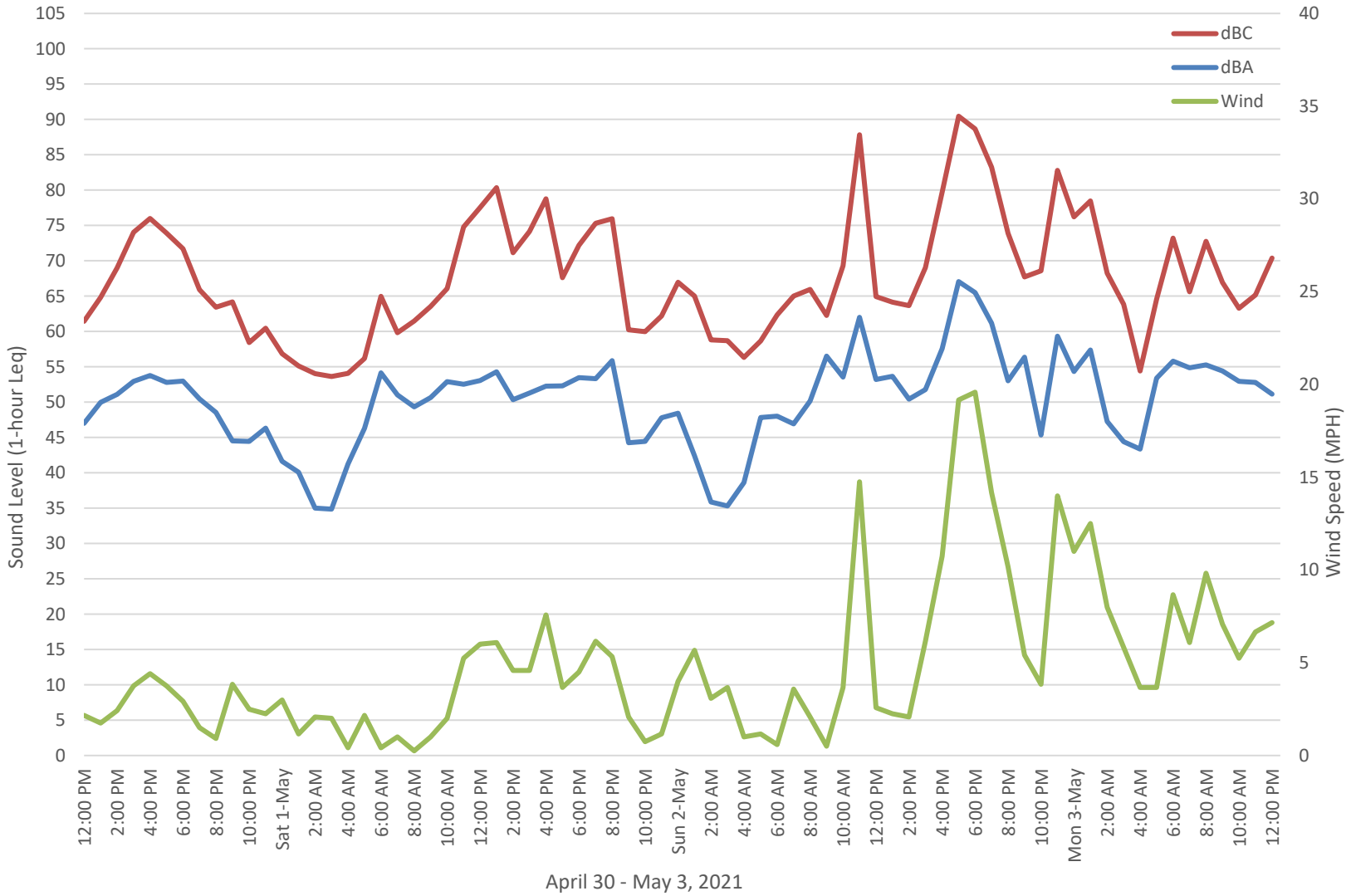


Figure 5-2 Ambient Sound Level Data for Measurement Location 1

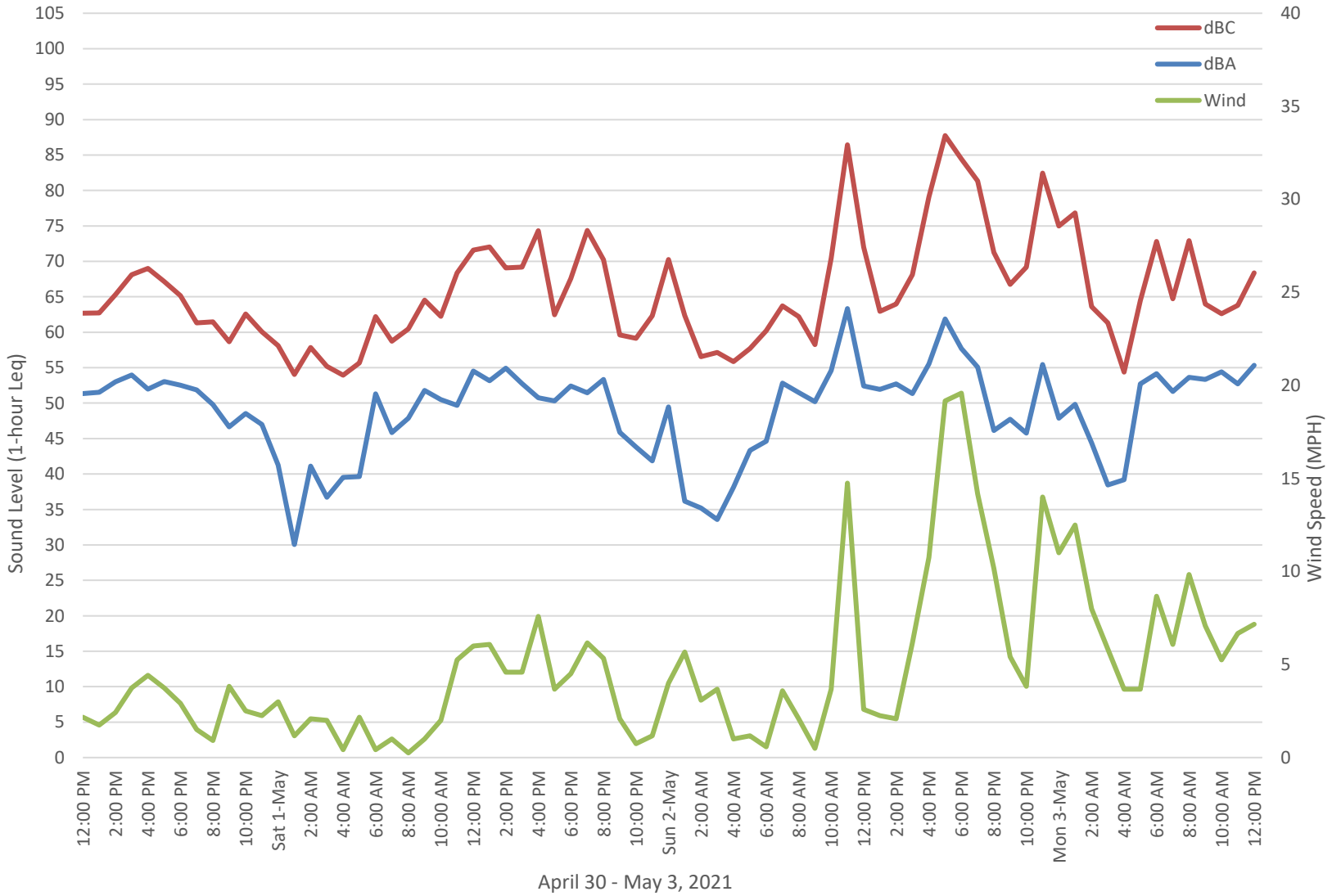


Figure 5-3 Ambient Sound Level Data for Measurement Location 2

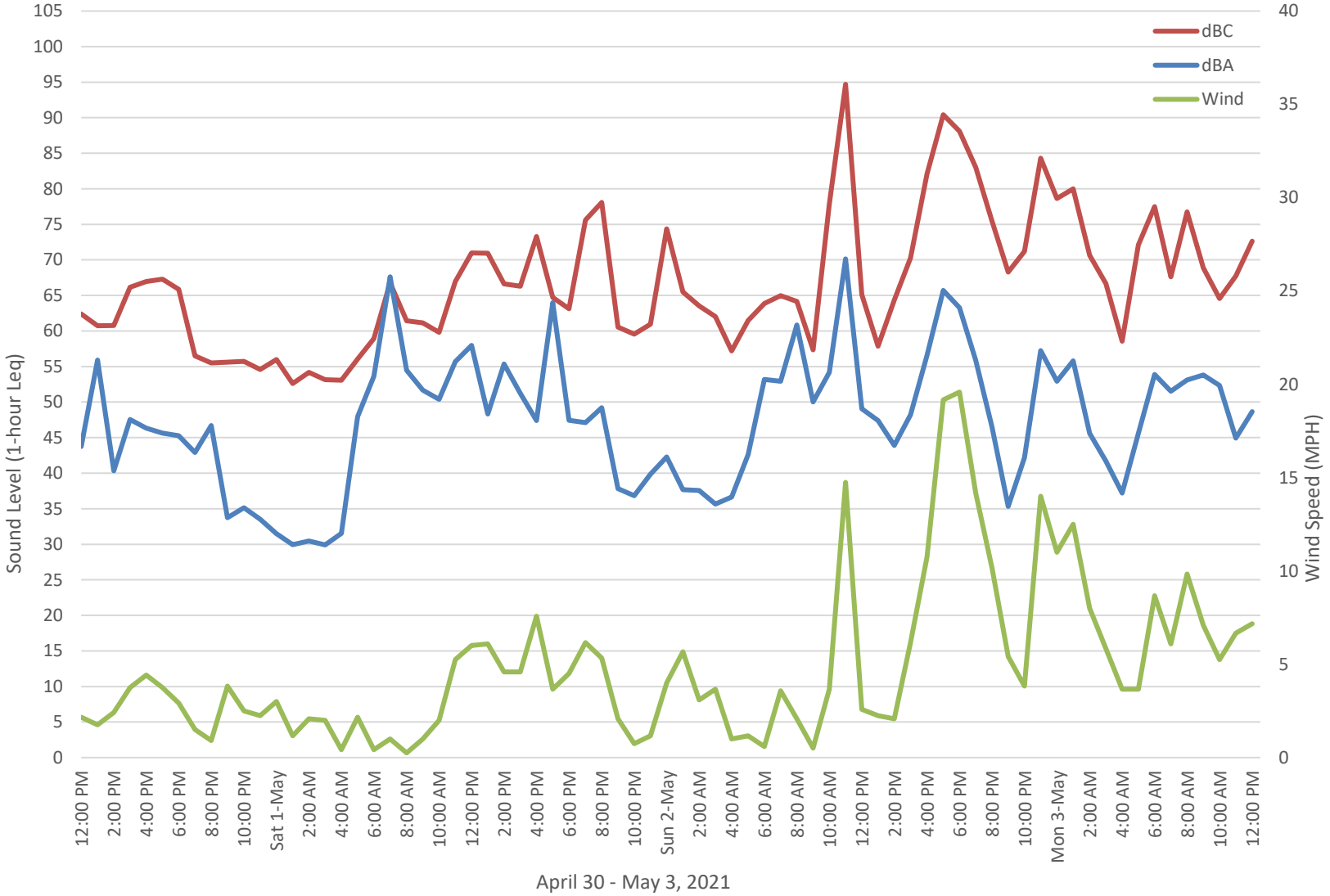


Figure 5-4 Ambient Sound Level Data for Measurement Location 3

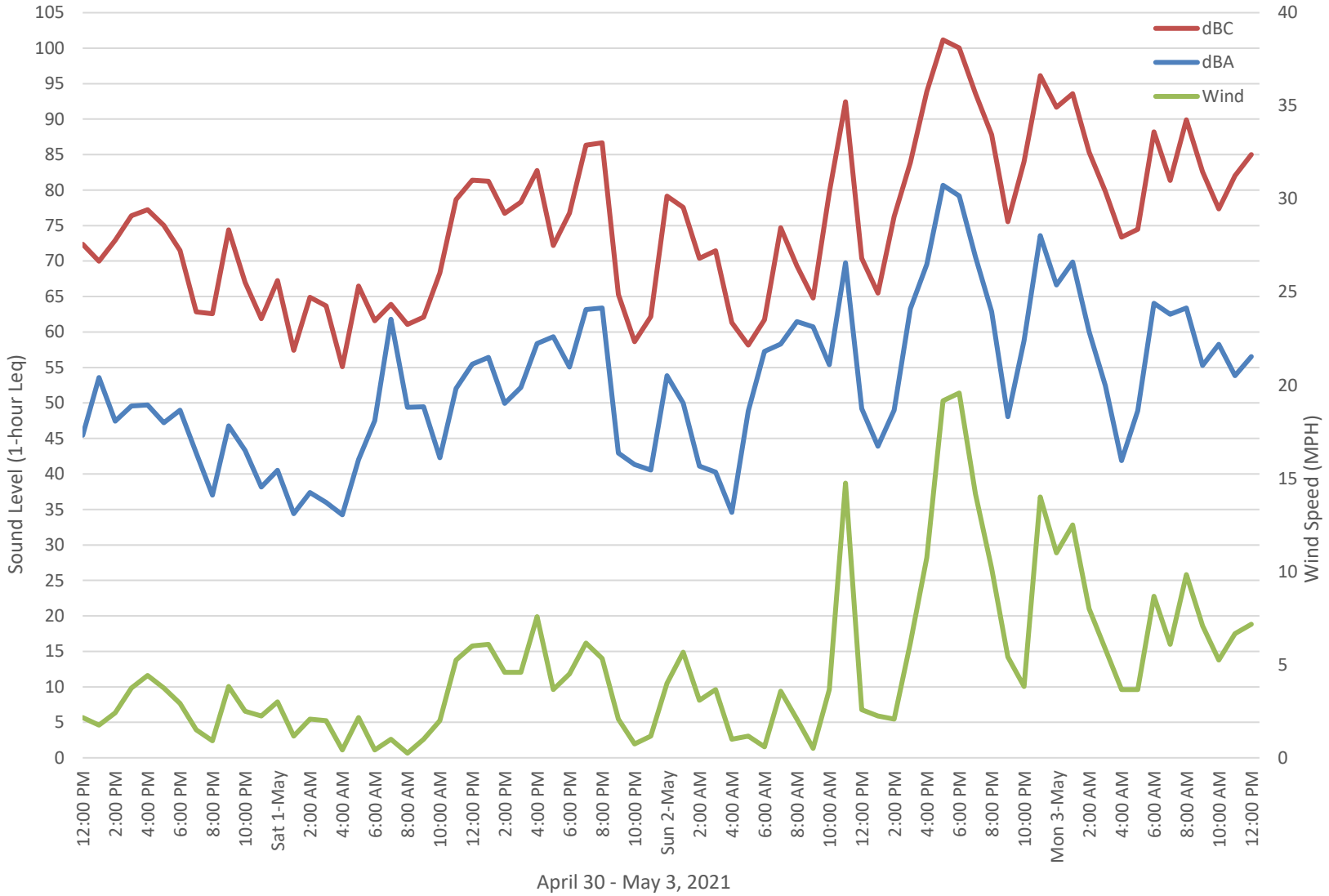


Figure 5-5 Ambient Sound Level Data for Measurement Location 4

6. Columbine 4-29HZ Pad Noise Modeling

6.1 Noise Modeling Methodology

The noise modeling was completed with use of three-dimensional computer noise modeling software. All models in this report were developed with SoundPLAN 8.1 software using the ISO 9613-2 standard. Noise levels are predicted based on the locations, noise levels and frequency spectra of the noise sources, and the geometry and reflective properties of the local terrain, buildings and barriers. To ensure a conservative assessment and compliance with ISO 9613-2 standards, light to moderate winds are assumed to be blowing from the source to receptor. The predicted noise levels represent only the contribution of the drilling, completions and production facility equipment operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Sound level data utilized in the surface drilling model was based on file data of the Precision 461 rig collected by BAENC. The V door faces west with the backyard equipment positioned to the south. Rig placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

Sound level data utilized in the completions model was based on file data of the Halliburton Quiet Fleet completions crew collected by BAENC. The model consists of 12 completions trucks positioned west of the well heads. Completions equipment placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

6.2 Noise Sensitive Receptors

The noise sensitive receptors utilized in the drilling and completions modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the drill pad surface. Receptor points used in the modeling can represent multiple closely located RBU's. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 6-1 shows the dBA and dBC noise sensitive receptor locations.

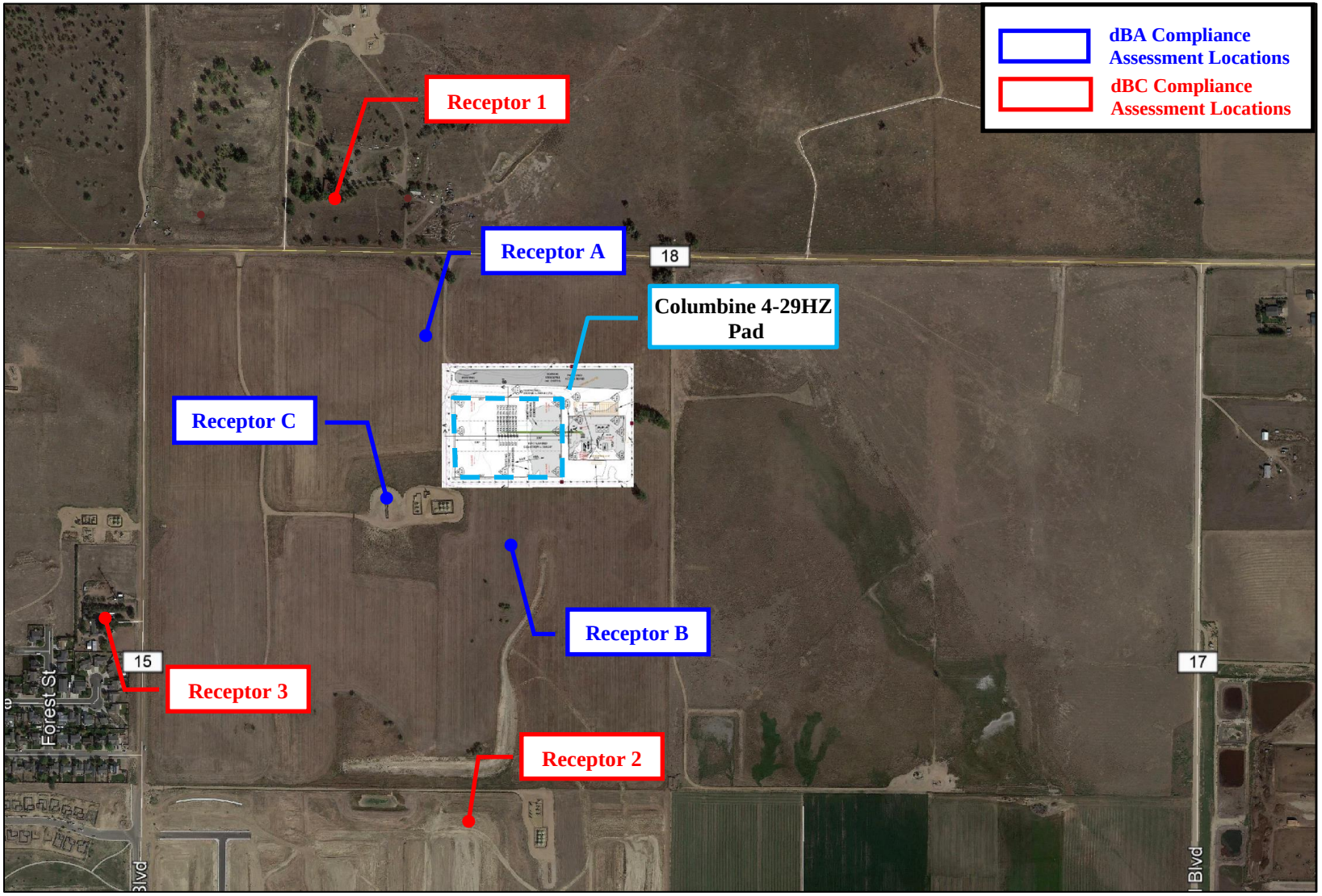


Figure 6-1 Noise Sensitive Receptor Locations

6.3 Unmitigated Drilling and Completions Noise Modeling Results

The unmitigated modeling is based off of current drilling and completions plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated drilling noise modeling are presented in Table 6-1 and Table 6-2. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-2 and Figure 6-3 shows the Unmitigated PD 461 Noise Contour Map in dBA and dBC respectively. Figure 6-4 and Figure 6-5 shows the Unmitigated Halliburton Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

Table 6-1 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location A	350 Feet Northwest	55	63
Location B	350 Feet South	57	63
Location C	350 Feet Southwest	58	61
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**	**65 Day / 60 Night**

Table 6-2 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location 1	7247 County Road 18	60	63
Location 2	South of Columbine 4-29HZ Pad	60	64
Location 3	7639 County Road 15	58	61
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted and C-weighted noise level limits. However, a mitigated modeling scenario has been included for drilling operations to show the noise reduction in the surrounding environment.

The results of the unmitigated noise modeling indicate that the completions operations will comply with the COGCC C-weighted noise level limits. However, the results of the unmitigated noise modeling indicate that the completions operations will exceed the COGCC A-weighted noise level limits. Therefore, mitigation will be recommended for completions.

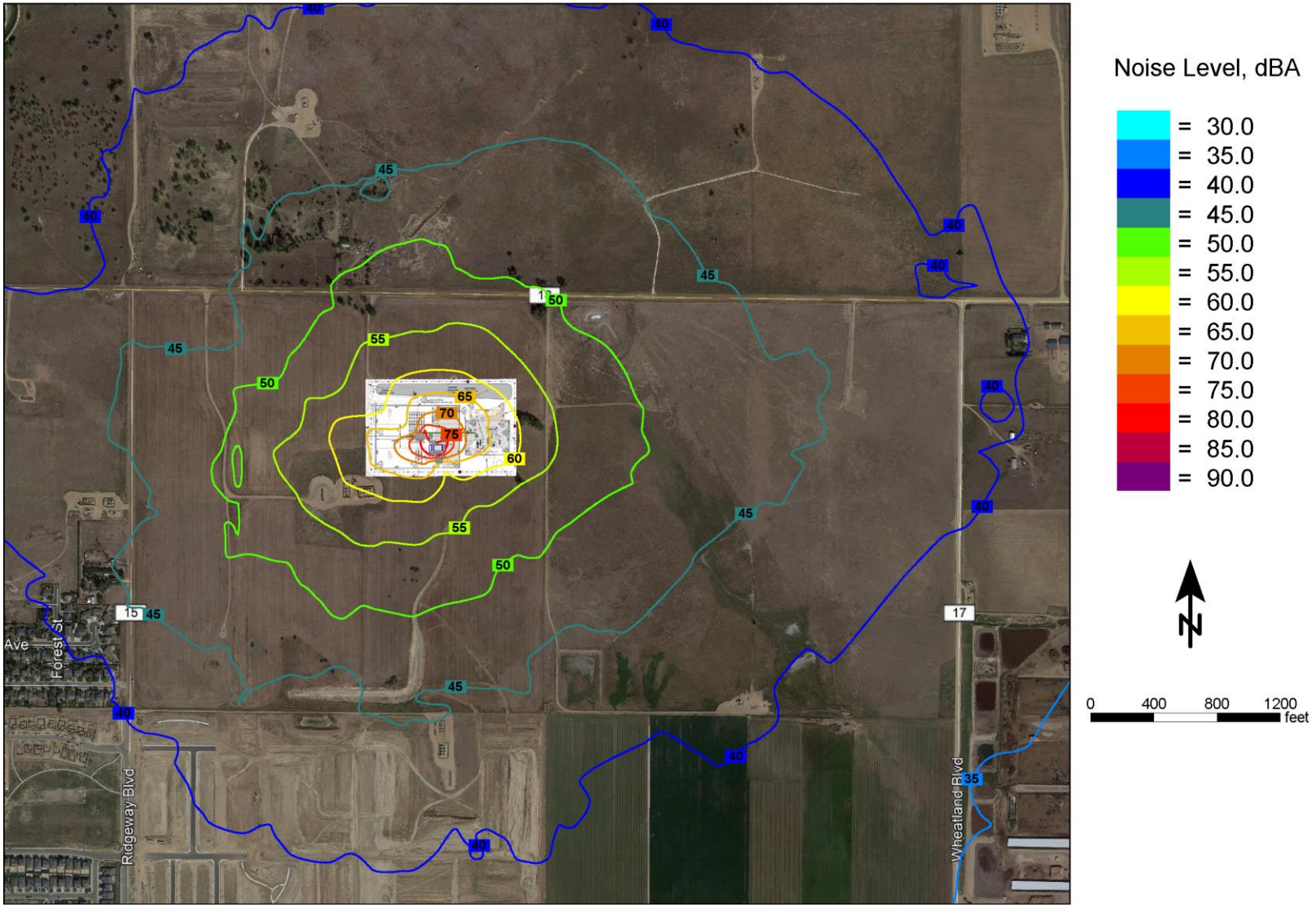


Figure 6-2 PD 461 Unmitigated Noise Contour Map (dBA)



Figure 6-3 PD 461 Unmitigated Noise Contour Map (dBC)

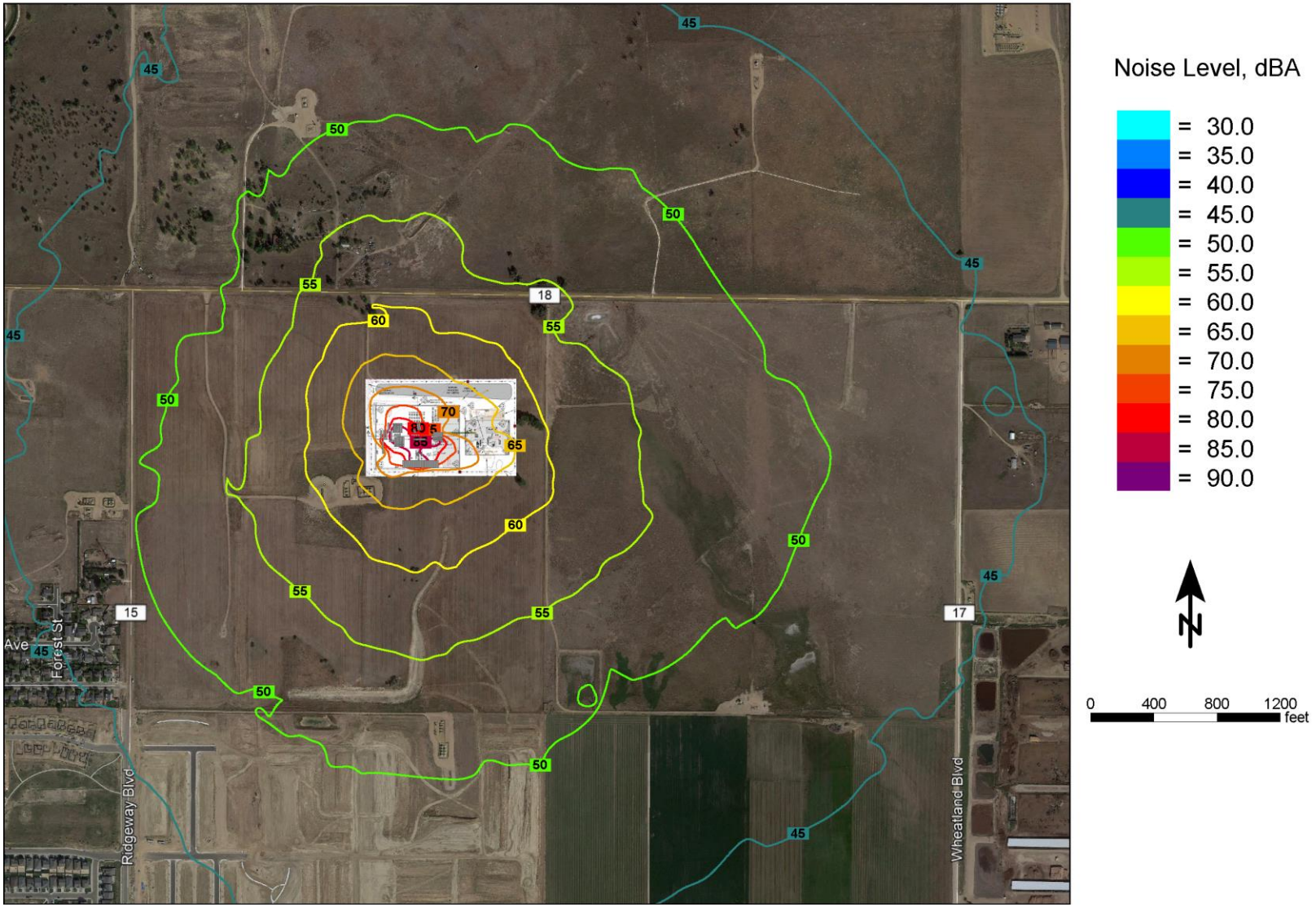


Figure 6-4 Halliburton Unmitigated Noise Contour Map (dBA)

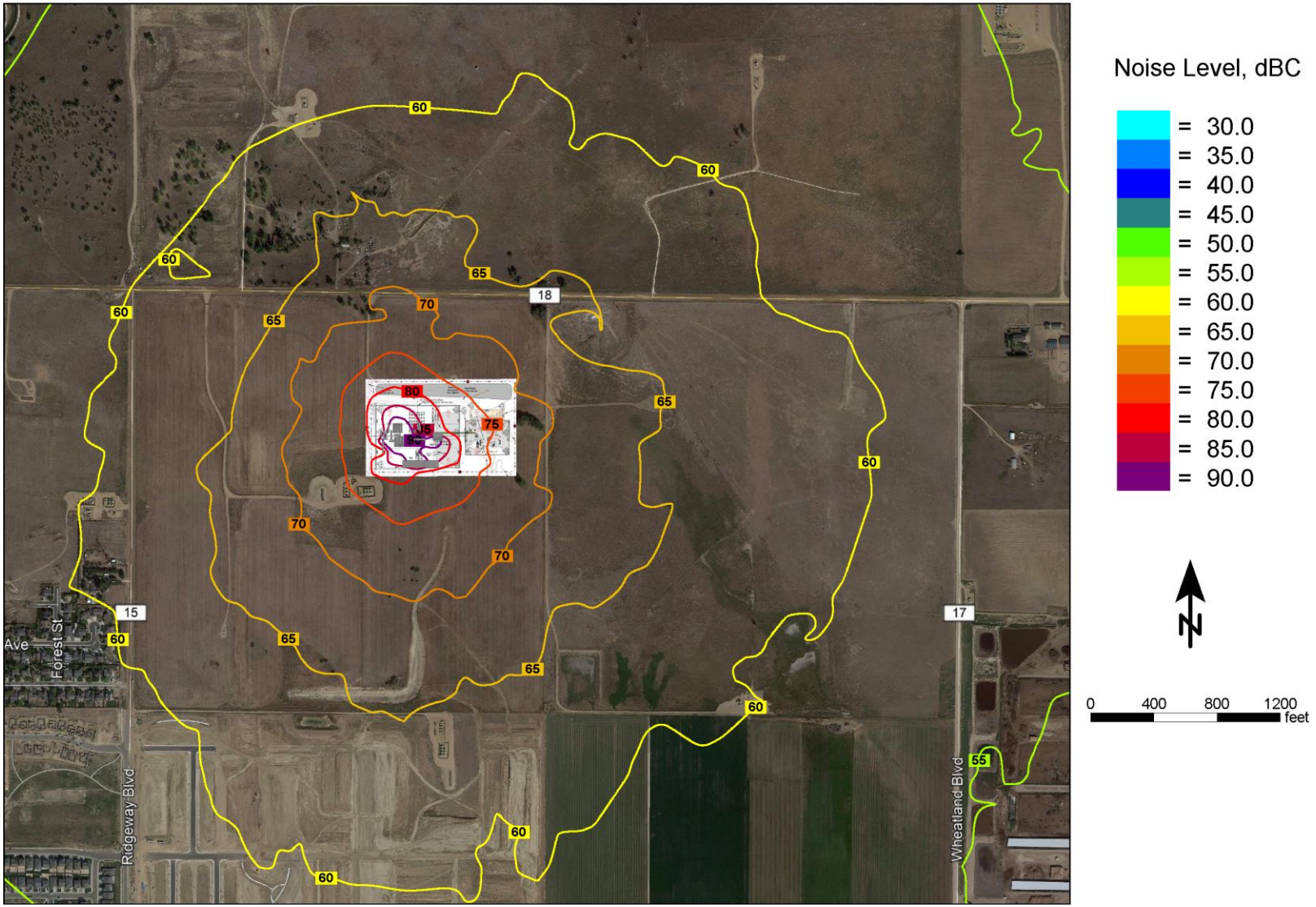


Figure 6-5 Halliburton Unmitigated Noise Contour Map (dBC)

6.4 Drilling Mitigated Modeling Results

Noise mitigation for drilling operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 840 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the south, west, and north perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-6.

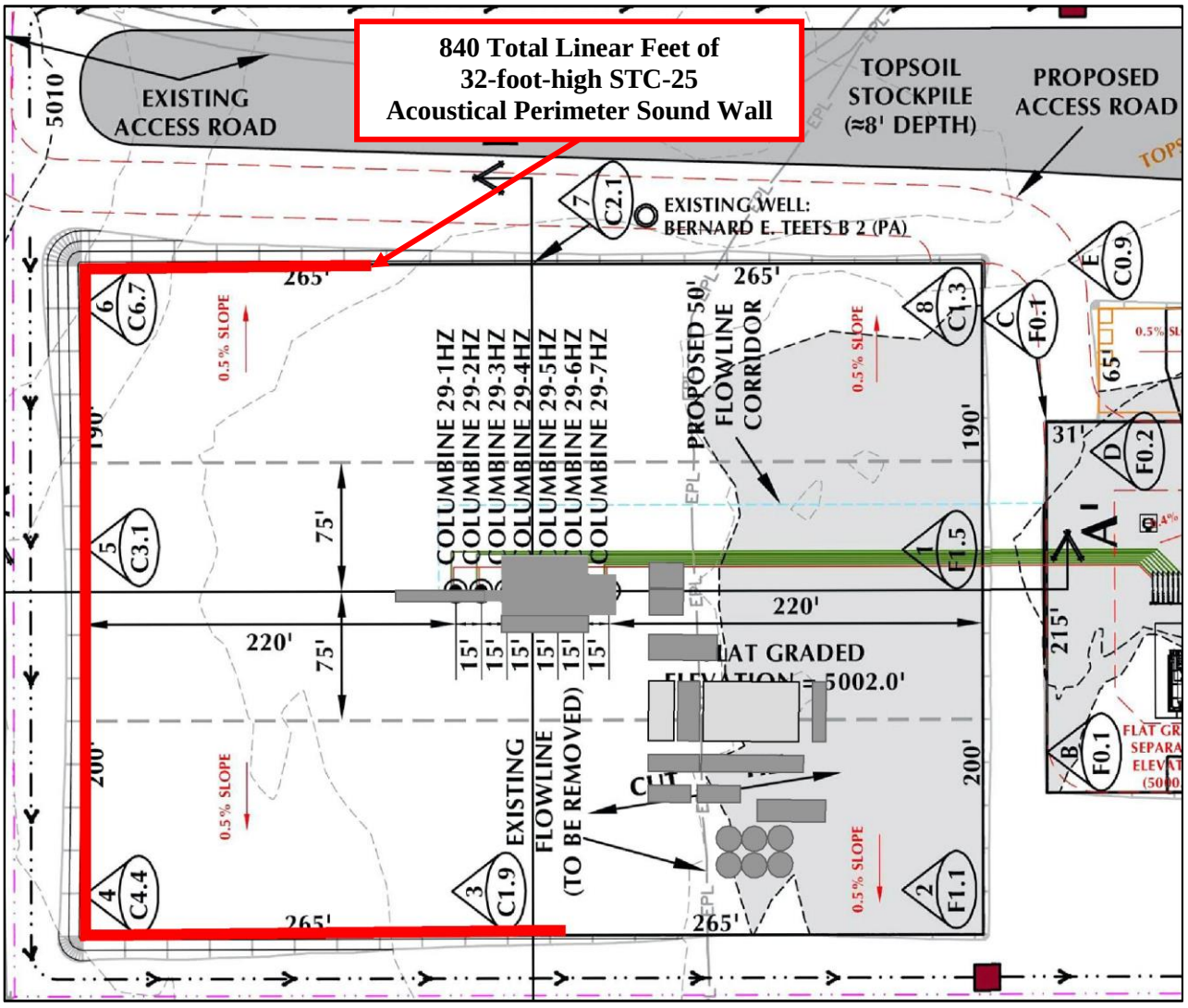


Figure 6-6 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-6. The results of the mitigated noise modeling are presented in Table 6-3 and Table 6-4. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the drilling operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-3 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461
Location A	350 Feet Northwest	51
Location B	350 Feet South	57
Location C	350 Feet Southwest	51
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-4 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461
Location 1	7247 County Road 18	59
Location 2	South of Columbine 4-29HZ Pad	61
Location 3	7639 County Road 15	57
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed drilling operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-7 shows the Mitigated PD 461 Noise Contour Map in the A-weighted scale and Figure 6-8 shows the Mitigated PD461 Noise Contour Map in the C-weighted scale.

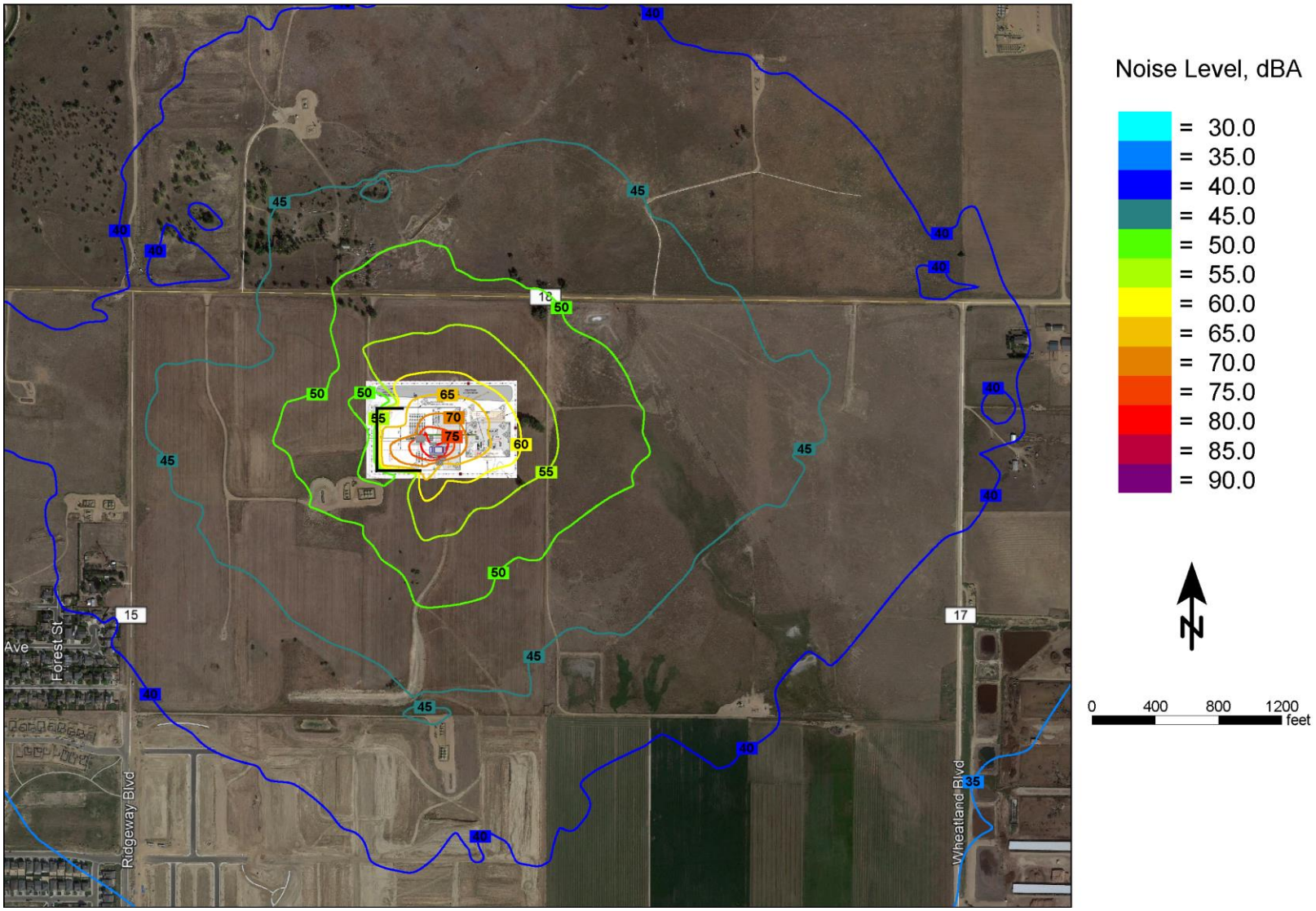


Figure 6-7 Mitigated PD 461 Noise Contour Map (dBA)



Figure 6-8 Mitigated PD 461 Noise Contour Map (dBC)

6.5 Completions Mitigated Modeling Results

Noise mitigation for completions operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 840 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-9.

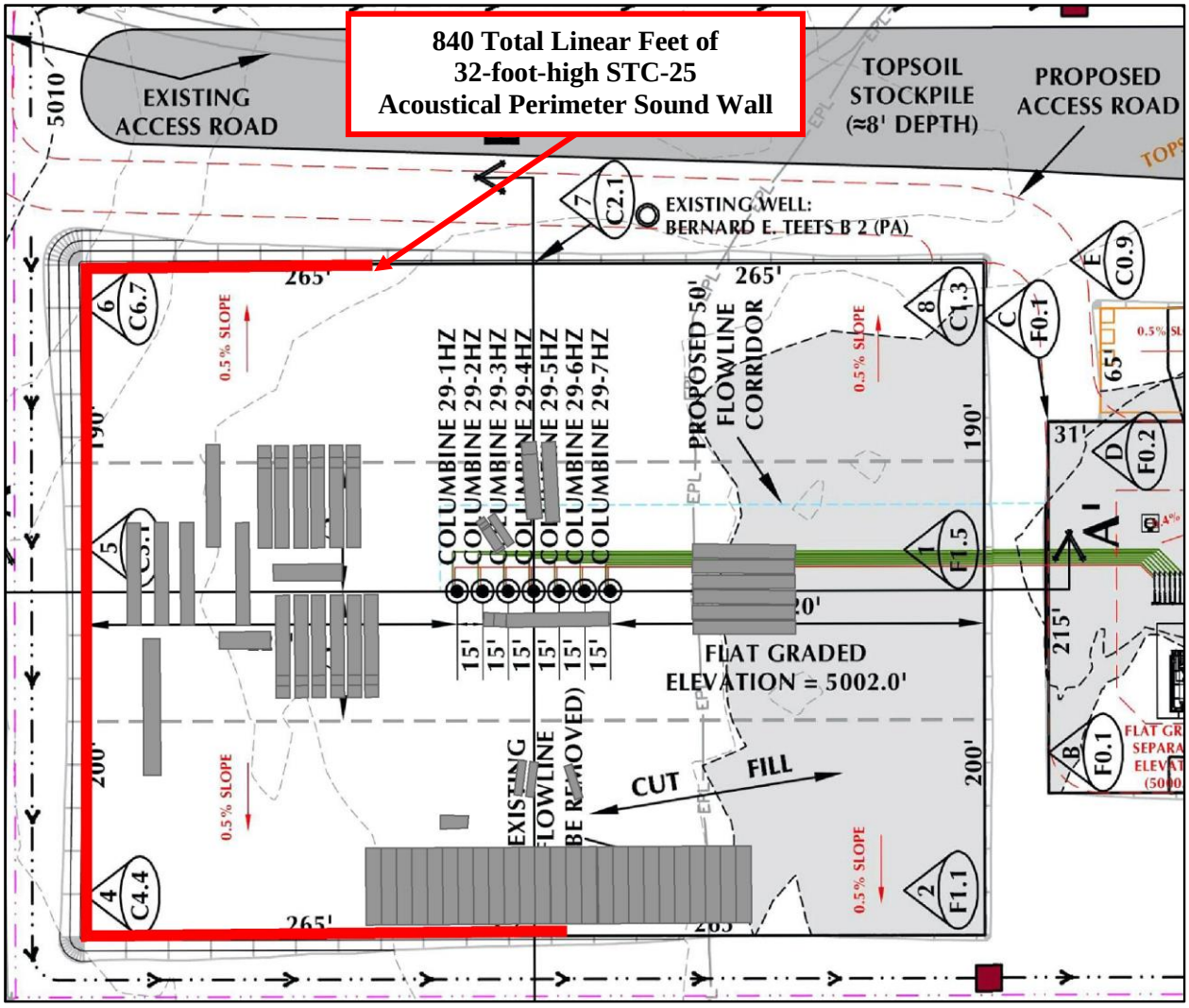


Figure 6-9 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-9. The results of the mitigated noise modeling are presented in Table 6-5 and Table 6-6. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the completions operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-5 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Halliburton Quiet Fleet
Location A	350 Feet Northwest	56
Location B	350 Feet South	58
Location C	350 Feet Southwest	56
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-6 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Halliburton Quiet Fleet
Location 1	7247 County Road 18	62
Location 2	South of Columbine 4-29HZ Pad	62
Location 3	7639 County Road 15	60
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed completions operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-10 shows the Mitigated Halliburton Noise Contour Map in the A-weighted scale Figure 6-11 shows the Mitigated Halliburton Noise Contour Map in the C-weighted scale.

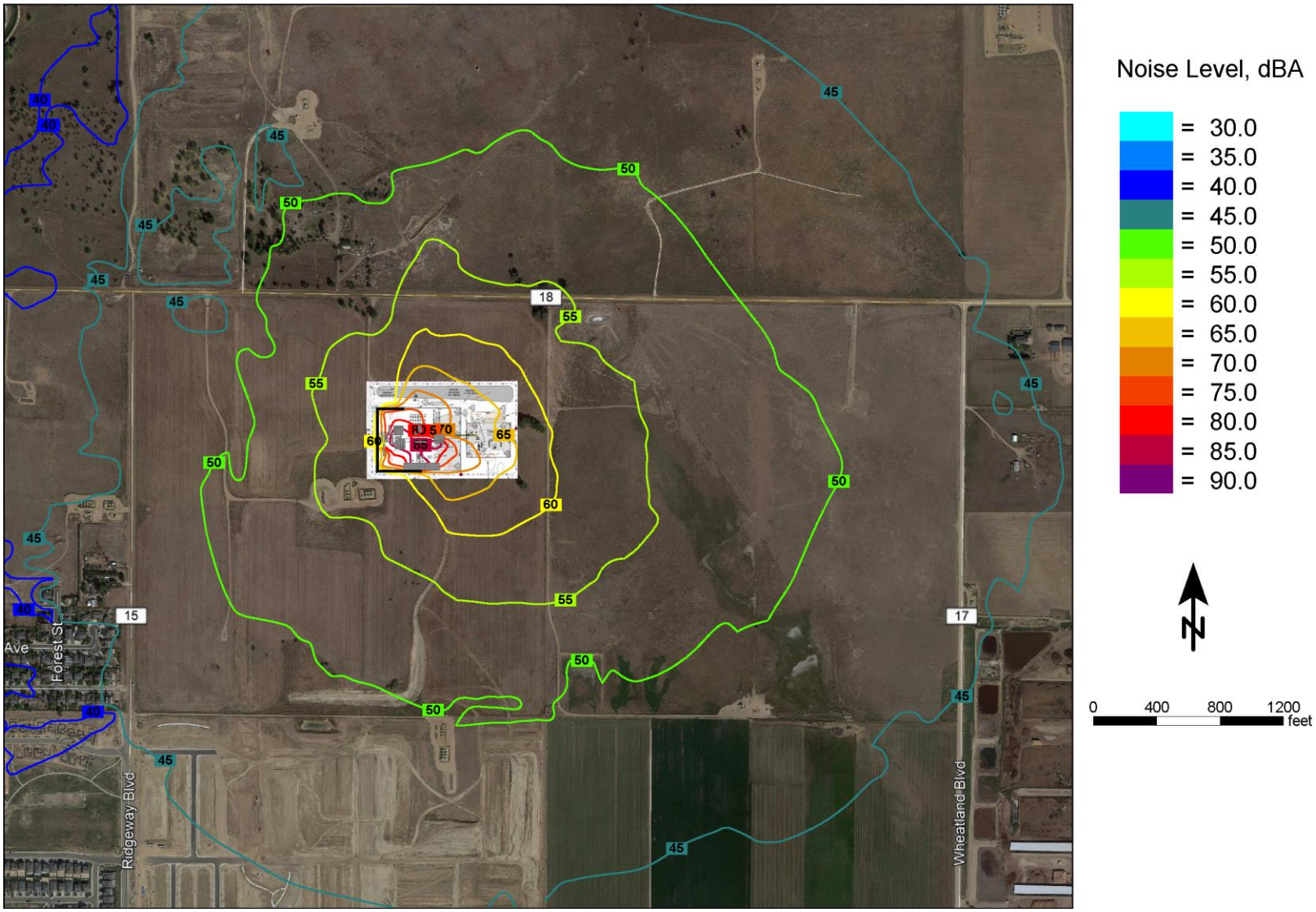


Figure 6-10 Mitigated Halliburton Noise Contour Map (dBA)



Figure 6-11 Mitigated Halliburton Noise Contour Map (dBC)

7. Columbine 4-29HZ Pad Production Facility Noise Modeling

7.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off of current production site plans and does not include sound walls or other third-party acoustical mitigation measures. The production facility operational noise model was created to predict the constant, steady-state noise levels at the Columbine 4-29HZ pad and adjacent surroundings. The production facility was modeled assuming all listed equipment was operating simultaneously to represent the loudest operating scenario. Sound level data utilized in the production model was based on file data previously collected by BAENC at a KMOG production facility with similar equipment. The production facility equipment list and equipment orientation were supplied by KMOG and can be seen Figure 7-1. The predicted modeling results are dependent on equipment and orientation as indicated.

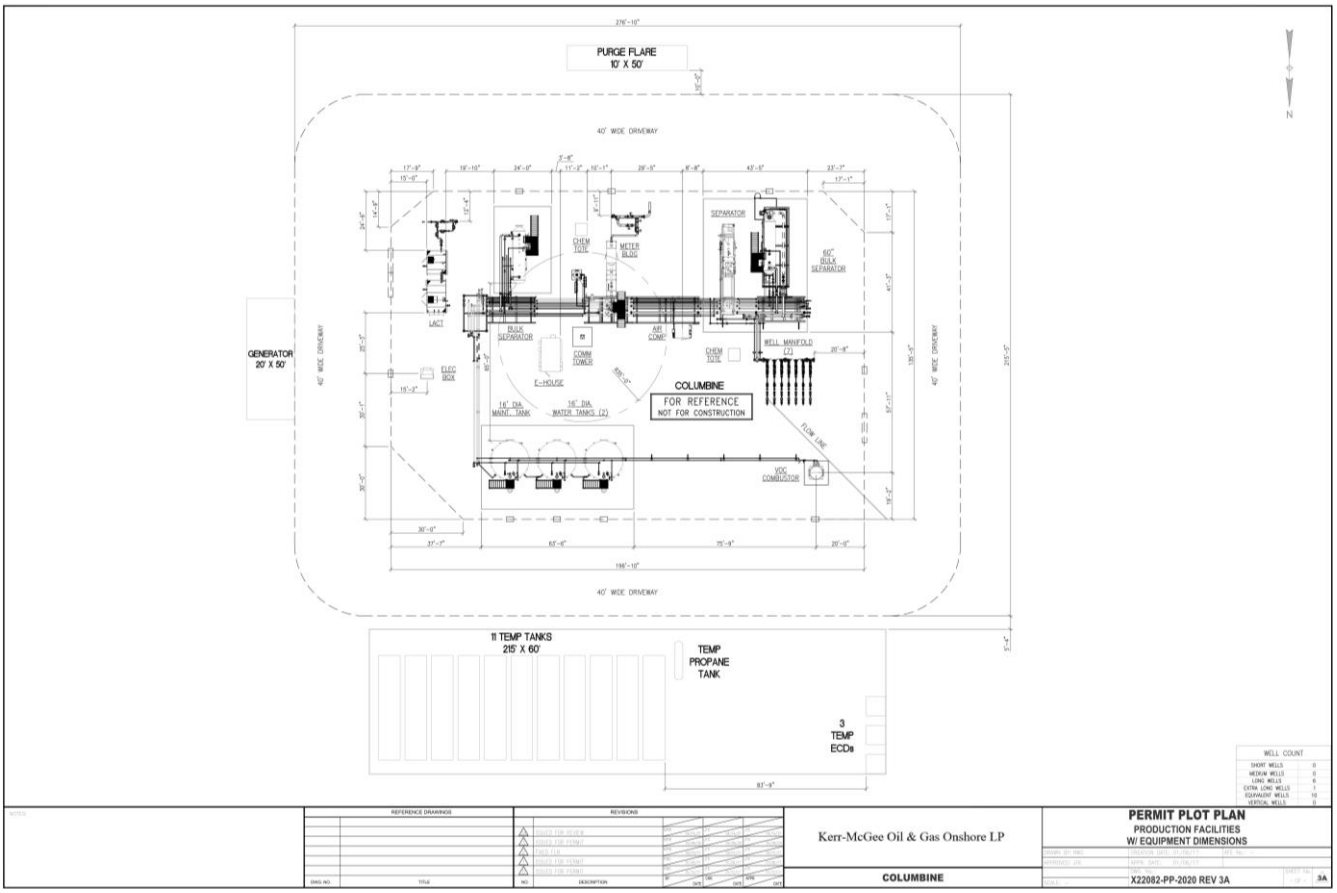


Figure 7-1 Modeled Columbine 4-29HZ Production Facility Layout (DWG # X22082-PP-2020 REV 3A, 01/06/2017)

The equipment list and layout were scrutinized to determine the major noise emitting sources planned for the site. These major noise sources, listed in Table 7-1, were included in the production modeling. Other auxiliary/temporary equipment or smaller equipment not anticipated to generate significant noise was not included in the production model.

The noise sensitive receptors utilized in the production modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the production pad surface. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 7-2 shows the dBA and dBC noise sensitive receptor locations.

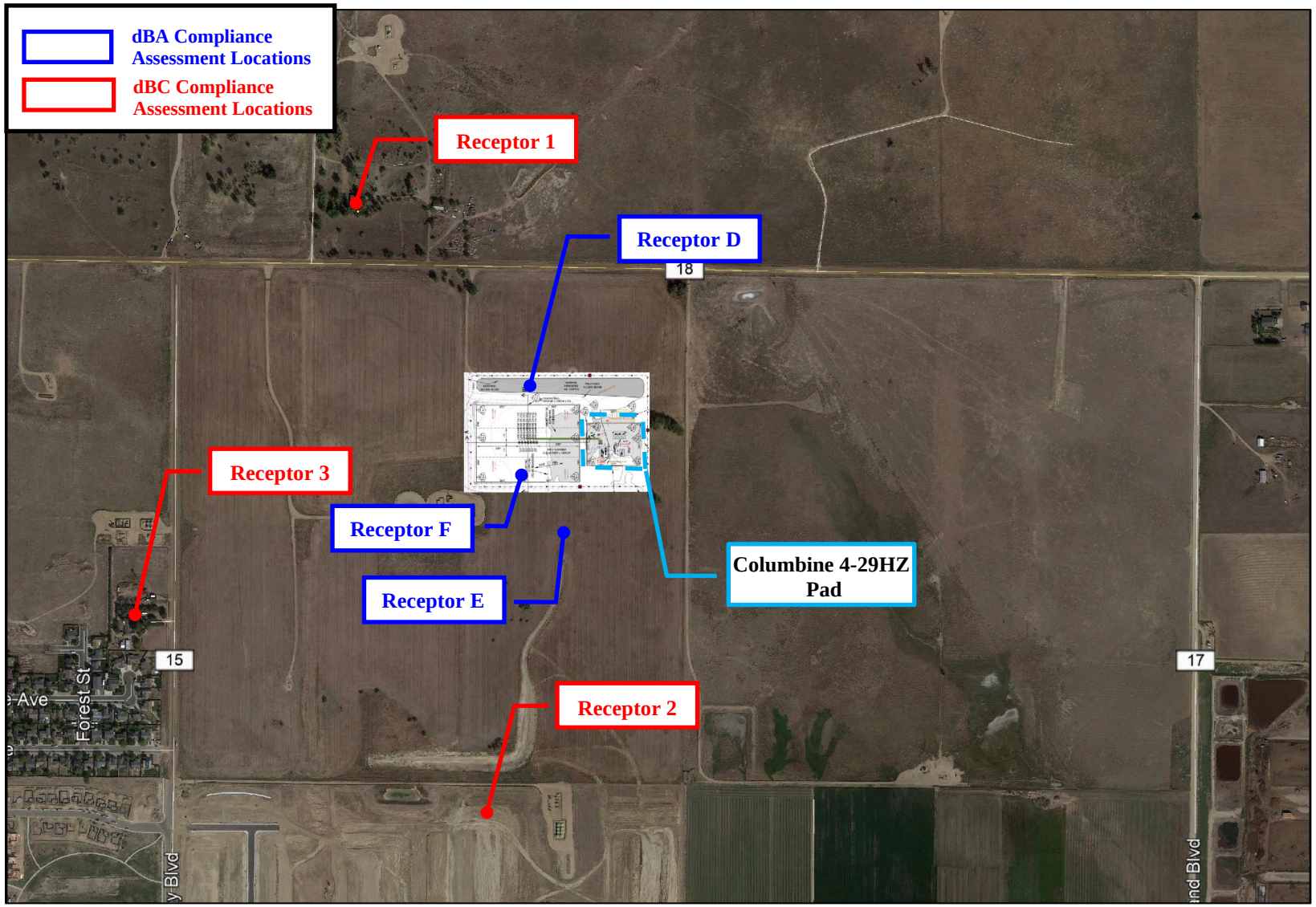


Figure 7-2 Noise Sensitive Receptor Locations

The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 7-1.

Table 7-1 Production Facility Major Noise Emitting Equipment Included in Model

Equipment	Quantity
Air Compressor	1
Electrical Panel/Box	2
LACT Building	1
Fisher 4-inch ET Series Whisper I Trim Globe Control Valve	1
Separator	1
Bulk Separator	2
Three Phase Separator Burner	3
VOC Combustor	1

The results of the unmitigated production facility noise modeling are presented in Table 7-2 and Table 7-3. The locations in the tables correspond to the locations identified in Figure 7-2. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 7-3 and Figure 7-4 shows the Unmitigated Production Facility Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

The results of the unmitigated noise modeling indicate that the production operations will comply with the COGCC A-weighted and C-weighted noise level limits.

Table 7-2 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Production Facility
Location D	350 Feet North	38
Location E	350 Feet Northeast	40
Location F	350 Feet East	42
COGCC Noise Limit	**350 ft. from the working pad surface**	**60 Day / 55 Night**

Table 7-3 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Production Facility
Location 1*	7247 County Road 18	36
Location 2**	South of Columbine 4-29HZ Pad	38
Location 3***	7639 County Road 15	35
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**60**

*Location 1 is subject to adjusted allowable limits of 73 day/ 66 night dBC for production
**Location 2 is subject to adjusted allowable limits of 75 day/ 70 night dBC for production
*** Location 3 is subject to adjusted allowable limits of 75 day/ 68 night dBC for production

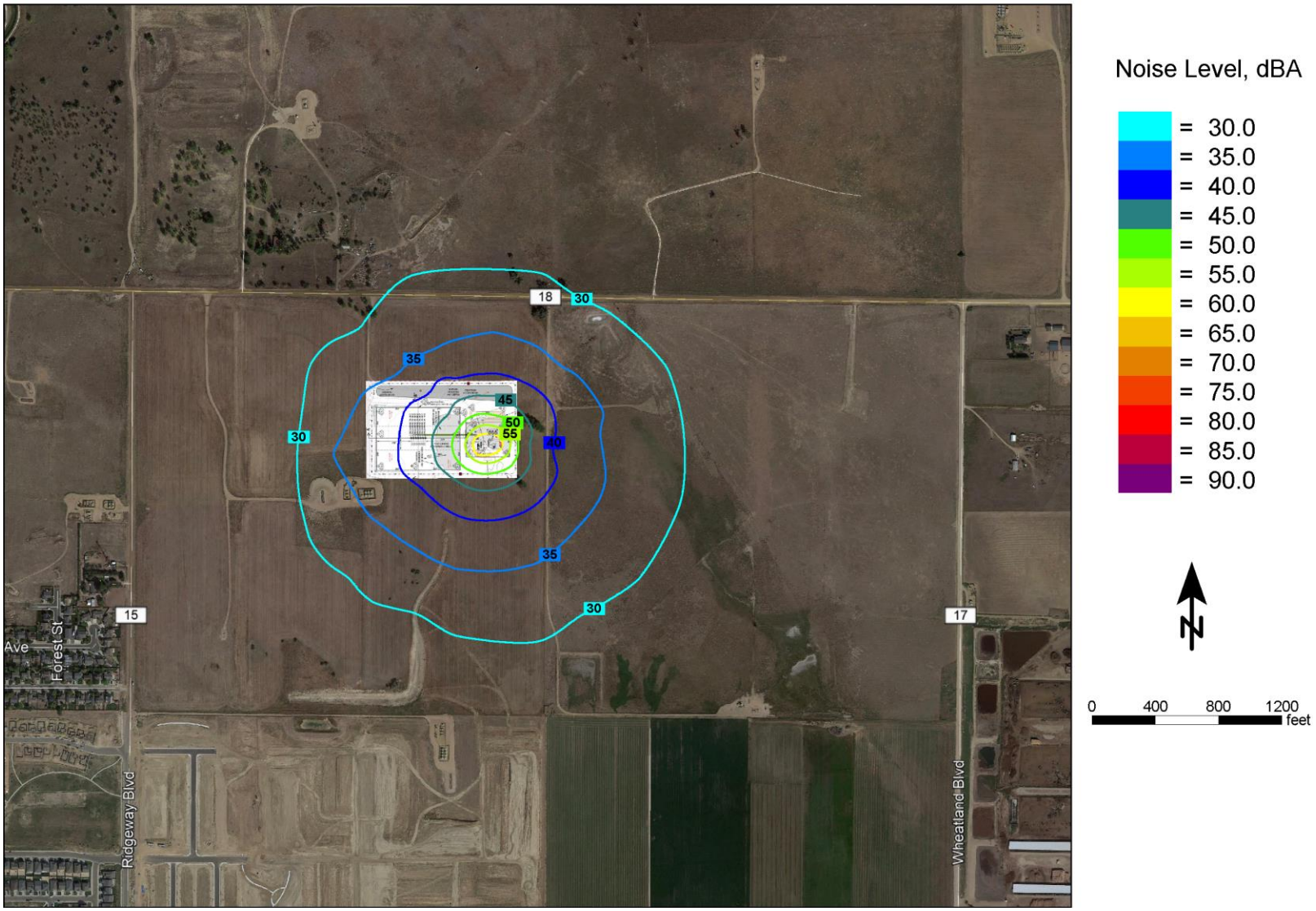


Figure 7-3 Production Facility Unmitigated Noise Contour Map (dBA)

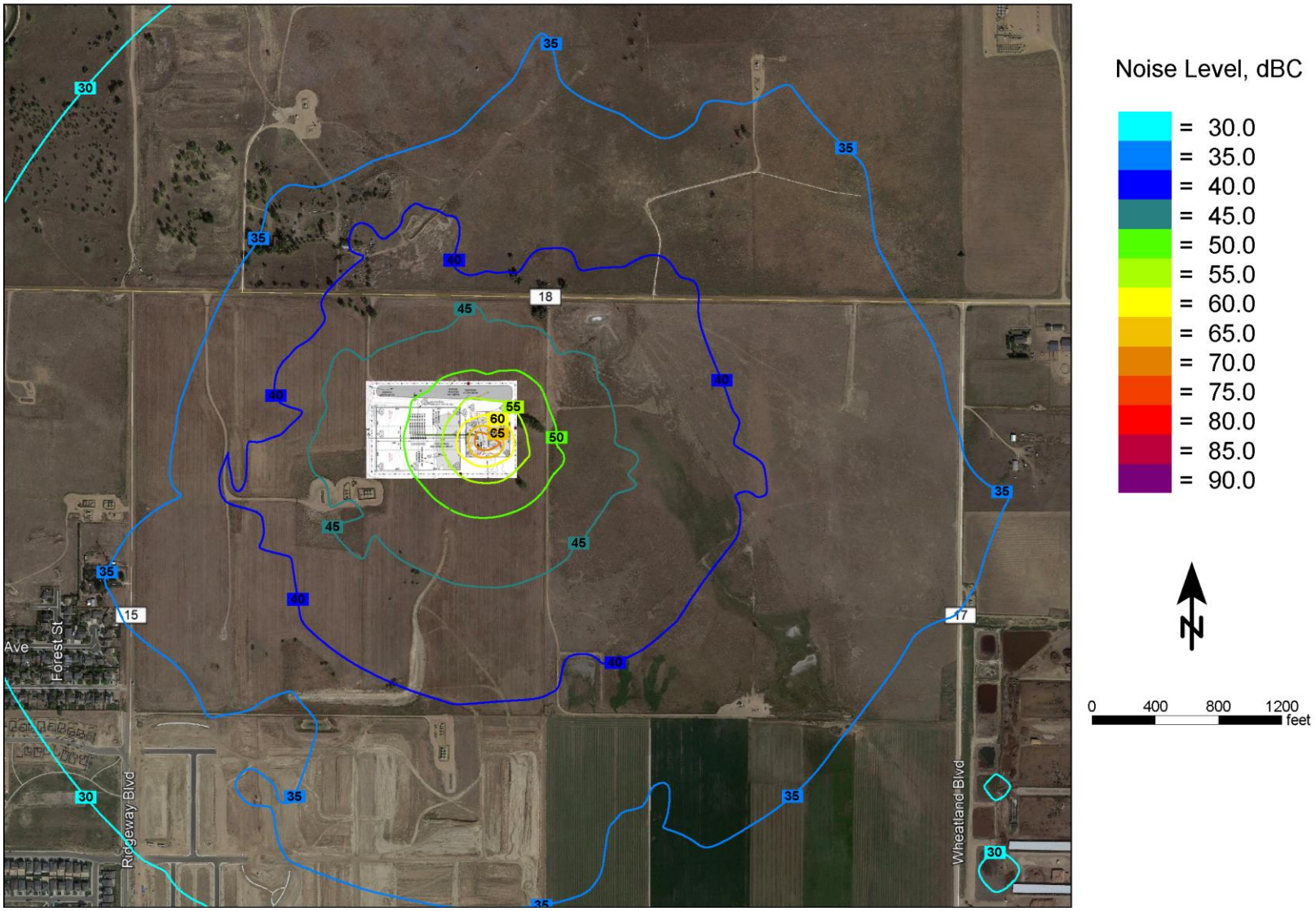


Figure 7-4 Production Facility Unmitigated Noise Contour Map (dBC)

8. Noise Points of Compliance and Continuous Noise Monitoring

8.1 Continuous Monitoring Procedure

The following continuous monitoring procedures are proposed to ensure compliance with the monitoring procedures outlined in COGCC Rule 423.c.(2) and CDA with the Town of Firestone. To demonstrate compliance with COGCC noise regulations, pre-production activities and ongoing operations lasting longer than 24 consecutive hours will require continuous monitoring measurements from each noise point of compliance designated. According to Section 423. Noise (c), to demonstrate compliance with Tables 423-1 and 423-2 Operators will measure sound levels according to the following standards:

> (1) During pre-production activities and ongoing operations lasting longer than 24 consecutive hours such as drilling, completion, recompletion, Stimulation, and Well maintenance, in areas zoned residential or within 2,000 feet of a Building Unit, Operators will take continuous sound measurements from each noise point of compliance designated pursuant to Rule 423.a.(5).

Figure 8-1 shows an aerial view of the proposed pad with an approximate 2,000 ft. radius from the working pad surface. There are Residential Building Units (RBU) with in the 2,000 ft. radius. Proposed noise points of compliance are detailed in Table 8-1. The noise points of compliance were selected to represent RBU's in multiple directions from the pad. Three noise points of compliance are proposed. There are no RBU's within 2,000 feet to the east of the pad, so a fourth noise point of compliance was not proposed.

Residential Building Units (RBU) may be exempt to continuous monitoring due to rule 423.b.(5) if an agreement is made between the surface owner and operator and subsequently accepted by the COGCC.

Table 8-1 Proposed Continuous Monitoring Locations

Location	Description	Notes
Noise Point of Compliance 1	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 2	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 3	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted • RBU's around Noise Point of Compliance 3 are not constructed at the time of this report. This point of compliance may be except if RBU's are not completed by the time drilling and completions occur

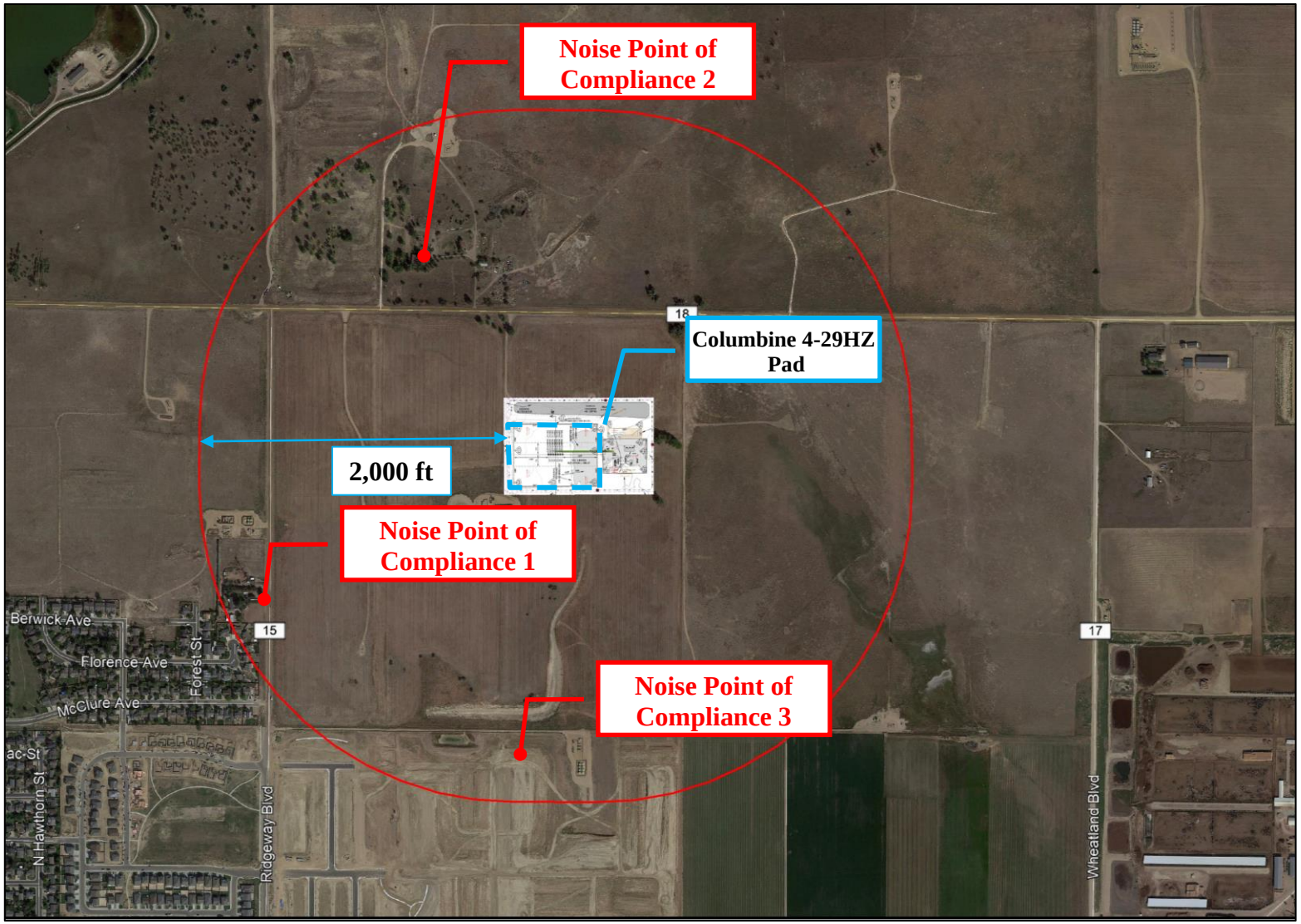


Figure 8-1 Proposed Continuous Monitoring Locations

Appendix A - Ambient Data

Table A-8-2 Recorded Hourly Average Ambient Sound Levels Location 1 (1-hr dBA L_{eq})

Location 1 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	47	61	1:00 AM	42	65
1:00 PM	50	65	2:00 AM	36	59
2:00 PM	51	69	3:00 AM	35	59
3:00 PM	53	74	4:00 AM	39	56
4:00 PM	54	76	5:00 AM	48	59
5:00 PM	53	74	6:00 AM	48	62
6:00 PM	53	72	7:00 AM	47	65
7:00 PM	50	66	8:00 AM	50	66
8:00 PM	49	63	9:00 AM	57	62
9:00 PM	45	64	10:00 AM	54	69
10:00 PM	44	58	11:00 AM	62	88
11:00 PM	46	60	12:00 PM	53	65
Sat 1-May	42	57	1:00 PM	54	64
1:00 AM	40	55	2:00 PM	50	64
2:00 AM	35	54	3:00 PM	52	69
3:00 AM	35	54	4:00 PM	58	80
4:00 AM	41	54	5:00 PM	67	90
5:00 AM	46	56	6:00 PM	66	89
6:00 AM	54	65	7:00 PM	61	83
7:00 AM	51	60	8:00 PM	53	74
8:00 AM	49	61	9:00 PM	56	68
9:00 AM	51	64	10:00 PM	45	69
10:00 AM	53	66	11:00 PM	59	83
11:00 AM	53	75	Mon 3-May	54	76
12:00 PM	53	78	1:00 AM	57	78
1:00 PM	54	80	2:00 AM	47	68
2:00 PM	50	71	3:00 AM	44	64
3:00 PM	51	74	4:00 AM	43	54
4:00 PM	52	79	5:00 AM	53	65
5:00 PM	52	68	6:00 AM	56	73
6:00 PM	53	72	7:00 AM	55	66
7:00 PM	53	75	8:00 AM	55	73
8:00 PM	56	76	9:00 AM	54	67
9:00 PM	44	60	10:00 AM	53	63
10:00 PM	44	60	11:00 AM	53	65
11:00 PM	48	62	12:00 PM	51	70
Sun 2-May	48	67			

Table A-8-3 Recorded Hourly Average Ambient Sound Levels Location 2 (1-hr dBA L_{eq})

Location 2 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	51	63	1:00 AM	36	62
1:00 PM	52	63	2:00 AM	35	57
2:00 PM	53	65	3:00 AM	34	57
3:00 PM	54	68	4:00 AM	38	56
4:00 PM	52	69	5:00 AM	43	58
5:00 PM	53	67	6:00 AM	45	60
6:00 PM	53	65	7:00 AM	53	64
7:00 PM	52	61	8:00 AM	51	62
8:00 PM	50	61	9:00 AM	50	58
9:00 PM	47	59	10:00 AM	55	70
10:00 PM	49	63	11:00 AM	63	86
11:00 PM	47	60	12:00 PM	52	72
Sat 1-May	41	58	1:00 PM	52	63
1:00 AM	30	54	2:00 PM	53	64
2:00 AM	41	58	3:00 PM	51	68
3:00 AM	37	55	4:00 PM	56	79
4:00 AM	40	54	5:00 PM	62	88
5:00 AM	40	56	6:00 PM	58	84
6:00 AM	51	62	7:00 PM	55	81
7:00 AM	46	59	8:00 PM	46	71
8:00 AM	48	60	9:00 PM	48	67
9:00 AM	52	65	10:00 PM	46	69
10:00 AM	50	62	11:00 PM	55	82
11:00 AM	50	68	Mon 3-May	48	75
12:00 PM	55	72	1:00 AM	50	77
1:00 PM	53	72	2:00 AM	44	64
2:00 PM	55	69	3:00 AM	38	61
3:00 PM	53	69	4:00 AM	39	54
4:00 PM	51	74	5:00 AM	53	64
5:00 PM	50	62	6:00 AM	54	73
6:00 PM	52	68	7:00 AM	52	65
7:00 PM	51	74	8:00 AM	54	73
8:00 PM	53	70	9:00 AM	53	64
9:00 PM	46	60	10:00 AM	54	63
10:00 PM	44	59	11:00 AM	53	64
11:00 PM	42	62	12:00 PM	55	68
Sun 2-May	49	70			

Table A-8-4 Recorded Hourly Average Ambient Sound Levels Location 3 (1-hr dBA L_{eq})

Location 3 - Hourly Leq					
Time	**dBA**	**dBC**	**Time**	**dBA**	**dBC**
12:00 PM	68	71	1:00 AM	53	82
1:00 PM	56	68	2:00 AM	54	81
2:00 PM	56	65	3:00 AM	61	88
3:00 PM	59	68	4:00 AM	61	87
4:00 PM	60	69	5:00 AM	55	79
5:00 PM	55	66	6:00 AM	55	65
6:00 PM	55	63	7:00 AM	56	69
7:00 PM	58	64	8:00 AM	55	65
8:00 PM	51	62	9:00 AM	55	62
9:00 PM	58	63	10:00 AM	62	88
10:00 PM	52	61	11:00 AM	65	92
11:00 PM	49	60	12:00 PM	58	85
Sat 1-May	38	58	1:00 PM	56	79
1:00 AM	47	59	2:00 PM	54	76
2:00 AM	37	59	3:00 PM	64	88
3:00 AM	44	61	4:00 PM	68	93
4:00 AM	40	59	5:00 PM	67	93
5:00 AM	50	63	6:00 PM	60	88
6:00 AM	58	65	7:00 PM	56	84
7:00 AM	55	63	8:00 PM	59	86
8:00 AM	59	67	9:00 PM	56	84
9:00 AM	57	64	10:00 PM	62	88
10:00 AM	55	62	11:00 PM	58	85
11:00 AM	57	65	Mon 3-May	59	86
12:00 PM	58	66	1:00 AM	56	83
1:00 PM	55	66	2:00 AM	49	77
2:00 PM	52	62	3:00 AM	53	81
3:00 PM	54	66	4:00 AM	45	73
4:00 PM	55	69	5:00 AM	54	80
5:00 PM	57	72	6:00 AM	57	73
6:00 PM	61	86	7:00 AM	58	75
7:00 PM	59	85	8:00 AM	57	73
8:00 PM	52	66	9:00 AM	58	72
9:00 PM	51	77	10:00 AM	58	73
10:00 PM	50	67	11:00 AM	59	73
11:00 PM	48	72	12:00 PM	57	73
Sun 2-May	48	73			

Table A-8-5 Recorded Hourly Average Ambient Sound Levels Location 4 (1-hr dBA L_{eq})

Location 4 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	45	72	1:00 AM	50	78
1:00 PM	54	70	2:00 AM	41	70
2:00 PM	47	73	3:00 AM	40	71
3:00 PM	50	76	4:00 AM	35	61
4:00 PM	50	77	5:00 AM	49	58
5:00 PM	47	75	6:00 AM	57	62
6:00 PM	49	71	7:00 AM	58	75
7:00 PM	43	63	8:00 AM	61	69
8:00 PM	37	63	9:00 AM	61	65
9:00 PM	47	74	10:00 AM	55	80
10:00 PM	43	67	11:00 AM	70	92
11:00 PM	38	62	12:00 PM	49	70
Sat 1-May	41	67	1:00 PM	44	65
1:00 AM	34	57	2:00 PM	49	76
2:00 AM	37	65	3:00 PM	63	84
3:00 AM	36	64	4:00 PM	70	94
4:00 AM	34	55	5:00 PM	81	101
5:00 AM	42	66	6:00 PM	79	100
6:00 AM	48	62	7:00 PM	71	94
7:00 AM	62	64	8:00 PM	63	88
8:00 AM	49	61	9:00 PM	48	76
9:00 AM	49	62	10:00 PM	59	84
10:00 AM	42	68	11:00 PM	74	96
11:00 AM	52	79	Mon 3-May	67	92
12:00 PM	55	81	1:00 AM	70	94
1:00 PM	56	81	2:00 AM	60	85
2:00 PM	50	77	3:00 AM	52	80
3:00 PM	52	78	4:00 AM	42	73
4:00 PM	58	83	5:00 AM	49	74
5:00 PM	59	72	6:00 AM	64	88
6:00 PM	55	77	7:00 AM	63	81
7:00 PM	63	86	8:00 AM	63	90
8:00 PM	63	87	9:00 AM	55	83
9:00 PM	43	65	10:00 AM	58	77
10:00 PM	41	59	11:00 AM	54	82
11:00 PM	41	62	12:00 PM	57	85
Sun 2-May	54	79			

Section 13

Traffic Management Plan and Baseline Road Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Shayelyn Marshall
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, CO 80202

Arcadis U.S., Inc.
11001 W. 120th Avenue
Suite 200
Broomfield
Colorado 80021
Tel 303 544 0043
Fax 720 887 6051
www.arcadis.com

Subject:
Traffic Management Plan for Columbine Pad

ENVIRONMENT

Date:
December 16, 2021

Contact:
Steve Rice

Phone:
303.710.7537

Email:
Steve.Rice@arcadis.com

Our ref:
30057047

Dear Ms. Marshall:

Kerr McGee Oil and Gas Onshore LP (Kerr McGee) has plans to develop mineral leases within the town limits of Firestone, Colorado and has contracted Arcadis U.S., Inc. (Arcadis) to prepare this Traffic Management Plan (TMP) to summarize the guidelines Kerr McGee will adhere to during the construction and development of Oil & Gas well facilities, and associated infrastructure. The objective of this TMP is to provide the Town of Firestone with a summary of the traffic anticipated by the development, along with supplemental information to demonstrate Kerr McGee's intent to comply with the requirements of the Town of Firestone to limit traffic impacts.

DEVELOPMENT PLAN OVERVIEW

The work will include the Columbine Pad. The Columbine Pad will include 7 wells, approximately 12.66 acres of temporary disturbance, and approximately 5 acres of final, permanent disturbance. The grading plan, which include a layout of the pad, are provided in **Attachment 1.** The proposed haul routes and truck turning movements for the Columbine Pad are presented in **Attachment 2**. The anticipated traffic associated with development of this facility has been summarized in trip generation tables included as **Attachment 3**.

MANAGEMENT OF ROAD IMPACT CONCERNS

A baseline road survey was completed for the Columbine Pad to aid in future assessment of road damage that may occur due to Kerr McGee development activities (**Attachment 4**). Results from the baseline survey indicated County Road (CR) 18 is in less than acceptable condition. The roadway shows signs of

moderate to high rutting with loose aggregate on the surface and shoulders. Loose aggregate that has accumulated in some areas of the shoulder could impede drainage. CR 19 is in good condition from a ride quality standpoint and that the roadway shows low to moderate rutting, transverse cracking, and fatigue cracking in certain areas. Portions of CR 19 were actively receiving a chip seal treatment, or roadway improvement, during the baseline study.

Once Kerr McGee's interim reclamation activities are complete, Arcadis will conduct a follow-up survey to determine if, and where, damage attributable to the added truck traffic occurred. In the event roads are damaged and warrant repair, Kerr McGee will use the baseline and post-completion survey data to determine the nature and extent of damage attributable to their traffic, and work with Firestone to determine how they prefer to handle the repairs.

MANAGEMENT OF TRAFFIC OPERATIONS

Kerr McGee understands the importance of maintaining positive relations with all community stakeholders. Kerr McGee will conduct neighborhood meetings prior to development to help address community concerns as it relates to traffic. As part of their community outreach they will also provide information on how members of the public can raise issues or complaints about traffic directly to Kerr McGee for resolution. The proposed haul route included as **Attachment 2** was selected following review of potential constraints. During route planning it was determined that there are no anticipated conflicts with weight or height restrictions, travel through school zones, or conflicts with routes that are heavily used by residential commuters.

Arcadis also modeled truck movements at each intersection and the proposed access location and has confirmed the anticipated development phase traffic can safely negotiate all the necessary right- and left-hand turning movements along this route. Some minor access point modifications at the Pad, specifically driveway widening will likely be required. Truck turning movements are included in **Attachment 2**.

Based on Arcadis' review of the proposed route, existing roadway speed limits, unobstructed sight distance, and the anticipated levels of development traffic, Arcadis does not anticipate that restrictions on when deliveries are made to the facility, or use of supplemental traffic controls (e.g., flagging, temporary signage) are warranted.

Kerr McGee does not anticipate, and Arcadis agrees, that their use of public roads to develop this facility will result in a need for an increase in roadway maintenance. Any dust associated with on-site activities and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the site to the extent practical given wind conditions. Additionally, improvements to the access roads will be made such that they are constructed of 100 linear feet of crushed stone and 100 linear feet of hard surface from the point of connection to the respective public road to help mitigate dust and mud concerns. Kerr McGee will apply water or a low magnesium chloride product to dirt roads as necessary. Kerr McGee will also inspect the access regularly and clean/remove any mud or dirt that gets tracked onto public roadways, as necessary.

Kerr McGee instructs all its contractors to adhere to all posted speed limits and traffic controls as a matter of policy. Policy compliance is reinforced through a combination of training, use and review of telematics by their carriers to monitor safe behaviors and investigate concerns, and through periodic audit and review meetings.

Sincerely,

Arcadis U.S., Inc.



Steve Rice
Project Manager

Enclosures:

Attachments

1 Grading Plans
2 Haul Routes and Truck Turning Movements
3 Estimated Trip Generation Data
4 Baseline Roadway Assessment Report

ATTACHMENT 1

Grading Plans

TEMPORARY EQUIPMENT PAD - COLUMBINE 4-29HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED PAD AREA = 0.32 ACRES
TOTAL PAD AREA = 0.33 ACRES

PAD QUANTITIES

TOTAL CUT FOR PAD = 0 C.Y.
TOTAL FILL FOR PAD = 702 C.Y.
TOPSOIL @ 14" DEPTH = 625 C.Y.
IMPORT MATERIAL = 702 C.Y.

FACILITY PAD - COLUMBINE 4-29HZ FACILITY DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

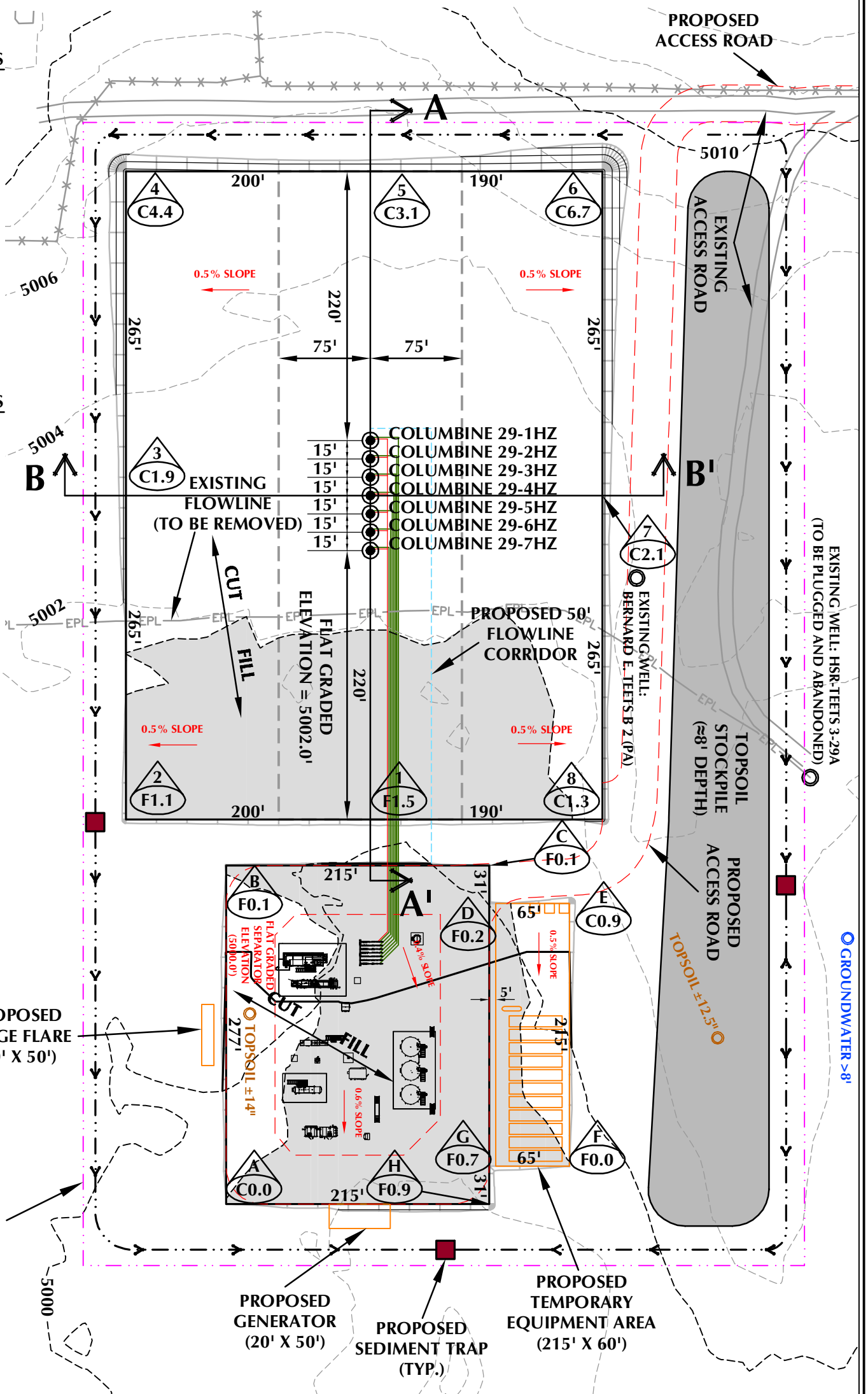
CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED FACILITY PAD AREA = 1.37 ACRES
TOTAL FACILITY PAD AREA = 1.43 ACRES

FACILITY PAD QUANTITIES

TOTAL CUT FOR FACILITY PAD = 0 C.Y.
TOTAL FILL FOR FACILITY PAD = 3,784 C.Y.
TOPSOIL @ 14" DEPTH = 2,685 C.Y.
IMPORT MATERIAL = 3,784 C.Y.

WELL NAME:	C/F
COLUMBINE 29-1HZ	C0.8
COLUMBINE 29-2HZ	C0.6
COLUMBINE 29-3HZ	C0.7
COLUMBINE 29-4HZ	C0.7
COLUMBINE 29-5HZ	C0.6
COLUMBINE 29-6HZ	C0.6
COLUMBINE 29-7HZ	C0.5

POINT NUMBER	EXISTING GRADE	FINISHED GRADE
A	4999.0	4999.0
B	5000.3	5000.4
C	5000.3	5000.4
D	5000.0	5000.2
E	5001.1	5000.2
F	4999.1	4999.1
G	4998.4	4999.1
H	4998.1	4999.0



NOTE:
FLARE IS TO BE LOCATED A MINIMUM OF 100' FROM THE NEAREST PROPOSED WELL HEAD.

NOTE:

1. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
2. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.
3. CENTER OF WELL PAD REFERENCED BELOW CORRESPONDS TO THE SURFACE LOCATION OF THE COLUMBINE 29-4HZ WELL.
4. FLAT GRADED AREA TO BE RECLAIMED DURING INTERIM RECLAMATION.

WELL PAD - COLUMBINE 4-29HZ DESIGN SUMMARY

WELL PAD QUANTITIES AND DESIGN PARAMETERS

EXISTING GRADE @ CENTER OF WELL PAD = 5002.7'
FINISHED GRADE ELEVATION = 5002.0'
CUT SLOPES = 3:1
FILL SLOPES = 3:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED WELL PAD SURFACE AREA = 4.75 ACRES
TOTAL WELL PAD AREA = 5.08 ACRES
OPERATIONAL DISTURBANCE AREA = 12.66 ACRES

WELL PAD QUANTITIES

TOTAL CUT FOR WELL PAD = 4,769 C.Y.
TOTAL FILL FOR WELL PAD = 4,769 C.Y.
TOPSOIL @ 14" DEPTH = 9,570 C.Y.
IMPORT MATERIAL = 0 C.Y.

DRAFT

FACILITY REVISION: COLUMBINE-PP-2020 REV 3A

WELL PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH AND/OR BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

WELL PAD - COLUMBINE 4-29HZ

WELL PAD - GRADING PLAN
COLUMBINE 29-1HZ,
COLUMBINE 29-2HZ, COLUMBINE 29-3HZ,
COLUMBINE 29-4HZ, COLUMBINE 29-5HZ,
COLUMBINE 29-6HZ & COLUMBINE 29-7HZ
LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

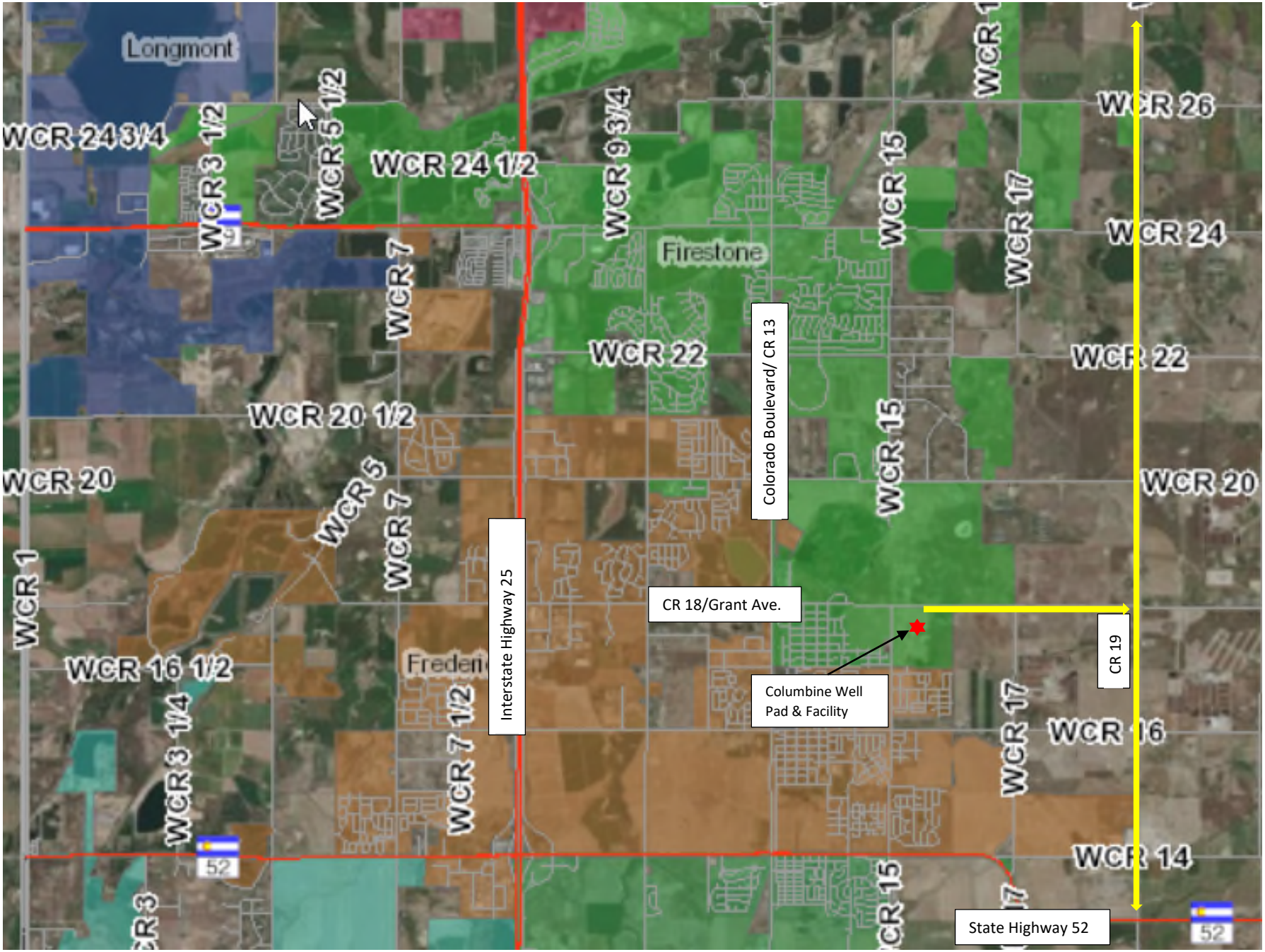
609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100' | DATE: 9/19/19 | SHEET NO: 1 1 OF 1
REVISED: HJL 4/20/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\COLUMBINE_8_HALFMOON.dwg, 4/20/2021 11:42:17 AM, steven

ATTACHMENT 2

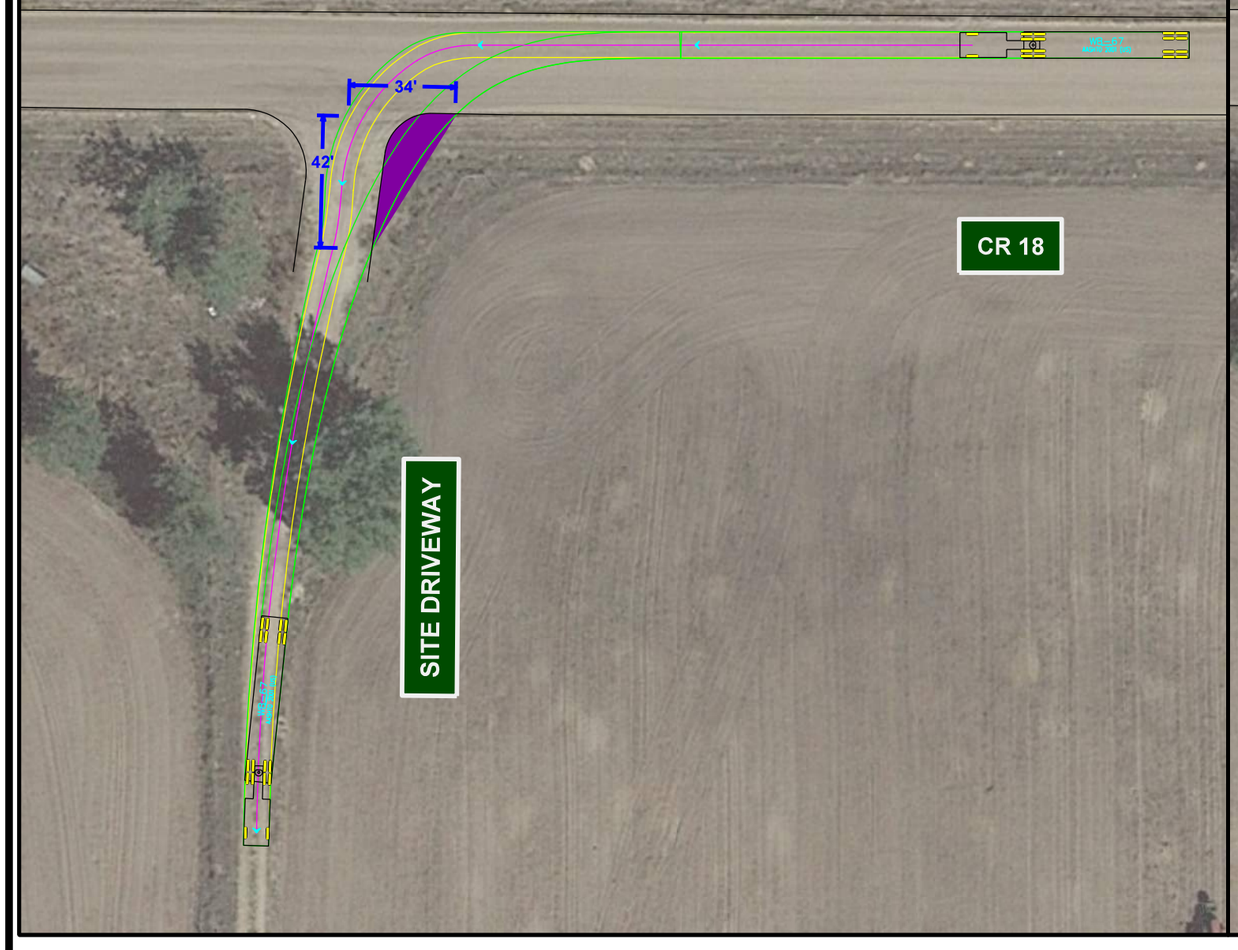
Haul Routes and Truck Turning Movements



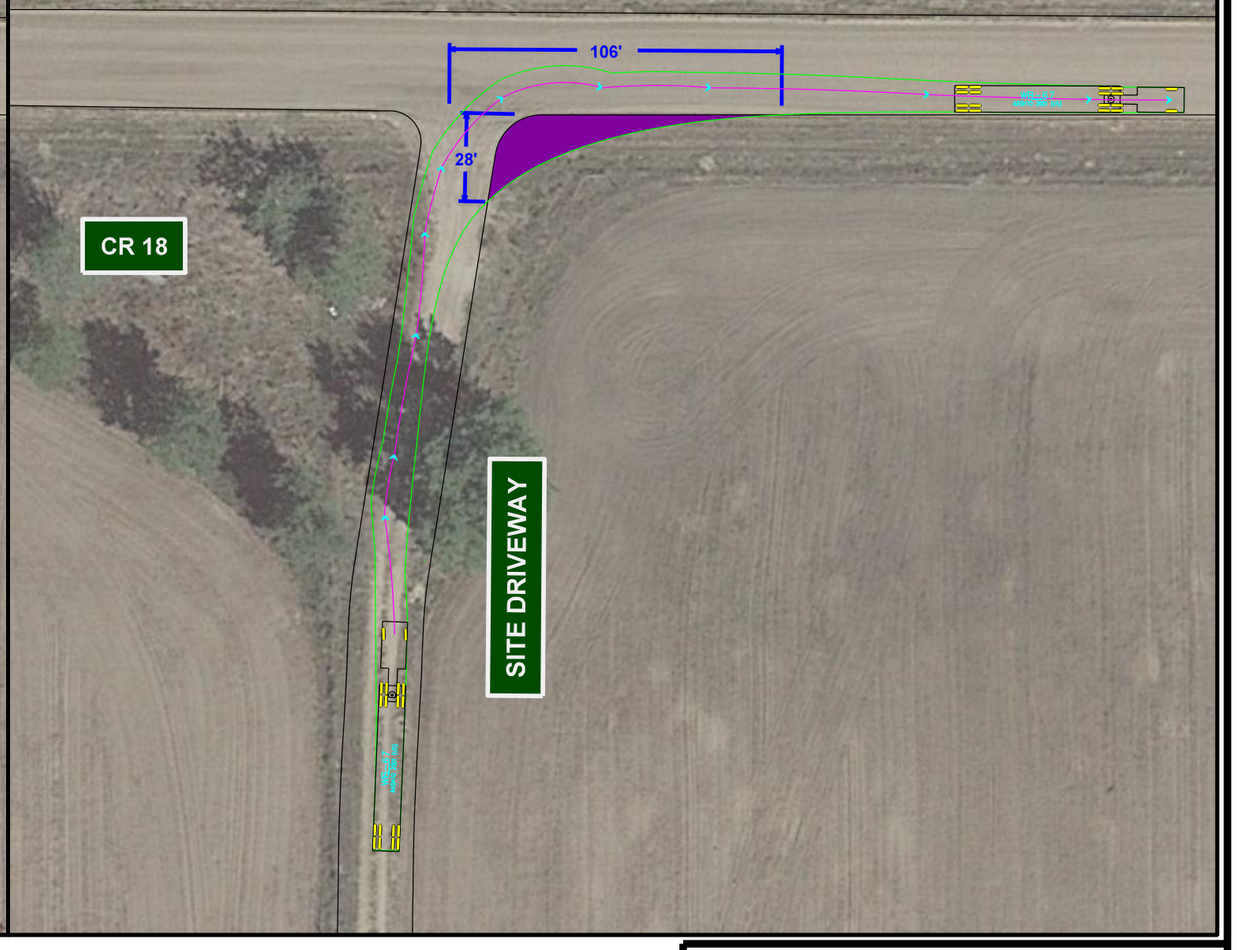
Columbine – Proposed Haul Routes

Firestone, Colorado

LEFT TURN FROM CR 18 WB ONTO SITE



RIGHT TURN FROM SITE TO CR 18 EB



LEGEND

PAVEMENT WIDENING FOR TRUCK TURNS

FIGURE 1 - TRUCKS ENTERING / EXITING COLUMBINE PAD
LEFT TURN FROM CR-18 WB ONTO SITE
RIGHT TURN FROM SITE ONTO CR-18 EB

N

0 50 100

GRAPHIC SCALE

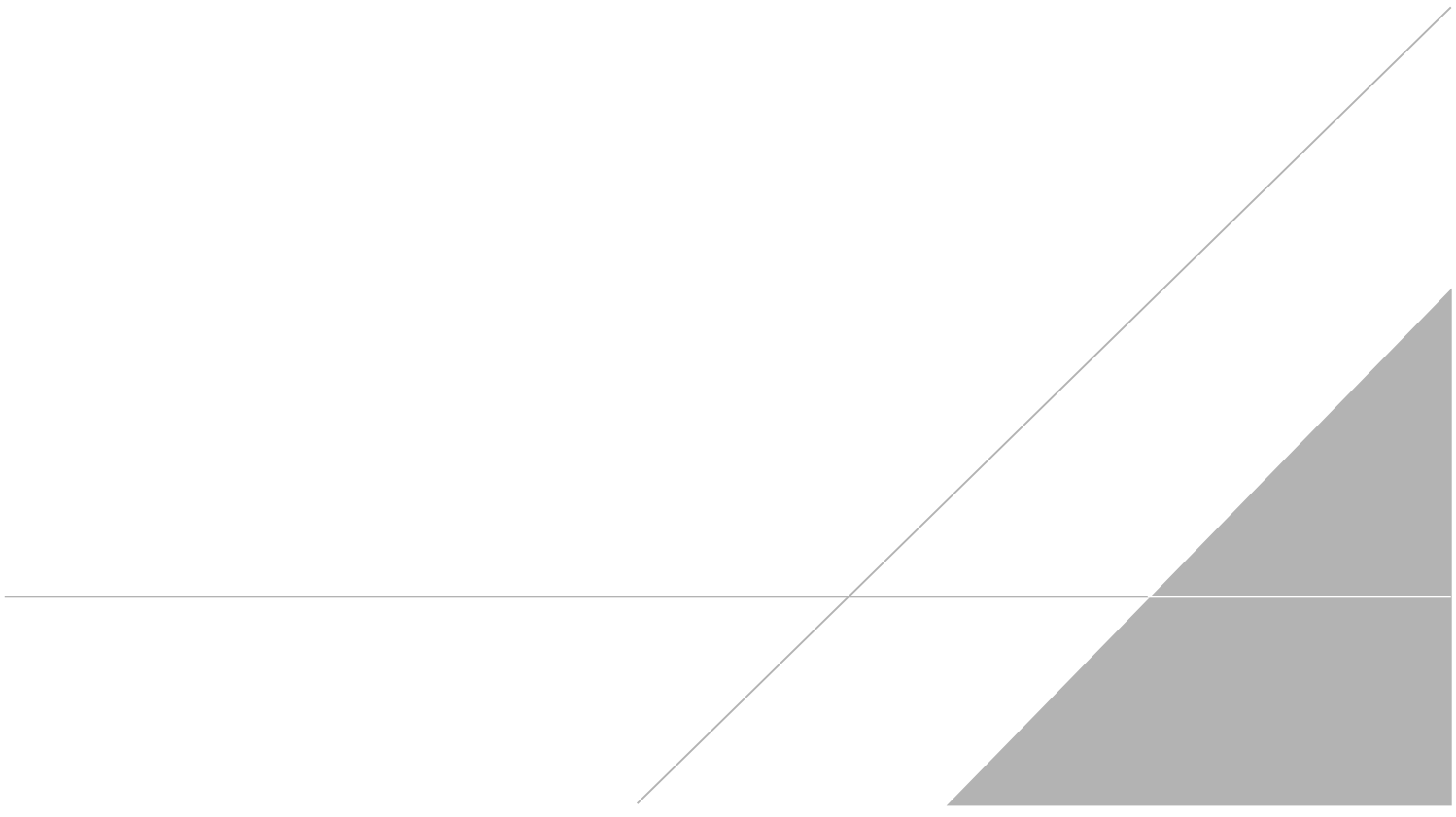
KERR MCGEE OIL AND GAS ONSHORE LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCK TURNING FIGURES

ARCADIS | FIGURE 1

ATTACHMENT 3

Estimated Trip Generation Data



COLUMBINE
Firestone, CO
Estimated Trip Generation Data
Site Preparation through Interim Reclamation

Phase of Development	Estimated Duration (days, max)[1]	Vehicle Type[2]	CDOT SHAC Equivalency Factor (PCE/Veh)[3]	Estimated Number of Veh/Day[4]		Average Daily Trips[5]		AM Peak Hour[6]						PM Peak Hour[6]						Total Trips	
								In		Out		Total		In		Out		Total			
				Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE
Site Preparation	30	Light Vehicle	1	3	3	6	6	*2*	*2*	*0*	*0*	**2**	**2**	*0*	*0*	*2*	*2*	**2**	**2**	176	176
		Single Unit	2	3	5	5	10	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	155	310
		Combo Unit	3	34	103	69	206	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,055	6,166
		Oversize Load	3	0	1	0	1	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	14	42
		Traffic Summary (Site Preparation):		**40**	**112**	**80**	**223**	*5*	*11*	*3*	*9*	**8**	**20**	*3*	*9*	*5*	*11*	**8**	**20**	**2,400**	**6,694**
Production Facility Construction	30	Light Vehicle	1	2	2	5	5	*1*	*1*	*0*	*0*	**1**	**1**	*0*	*0*	*1*	*1*	**1**	**1**	147	147
		Single Unit	2	1	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	35	70
		Combo Unit	3	7	21	14	43	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	425	1,276
		Oversize Load	3	0	1	1	2	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	22	66
		Traffic Summary (Production Facility Construction):		**10**	**26**	**21**	**52**	*3*	*7*	*2*	*6*	**5**	**13**	*2*	*6*	*3*	*7*	**5**	**13**	**629**	**1,559**
Surface Casing Preset	7	Light Vehicle	1	8	8	15	15	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	106	106
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	25	49
		Combo Unit	3	49	148	98	295	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	689	2,066
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Surface Casing Preset):		**59**	**159**	**117**	**317**	*9*	*16*	*5*	*12*	**14**	**28**	*5*	*12*	*9*	*16*	**14**	**28**	**819**	**2,221**
Surface Rig Mobilization	2	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	36	36
		Single Unit	2	11	22	22	44	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	44	88
		Combo Unit	3	176	528	352	1,056	*8*	*24*	*8*	*24*	**16**	**48**	*8*	*24*	*8*	*24*	**16**	**48**	704	2,112
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Mobilization):[7]		**198**	**564**	**395**	**1,127**	*15*	*34*	*11*	*30*	**26**	**64**	*11*	*30*	*15*	*34*	**26**	**64**	**790**	**2,254**
Sequential Drilling and Pad Regrade	66	Light Vehicle	1	24	24	49	49	*15*	*15*	*3*	*3*	**18**	**18**	*3*	*3*	*15*	*15*	**18**	**18**	3,224	3,224
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	241	482
		Combo Unit	3	7	22	15	45	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	984	2,952
		Oversize Load	3	0	1	1	3	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	59	177
		Traffic Summary (Sequential Drilling and Pad Regrade):		**34**	**52**	**68**	**104**	*18*	*23*	*6*	*11*	**24**	**34**	*6*	*11*	*18*	*23*	**24**	**34**	**4,508**	**6,835**
Surface Rig Demobilization	2	Light Vehicle	1	27	27	54	54	*16*	*16*	*3*	*3*	**19**	**19**	*3*	*3*	*16*	*16*	**19**	**19**	108	108
		Single Unit	2	11	21	21	42	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	42	84
		Combo Unit	3	146	437	291	873	*7*	*21*	*7*	*21*	**14**	**42**	*7*	*21*	*7*	*21*	**14**	**42**	582	1,746
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Demobilization):[7]		**185**	**489**	**369**	**978**	*25*	*42*	*12*	*29*	**37**	**71**	*12*	*29*	*25*	*42*	**37**	**71**	**738**	**1,956**
Well Completions	35	Light Vehicle	1	57	57	114	114	*34*	*34*	*7*	*7*	**41**	**41**	*7*	*7*	*34*	*34*	**41**	**41**	3,990	3,990
		Single Unit	2	8	15	15	30	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	525	1,050
		Combo Unit	3	19	57	38	114	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	1,330	3,990
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Well Completions):		**84**	**129**	**167**	**258**	*36*	*39*	*9*	*12*	**45**	**51**	*9*	*12*	*36*	*39*	**45**	**51**	**5,845**	**9,030**
Reclamation	30	Light Vehicle	1	15	15	30	30	*9*	*9*	*2*	*2*	**11**	**11**	*2*	*2*	*9*	*9*	**11**	**11**	902	902
		Single Unit	2	19	37	37	75	*2*	*4*	*2*	*4*	**4**	**8**	*2*	*4*	*2*	*4*	**4**	**8**	1,125	2,249
		Combo Unit	3	23	68	45	136	*2*	*6*	*2*	*6*	**4**	**12**	*2*	*6*	*2*	*6*	**4**	**12**	1,364	4,093
		Oversize Load	3	0	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	16	48
		Traffic Summary (Reclamation):		**57**	**122**	**114**	**243**	*13*	*19*	*6*	*12*	**19**	**31**	*6*	*12*	*13*	*19*	**19**	**31**	**3,407**	**7,293**
										Max AM Peak Hour:		**45**	**71**				*Max PM Peak Hour:*		**45**	**71**		
																				Development Totals:		**19,137**	**37,841**

Abbreviations:

ADT	Average Daily Trips	lbs.	pounds	PCE	Passenger Car Equivalents
CDOT	Colorado Department of Trans	GVW	Gross Vehicle Weight	SHAC	State Highway Access Code
ft	feet	KMG	Kerr McGee Oil & Gas Onshore, LP	Veh	Vehicle

Notes:

1 Estimate of phase durations is based on anticipated development expectations for each phase based on previous schedules provided by Anadarko

2 Arcadis has categorized the trip data into the four unique Vehicle Types based on trip profile data provided by KMG which summarizes traffic based on these categories. Vehicle categories include the following: Light Vehicles (e.g. pickup trucks) have a GVW between 4,500 and 8,500 lbs. and measures < 20 ft long; Single Unit vehicles (e.g. 3-axle bobtail or dump truck) having a GVW between 10,000 and 20,000 lbs. and measuring between 20-40 ft long; Combo Unit vehicles (typically a semi and Trailer) having GVW between 50,000 and 70,000 lbs., measuring between 40 and 60 ft long; Oversize Loads (low boy equip trailers, wide loads) usually having GVW greater than 70,000 lbs., and measuring between 40 and 60 feet long.

3 CDOT SHAC assumes: passenger vehicle < 20ft, single unit truck from 20 to 40 ft, multiple unit truck > 40 ft; 1 Single Unit truck = 2 PCE, and 1 Combo Unit truck = 3 PCE.

4 Estimated number of vehicles per day is based on trip generation breakdown summary provided by KMG for other similarly sized facilities. These data were then scaled/adjusted to approximate trip generation traffic for specific Pad/Facility based on the number of wells that will be drilled.

5 Average Daily Trips number assumes all vehicles make a round trip (e.g., ADT = No. of Vehicles per day x 2) and that the total trips in and out levels/evens out on a daily basis.

6 AM peak hour and PM peak hour trips are estimated based on input from KMG experience with similar facility development projects. Light truck traffic is almost entirely associated with daily crew/worker trips to the site; Approximately 60% of the worker trips associated with shift changes will likely occur during the AM and PM peak hours. The larger vehicle (Single unit, Combo units, Oversize loads), daily truck traffic will occur uniformly over the course of a 12 hour work day for the Site Preparation and Reclamation phases. Larger vehicle traffic (Single unit, Combo units, Oversize loads) during the remaining phases (e.g., casing preset, rig mobe/demobe, sequential drilling, and completions) will be spread uniformly over a 24 hour period.

7 Rig mobilization and demobilization will generally occur while temporary traffic controls are in place

ATTACHMENT 4

Baseline Roadway Assessment Report

ARCADIS Design & Consultancy for natural and built assets

Kerr McGee Oil and Gas Onshore LP

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 18 & COUNTY ROAD 19

Columbine Well Pad

Town of Firestone

Weld County, Colorado

July 23, 2020

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 18 AND COUNTY ROAD 19

Columbine Well Pad

Town of Firestone, Weld County, Colorado



Steve Rice
Project Manager

Prepared for:

Shayelyn Coppinger
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Prepared by:

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Highlands Ranch
Colorado 80129
Tel 720 344 3500
Fax 720 344 3535

Our Ref.: 30057047

Date:

July 23, 2020

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3.1 High-Speed Profiling 2

3.2 Visual Assessment 3

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3.2.2 County Road 19 4

4 Conclusions and Recommendations 4

TABLES

Table 1. Road Distress: Type and Severity

Table 2. Baseline Ride Quality Data for County Road 18

Table 3. Baseline Ride Quality Data for County Road 19

FIGURES

Figure 1. Proposed Trucking Route

Figure 2. Baseline Roadway Assessment of Proposed Trucking Routes South/Westbound Lanes

Figure 3. Baseline Roadway Assessment of Proposed Trucking Routes North/Eastbound Lanes

APPENDICES

A: HSP Charts (on DVD)

B: Visual Assessment Photographic Log

ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis U.S., Inc.
Blvd	Boulevard
CDOT	Colorado Department of Transportation
CR	County Road
Firestone	City of Firestone
FHWA	Federal Highway Administration
HSP	High Speed Profiler
Hwy	Highway
in/mi	inches per mile
IRI	International Roughness Index
Kerr McGee	Kerr McGee Oil and Gas Onshore LP
MRI	Mean Roughness Index

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) completed a baseline road assessment on behalf of Kerr McGee Oil and Gas Onshore LP (Kerr McGee) to document the current condition of select roadways maintained by both the Town of Firestone (Firestone) and Weld County, within Weld County, Colorado. The purpose of the assessment was to document baseline roadway conditions prior to planned oil and gas development activities by Kerr McGee. The assessed road segments will be used to access areas designated for new construction, operation, and production at a proposed well pad site (Columbine Pad) within the town limit of Firestone. The facility will utilize roadways within Firestone for access.

The proposed trucking routes that will be utilized by Kerr McGee for facility access include portions of County Roads 18 and 19; the full length of roadways assessed include:

- 2 miles (4 lane miles) of County Road 18, between County Road 15/Frontier Street and County Road 19
- 8.6 miles (17.2 lane miles) of County Road 19, between Hwy 52 and Hwy 66

Sections of these roadways which will not be utilized by Kerr McGee but were assessed will serve as a comparison for roadway deterioration should a follow-up assessment be performed. Specific routes utilized for each well pad location are shown on **Figure 1.**

This report documents findings from a baseline roadway assessment conducted prior to use by Kerr McGee. After interim reclamation, Kerr McGee will conduct a follow-up assessment to evaluate the nature and extent of any impacts to this road that may be attributable to construction traffic. Those findings will be documented, as appropriate, in a subsequent report.

2 ASSESSMENT OVERVIEW

The baseline roadway assessment included two separate elements. First, a high-speed profiler (HSP) was used to measure and map relative smoothness of the roadway. Following collection of the surface roughness data, Arcadis conducted a visual inspection to qualify the nature of any pavement distresses and the potential causes of any roughness anomalies. The roadway assessment and documentation efforts were completed under the supervision of an Arcadis Professional Engineer. Further discussion of how the data were collected to support this assessment is provided below.

- To provide a quantitative measure of pavement conditions, the roadway was profiled utilizing the HSP, equipped with a laser scanner, to measure smoothness of the pavement. Scans were collected on July 14, 2020 of both the right and left wheel paths, for both lanes of traffic, along the entire truck hauling route. The profiler system was calibrated, and scanner data were collected, stored, and analyzed in accordance with Colorado Department of Transportation's (CDOT's) standard practice for HSP systems (Colorado Procedure 78-14). Applicable output files from the profiling system software (viewable in Google Earth) are provided as **Appendix A** on the attached DVD. In addition, all roadway surfaces were photo-logged at 50-foot intervals in both directions to

provide additional details of baseline roadway conditions. Electronic copies of the photos and output files accompany this report as **Appendix A**.

- On July 20 and 22, 2020, Arcadis conducted a visual inspection to further assess roadway conditions, including any potential issues related to drainage or utility crossings. Photographic logs depicting key areas of concern and typical roadway conditions observed during the baseline inspection are attached as **Appendix B**. Roadway distress observations were documented and qualitatively classified using U.S. Department of Transportation guidelines and terminology[1]. **Table 1** summarizes the distress types and severity standards used to classify roadway distress during the visual assessment.

3 BASELINE DETERMINATIONS

This section summarizes the key findings and observations from the baseline assessment. The assessment included analysis of the data collected (as described in **Section 2**), as well as (1) review of findings from the HSP; and (2) observations from the visual assessment and inspection. Collectively, these data were used to prepare a summary of roadway conditions for each road segment.

3.1 High-Speed Profiling

The HSP scan was performed to record roughness and imperfections along the roadway surface. The HSP uses a line laser system to measure the ride quality of asphalt pavement, concrete pavement, and can also be used on gravel roads. The HSP system provides a high-resolution measurement of surface displacement along each wheel path over a longitudinal distance and is able to provide data output in one of several frequently used indices. These baseline results can later be compared to the final, post-completion assessment to provide a quantitative measure of roadway deterioration that occurred following the baseline survey. Baseline results of this profiling are provided in **Appendix A** and summarized on **Figures 2** and **3.** Additionally, the scanner data output, including International Roughness Index (IRI) and Mean Roughness Index (MRI) data for each lane segment, is summarized in **Tables 2 through 4**. Additional data was collected beyond to the east and west to serve as comparison of roadway deterioration beyond the segments utilized by Kerr McGee.

The IRI and MRI are measures of road smoothness, reported in units of inches per mile (in/mi). The IRI is a scale for roughness based on simulated response of a generic motor vehicle along a single wheel path of the road surface. The IRI value is determined by obtaining a suitably accurate measurement of the profile of the road, processing it through an algorithm that simulates a reference vehicle's (e.g., passenger car) response to the roughness inputs, while accounting for the suspension travel over time and distance. These indices are typically derived for one tenth of mile segments of roadway. The MRI is like IRI and is simply the calculated mean of the IRI from both wheel paths.

[1] Miller and Bellinger, 2003. "*Distress Identification Manual for the Long-Term Pavement Performance Program.*" U.S. Department of Transportation, Federal Highway Administration, Office of Infrastructure Research and Development; Publication No. FHWA-RD-031. June 2003. Fourth Edition.

In general terms, the lower the IRI or MRI, the smoother the road. For context, the Federal Highway Administration (FHWA) has established recommended IRI (or MRI) threshold values for highways and rural roadways. According to FHWA guidelines, roadways with IRI or MRI values:

- Less than 60 in/mi are considered to be in very good condition;
- Between 60 and 94 in/mi are considered to be in good condition;
- Between 95 and 119 in/mi are considered to be in fair condition;
- Between 120 and 170 in/mi are considered to be in mediocre condition; and
- Greater than 170 in/mi are considered to be in poor condition.

Typically, for asphalt or concrete paved roads, IRI values less than 170 in/mi (very good to mediocre conditions) are considered acceptable from a ride quality perspective. Road segments with IRI values greater than 170 in/mi are deemed less acceptable and often warrant further evaluation for repair or reconstruction.

3.2 Visual Assessment

The roadway visual assessment was completed using the guidelines provided in the US Department of Transportation, Distress Identification Manual to identify and further document and qualify roadway distress within the survey area. All documentation was done by walking the roadway and classifying typical roadway distress based on type and severity. Detailed photos and descriptions of the distress included in **Appendix B** document the findings of the visual assessment.

3.2.1 County Road 18

The portion of County Road 18 assessed includes an unpaved dirt/gravel segment, which runs from Country Road 15/Frontier St to County Road 19. Moderate to high wash-boarding and rutting were observed throughout the roadway, with loose aggregate on the surface and shoulders of some segments. Loose aggregate accumulated in some portions of the shoulder could impede drainage; overall ride quality was in poor condition.

Based on the FHWA recommended standards, the eastbound lane of County Road 18 MRI values indicated that 85 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), 15 percent in fair-to-mediocre (95-170 in/mi) and less than one percent of the eastbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire eastbound segment was 238 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the eastbound segment of County Road 18 and are depicted on **Figure 3**.

The MRI values determined by the HSP indicate that 80 percent of the roadway in the westbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 20 percent in fair-to-mediocre (95-170 in/mi) and less than one percent of the westbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire westbound segment was 236 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the westbound segment of County Road 18 and are depicted on **Figure 2.**

3.2.2 County Road 19

The portion of County Road 19 assessed was in the midst of being chip sealed at the time the visual survey was completed. The portion of roadway Kerr McGee intends to use runs approximately 8.5 miles between Hwy 52 and Hwy 66. For this roadway portion the overall ride quality was in good condition. Areas that were recently chip sealed showed minimal to no wear or deterioration. Areas that had yet to be chip sealed displayed low to moderate rutting, transverse cracking, and fatigue cracking.

Based on the FHWA recommended standards, the southbound lane of County Road 19 MRI values indicated that about 2 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 20 percent in fair-to-mediocre (95-170 in/mi) and 78 percent of the southbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire southbound segment was 83 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the southbound segment of County Road 19 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that approximately one percent of the roadway in the northbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 23 percent in fair-to-mediocre (95-170 in/mi) and 76 percent of the northbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire northbound segment was 85 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the northbound segment of County Road 19 and are depicted on **Figure 3.**

4 CONCLUSIONS AND RECOMMENDATIONS

The baseline road assessment is intended to provide documentation of current road conditions prior to the development activities planned by Kerr McGee. It was observed that County Road 19 is in good shape, while County Road 18 in poor condition. It can be expected that County Road 18 will deteriorate more rapidly under normal traffic and weathering since it is an unpaved dirt/gravel roadway.

Kerr McGee will conduct a follow-up survey of these roadways once their interim reclamation activities are substantively complete. The follow up survey should include a visual assessment of the roads and an evaluation of ride quality using the HSP scanner. The assessment and HSP scan can then be compared to these baseline observations to identify roadway segments that may have been adversely impacted or distressed by construction traffic.

In the interim, Arcadis also recommends that Kerr McGee's construction foreman periodically inspect and monitor the condition of these roadways during the construction period. If, based on the monitoring, it is determined that interim repairs or further distress mitigation efforts are warranted, mitigation efforts (e.g., routing/filling cracks, pothole repairs) should be discussed with Arcadis, Firestone's Engineers, and performed as necessary to prevent significant or accelerated deterioration of these roadways.

TABLES



Table 1
Road Distress: Type and Severity

Distress Type	Distress Description	Severity Levels
Block Cracking	A pattern of cracks that turns pavement into approximately rectangle pieces, ranging from 0.1 m^2 (square meter) to 10 m^2.	Low - Cracks with a mean width ≤ 6 millimeters (mm). Moderate - Cracks with a mean width greater than (>) 6 mm and less than or equal to (≤) 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to low severity random cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to high-severity random cracking.
Fatigue Cracking	Occurs in areas subject to repeated traffic loading (wheel paths). Can be a series of interconnecting cracks in early stages of development. Develops into many-sided, sharp, angled pieces, usually less than 0.3 m. Often referred to as 'chicken wire' or 'alligator' cracking in later stages.	Low - An area of cracks with no or only few connecting cracks; cracks are not spalled or sealed. Moderate - An area of interconnecting cracks forming a complete pattern; may be slightly spalled, and cracks may be sealed. High - An area of interconnecting cracks forming a complete pattern; pieces may move when subject to traffic.
Longitudinal Cracking	Cracks predominantly parallel to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 mm and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low-severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to moderate- to high-severity random cracking.
Transverse Cracking	Cracks predominantly perpendicular to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 m and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent moderate- to high-severity random cracking.
Rutting	A rut is a longitudinal surface depression in the wheel path. It may be associated with transverse displacement.	Not applicable (N/A). Severity levels can be defined by categorizing the measurements collected.

Table 2
Bsaeline Ride Quality Data for County Road 18

Eastbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	240.0	276.1	258
2	528	1056	528	246.4	252.2	249
3	1056	1584	528	146.3	209.9	178
4	1584	2112	528	199.6	273.6	237
5	2112	2640	528	209.3	187.3	198
6	2640	3168	528	168.3	277.0	223
7	3168	3696	528	257.3	236.9	247
8	3696	4224	528	218.9	209.3	214
9	4224	4752	528	361.8	394.7	378
10	4752	5280	528	312.0	310.7	311
11	5280	5808	528	278.7	221.6	250
12	5808	6336	528	252.6	198.0	225
13	6336	6864	528	271.5	236.4	254
14	6864	7392	528	287.1	294.0	291
15	7392	7920	528	450.1	351.1	401
16	7920	8448	528	218.6	246.3	232
17	8448	8976	528	188.7	100.7	145
18	8976	9504	528	136.7	92.2	114
19	9504	10032	528	193.6	85.4	139
20	10032	10515.6	484	240.2	203.0	222
		Overall Averages:		**244**	**233**	**238**

Westbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	258.9	256.0	257
2	528	1056	528	189.9	181.0	185
3	1056	1584	528	165.4	182.3	174
4	1584	2112	528	163.6	185.1	174
5	2112	2640	528	120.5	192.8	157
6	2640	3168	528	153.3	145.8	150
7	3168	3696	528	158.3	190.6	174
8	3696	4224	528	183.1	139.8	161
9	4224	4752	528	145.5	105.6	126
10	4752	5280	528	219.0	166.0	193
11	5280	5808	528	421.8	320.9	371
12	5808	6336	528	366.0	344.3	355
13	6336	6864	528	267.1	257.0	262
14	6864	7392	528	310.9	213.0	262
15	7392	7920	528	216.6	223.9	220
16	7920	8448	528	403.9	285.2	345
17	8448	8976	528	363.0	183.8	273
18	8976	9504	528	257.1	272.1	265
19	9504	10032	528	271.9	320.7	296
20	10032	10501.3	469	340.8	298.9	320
		Overall Averages:		**248**	**223**	**236**

Table 2
Bsaeline Ride Quality Data for County Road 18

Abbreviations:

IRI	International Roughness Index
MRI	Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The eastbound route began at GPS location 40.1166317122222 N 104.923761281667 W and ended at GPS location 40.1165025368889 N 104.887988146667 W. The westbound route began at GPS location 40.1165479767901 N 104.88624182321 W and ended at GPS location 40.1166852238889 N 104.922102417963 W.

Table 3
Baseline Ride Quality Data for County Road 19

Southbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	123.2	146.3	135
2	528	1056	528	89.0	77.6	83
3	1056	1584	528	96.0	70.2	83
4	1584	2112	528	75.1	63.9	70
5	2112	2640	528	72.4	71.6	72
6	2640	3168	528	68.2	64.5	66
7	3168	3696	528	73.7	70.3	72
8	3696	4224	528	69.1	79.1	74
9	4224	4752	528	62.6	77.0	70
10	4752	5280	528	77.6	112.4	95
11	5280	5808	528	49.8	58.8	54
12	5808	6336	528	62.1	74.4	68
13	6336	6864	528	67.1	85.3	76
14	6864	7392	528	58.1	82.1	70
15	7392	7920	528	58.1	86.3	72
16	7920	8448	528	56.0	69.1	63
17	8448	8976	528	67.7	80.2	74
18	8976	9504	528	64.5	72.8	69
19	9504	10032	528	57.2	58.0	58
20	10032	10560	528	120.5	143.0	132
21	10560	11088	528	94.9	116.9	106
22	11088	11616	528	80.4	101.8	91
23	11616	12144	528	96.3	115.8	106
24	12144	12672	528	105.4	124.4	115
25	12672	13200	528	79.3	80.0	80
26	13200	13728	528	94.4	141.7	118
27	13728	14256	528	80.5	95.5	88
28	14256	14784	528	85.5	109.0	97
29	14784	15312	528	85.1	114.2	100
30	15312	15840	528	90.7	124.8	108
31	15840	16368	528	136.6	163.2	150
32	16368	16896	528	57.2	57.6	57
33	16896	17424	528	50.3	60.9	56
34	17424	17952	528	59.2	55.9	58
35	17952	18480	528	71.1	86.4	79
36	18480	19008	528	63.1	77.1	70
37	19008	19536	528	56.0	67.8	62
38	19536	20064	528	46.8	67.7	57
39	20064	20592	528	55.3	62.1	59
40	20592	21120	528	48.9	52.4	51
41	21120	21648	528	62.8	70.5	67
42	21648	22176	528	48.9	57.1	53
43	22176	22704	528	51.0	60.2	56
44	22704	23232	528	50.3	68.0	59
45	23232	23760	528	45.1	52.5	49
46	23760	24288	528	68.6	73.9	71
47	24288	24816	528	54.9	64.8	60
48	24816	25344	528	61.9	81.5	72

Table 3
Baseline Ride Quality Data for County Road 19

49	25344	25872	528	68.7	71.1	70
50	25872	26400	528	59.9	76.7	68
51	26400	26928	528	147.3	138.5	143
52	26928	27456	528	68.8	75.1	72
53	27456	27984	528	76.4	72.7	75
54	27984	28512	528	68.3	62.2	65
55	28512	29040	528	70.7	70.2	70
56	29040	29568	528	62.8	80.4	72
57	29568	30096	528	62.4	72.9	68
58	30096	30624	528	100.5	106.3	103
59	30624	31152	528	88.5	118.3	103
60	31152	31680	528	63.4	60.8	62
61	31680	32208	528	72.4	85.5	79
62	32208	32736	528	59.4	81.3	70
63	32736	33264	528	72.7	91.0	82
64	33264	33792	528	92.5	105.1	99
65	33792	34320	528	64.9	98.8	82
66	34320	34848	528	71.8	84.0	78
67	34848	35376	528	63.4	70.6	67
68	35376	35904	528	60.9	71.6	66
69	35904	36432	528	72.5	74.7	74
70	36432	36960	528	86.2	85.0	86
71	36960	37488	528	104.7	111.2	108
72	37488	38016	528	64.7	77.1	71
73	38016	38544	528	66.2	76.0	71
74	38544	39072	528	80.8	87.8	84
75	39072	39600	528	73.0	95.7	84
76	39600	40128	528	80.3	95.9	88
77	40128	40656	528	79.3	120.5	100
78	40656	41184	528	75.6	106.6	91
79	41184	41712	528	84.0	108.5	96
80	41712	42240	528	70.8	80.9	76
81	42240	42768	528	88.9	102.3	96
82	42768	43296	528	67.9	69.2	69
83	43296	43824	528	63.2	94.9	79
84	43824	44352	528	69.4	112.1	91
85	44352	44880	528	75.0	97.6	86
86	44880	45194.8	315	601.3	571.8	587
			Overall Averages:	**77**	**90**	**83**

Northbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	137.8	161.1	149
2	528	1056	528	80.4	104.8	93
3	1056	1584	528	71.4	74.6	73
4	1584	2112	528	79.3	100.7	90
5	2112	2640	528	81.3	76.7	79
6	2640	3168	528	115.5	105.0	110
7	3168	3696	528	80.7	97.2	89
8	3696	4224	528	78.8	89.3	84
9	4224	4752	528	84.4	77.4	81

Table 3
Baseline Ride Quality Data for County Road 19

10	4752	5280	528	82.6	100.7	92
11	5280	5808	528	68.0	92.5	80
12	5808	6336	528	84.1	102.2	93
13	6336	6864	528	80.1	79.1	80
14	6864	7392	528	85.4	84.6	85
15	7392	7920	528	101.1	130.7	116
16	7920	8448	528	74.3	87.8	81
17	8448	8976	528	70.5	94.2	82
18	8976	9504	528	65.0	69.0	67
19	9504	10032	528	71.7	71.5	72
20	10032	10560	528	66.4	64.2	65
21	10560	11088	528	82.9	86.7	85
22	11088	11616	528	107.9	114.3	111
23	11616	12144	528	83.9	107.1	95
24	12144	12672	528	74.4	103.1	89
25	12672	13200	528	79.5	114.4	97
26	13200	13728	528	82.6	101.4	92
27	13728	14256	528	79.1	82.2	81
28	14256	14784	528	108.4	113.9	111
29	14784	15312	528	79.9	79.4	80
30	15312	15840	528	87.1	108.0	98
31	15840	16368	528	118.7	146.8	133
32	16368	16896	528	97.5	100.0	99
33	16896	17424	528	90.7	138.8	115
34	17424	17952	528	75.7	84.0	80
35	17952	18480	528	76.5	69.6	73
36	18480	19008	528	167.0	168.1	168
37	19008	19536	528	102.2	74.6	88
38	19536	20064	528	87.4	65.9	77
39	20064	20592	528	85.8	63.1	74
40	20592	21120	528	93.3	75.9	85
41	21120	21648	528	94.9	71.1	83
42	21648	22176	528	90.2	58.3	74
43	22176	22704	528	74.1	66.3	70
44	22704	23232	528	117.9	65.9	92
45	23232	23760	528	118.5	73.8	96
46	23760	24288	528	93.8	86.0	90
47	24288	24816	528	84.4	54.9	70
48	24816	25344	528	66.7	59.3	63
49	25344	25872	528	58.5	59.5	59
50	25872	26400	528	62.6	76.4	70
51	26400	26928	528	85.8	90.4	88
52	26928	27456	528	89.8	84.5	87
53	27456	27984	528	69.4	56.7	63
54	27984	28512	528	64.4	62.6	64
55	28512	29040	528	77.6	68.8	73
56	29040	29568	528	128.5	157.2	143
57	29568	30096	528	77.4	84.7	81
58	30096	30624	528	69.8	78.7	74
59	30624	31152	528	86.4	90.4	88
60	31152	31680	528	88.3	114.8	102
61	31680	32208	528	95.2	106.3	101
62	32208	32736	528	103.0	93.7	98

Table 3
Baseline Ride Quality Data for County Road 19

63	32736	33264	528	108.8	119.4	114
64	33264	33792	528	83.2	102.4	93
65	33792	34320	528	101.7	108.2	105
66	34320	34848	528	111.9	99.1	106
67	34848	35376	528	69.0	78.9	74
68	35376	35904	528	79.9	87.9	84
69	35904	36432	528	68.3	64.4	66
70	36432	36960	528	47.4	50.9	49
71	36960	37488	528	58.8	67.6	63
72	37488	38016	528	43.4	51.5	47
73	38016	38544	528	57.7	63.1	60
74	38544	39072	528	53.3	60.8	57
75	39072	39600	528	61.5	69.0	65
76	39600	40128	528	60.7	77.3	69
77	40128	40656	528	53.2	63.0	58
78	40656	41184	528	66.7	77.0	72
79	41184	41712	528	54.3	62.2	58
80	41712	42240	528	67.1	73.5	70
81	42240	42768	528	66.4	69.4	68
82	42768	43296	528	51.8	54.1	53
83	43296	43824	528	59.9	65.1	63
84	43824	44352	528	59.4	80.1	70
85	44352	44880	528	67.4	96.6	82
86	44880	45140.6	261	215.2	259.3	237
			Overall Averages:	**83**	**88**	**85**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

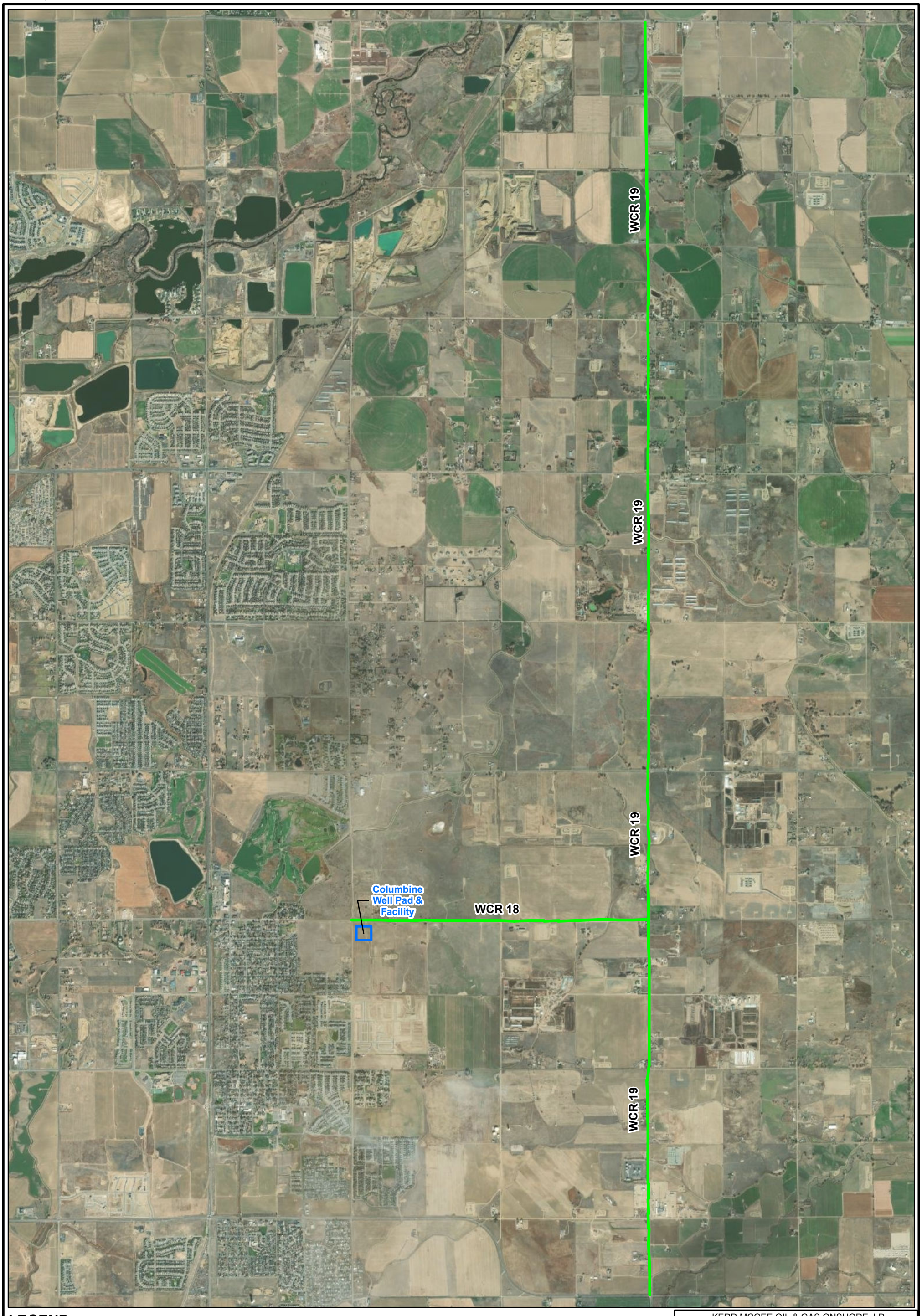
Good/Very Good <95 inches/mile 94.0
Fair/Mediocre 95-170 inches/mile 169.0
Less than acceptable >170 inches/mile 170.0

Notes:

Data was collected on July 14, 2020.
The start and stop locations were based on GPS coordinates. The southbound route began at GPS location 40.2038265215873 N 104.885933164921 W and ended at GPS location 40.0807181466162 N 104.886453600556 W. The northbound route began at GPS location 40.0800714961111 N 104.886415832222 W and ended at GPS location 40.2031560818519 N 104.885884058287 W.

FIGURES

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig1_Firestone_Trucking_Route_Columbine.mxd
12/13/2021, 4:37:54 PM



LEGEND

- Trucking Route
- Access Road
- Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

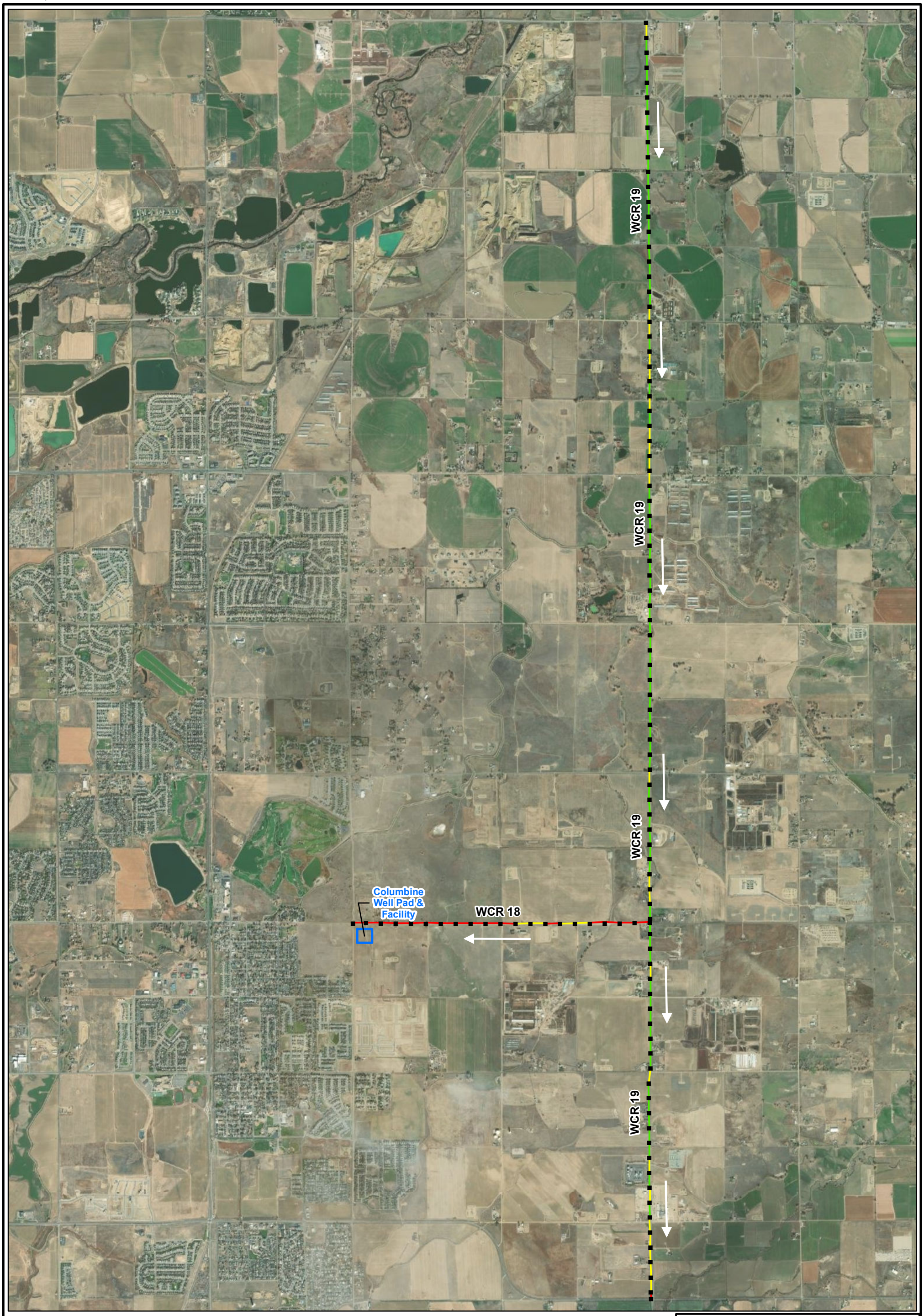
KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCKING ROUTE
WELD COUNTY ROADS 18 AND 19

ARCADIS | FIGURE 1

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig2_Firestone_Southbound_Westbound_Columbine.mxd
12/13/2021, 4:38:46 PM



LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

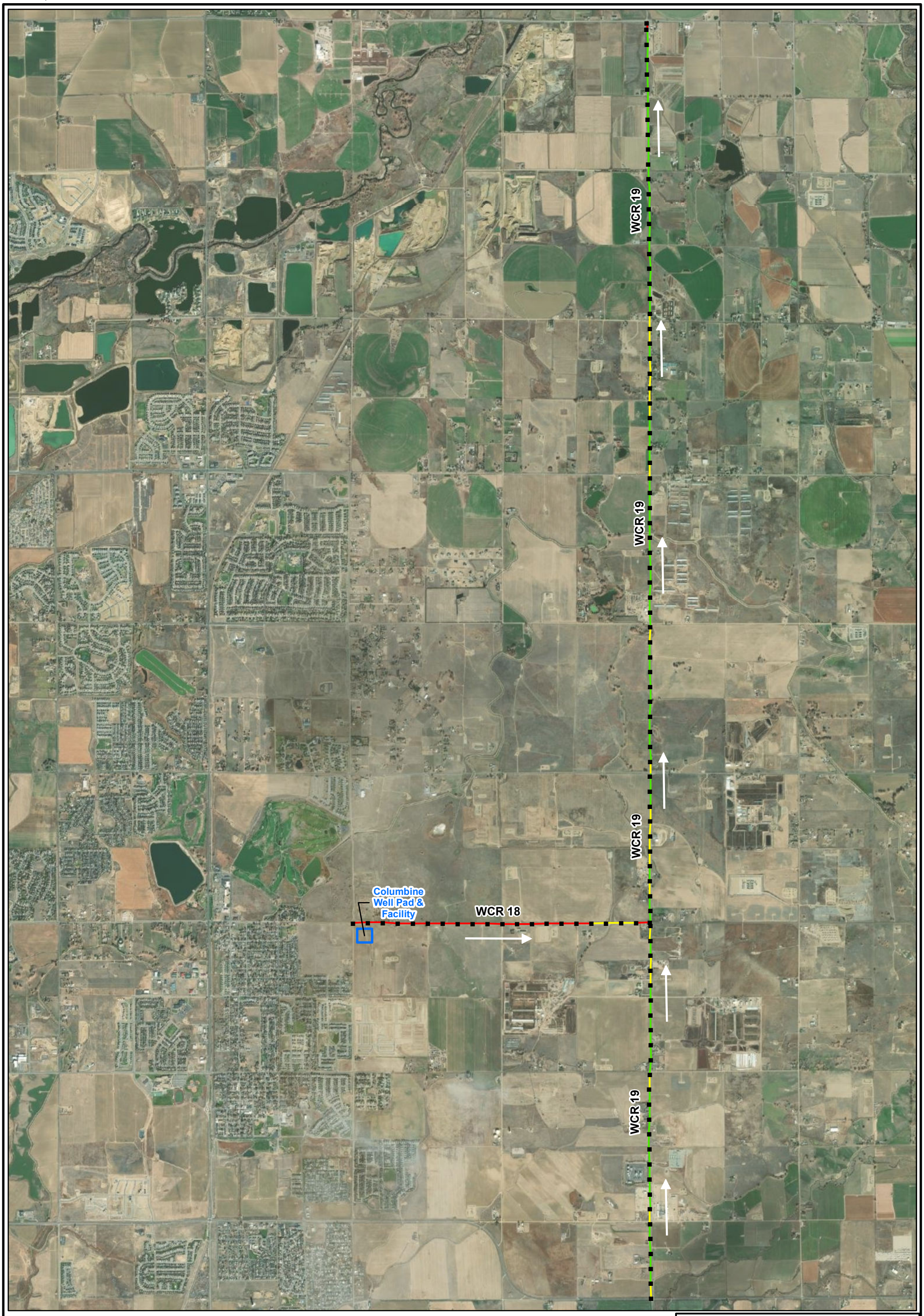
ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 18 AND 19 SOUTH/WESTBOUND

ARCADIS

FIGURE
2

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig3_Firestone_Northbound_Eastbound_Columbine.mxd
12/13/2021, 4:39:38 PM



LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 18 AND 19 NORTH/EASTBOUND

ARCADIS

FIGURE 3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX A

HSP Charts (on DVD)

APPENDIX B

Visual Assessment Photographic Log

Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 18
Time:	9:46:02 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165448504214	Longitude	-104.88643448
Primary Distress:	Washboarding	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 18
Time:	9:48:33 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165635698409	Longitude	-104.89613294
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:49:01 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1165107870755	Longitude	-104.90507745
Primary Distress:	Washboarding	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:49:51 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.116523401852	Longitude	-104.90515766
Primary Distress:	Washboarding	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:53:14 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165405731753	Longitude	-104.90516843
Primary Distress:	Washboarding	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:55:13 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.116649143338	Longitude	-104.9179117
Primary Distress:	Washboarding	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:55:41 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1167133534437	Longitude	-104.92364684
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	9:59:40 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.2033372524287	Longitude	-104.88592954
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:00:47 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.2035102919943	Longitude	-104.88595845
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:04:05 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.195439346691	Longitude	-104.88589878
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:05:35 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1926557692914	Longitude	-104.88584477
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:07:25 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1847935416447	Longitude	-104.88580319
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:10:16 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.1747943941366	Longitude	-104.88575508
Primary Distress:	Fatigue (Alligator) Cracking	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:09:01 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1750818809408	Longitude	-104.88554018
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:	Fatigue (Alligator) Cracking	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:12:58 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1671455216539	Longitude	-104.88585588
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:15 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1597934500299	Longitude	-104.88595731
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:53 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1597814141739	Longitude	-104.88590627
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:20:11 AM	Section:	Mile 3.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1525085552292	Longitude	-104.88601847
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:05 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1456340336325	Longitude	-104.88612623
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:46 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1452690824332	Longitude	-104.88604164
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:24:33 AM	Section:	Mile 4.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1366233153063	Longitude	-104.88609123
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:09 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1317873269072	Longitude	-104.88607846
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:53 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1309659491344	Longitude	-104.88615778
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:29:26 AM	Section:	Mile 5.6
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1308417098263	Longitude	-104.88616857
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:32:15 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1164490931005	Longitude	-104.88631309
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:33:08 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1166034760774	Longitude	-104.88625442
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:35:39 AM	Section:	Mile 6.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1145219424268	Longitude	-104.88618993
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:05 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1085079818709	Longitude	-104.88627954
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:55 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1018067201925	Longitude	-104.88645202
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:42:07 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1017782490729	Longitude	-104.88645283
Primary Distress:	Transverse Cracking	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:43:20 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.0874621404114	Longitude	-104.88654459
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:46:29 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.0873702162933	Longitude	-104.88652399
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:48:47 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.0802392466538	Longitude	-104.88660283
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



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Section 14

Reclamation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Interim Reclamation Plan

Columbine 4-29HZ Well Pad and Facility

Firestone, CO

June 2021

TABLE OF CONTENTS

1.0 INTRODUCTION....1
2.0 SITE DESCRIPTION....1
3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES....2
4.0 INSPECTION AND MAINTENANCE PROCEDURES....3
4.1 Inspections....3
4.2 Maintenance....3

APPENDICES

Appendix A Seed Mix
Appendix B Grading Plan for Production Phase

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has developed this site-specific Interim Reclamation Plan to establish proper planning and execution for reclamation of the land within areas that are affected by oil and gas location construction and operations, but no longer in use by production operations. When all wells on a pad are completed and turned over to production, the drilling footprint will be reduced, and areas not needed for production will be restored and re-vegetated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) Series 1000 Reclamation Rules and consistent with the requirements of Rule 1003. Interim Reclamation. Reference shall also be made to Rules 304.c(14) Topsoil Protection Plan and 304.c(15) Stormwater Management Plan within this process.

Soil and aggregate mix used to build a compacted drilling pad will be removed. All segregated soil horizons removed from the disturbance area shall be replaced to their original relative positions and contour based on final land use and shall be tilled adequately to alleviate compaction and re-establish a proper seedbed. Final contour, irrigation, and landscape construction, including plantings and perennial seeding, will occur in the first favorable season. The area shall be treated as necessary to prevent invasion of undesirable species and noxious weeds as practicable. The site will be stabilized, inspected, and maintained to control erosion.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	Columbine 4-29HZ Well Pad and Facility
Location:	Sec 29, T2N, Range 67W, Firestone, Colorado
Total Area of Project:	12.66 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is winter wheat, land use is agriculture
Soil Type(s):	44-Olney loamy sand, 1-3% slopes 73-Vona loamy sand, 3-5% slopes
Operator ID:	47120
Reclamation Manager/Contact:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation 720-929-6317

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

1) Surface Owner Consultation and Timing: KMOG is the surface owner and interim reclamation shall occur approximately no later than 10/30/2023 after conclusion of subsequent operations. If soil conditions are not conducive due to weather conditions, a Sundry Notice Form 4 shall be submitted, and reclamation commenced as soon as conditions allow and as practicable.
2) Recontouring, Compaction Relief and Topsoil Redistribution: Refer to the Topsoil Protection Plan to address site specific requirements.
3) Soil Preparation: Equipment to be cleaned from soil or debris prior to mobilizing and commencing soil preparation operations between properties.
    a) Compaction Alleviation: After topsoil redistribution, the interim reclamation area shall be cross ripped to a depth of eighteen inches with an agricultural ripper/subsoiler; however, this depth may be adjusted in rocky or shallow soils. Chiseling/ripping will be performed at the minimum depth of topsoil. Cultipacking or disking may be required to reduce soil clod size. Ripping with construction style shanks, for the purpose of surface ridge roughness as a stormwater BMP, is only allowed to a six-inch depth.
    b) Leveling: All areas will be leveled and graded to drain properly and blend to the adjacent undisturbed land.
    c) Soil Amendments: Necessary amendments will be determined by soil analysis completed during Topsoil Protection Plan Site Investigation, land use, site conditions at time of interim reclamation, and surface owner consultation.
    d) Seedbed Preparation: Incorporate soil amendments by disking, harrowing or cultipacking and to provide a seedbed that is firm and friable, and properly crimp straw mulch material.
    e) Surface Rock Removal: Surface rocks that interfere with agricultural operations, seeding equipment or future mowing operations will be removed.
4) Seeding: Seed mix is considered based on consultations with NRCS, CPW, and Surface Owner; also, by soil type, land use, adjacent reference area vegetation and in accordance with Rule 1202.a.6. Seeding shall not occur in windy conditions or when the soil is frozen or wet. Equipment to be cleaned from previous mixes, soil, or debris, prior to mobilizing and commencing seeding operations between properties. Seed shall be applied using appropriate equipment that can place the specified seed at the specified rate and depth included as Appendix A.
5) Mulching: Due to location being in cropland, mulch will not be applied.
6) Implement Post-Construction Stormwater Control Measures: Additional erosion control measures and materials should include consideration of land use, surface owner grazing practices, and potential damage to materials. Refer to a site-specific stormwater management plan prior to implementation.
7) Weed control: Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act.
    a) Weed control measures shall be conducted in consultation with the Surface Owner and County Weed Management Specialist(s) based on site specific conditions. Kerr-McGee will monitor and control noxious weeds until achieving reclamation threshold for release within

reclaimed disturbance areas, including monitoring to measure success of treatments. Weed control measures employed may include mowing or removal and herbicide treatment during the appropriate growing season. During drilling, production, and reclamation operations, all disturbed areas shall be kept reasonably free of noxious weeds and undesirable species.

4.0 INSPECTION AND MAINTENANCE PROCEDURES

4.1 Inspections

Post-construction stormwater inspections will be conducted in accordance with COGCC Rules 1002.f and 1003.e, to document the status of the location, maintenance needs, effectiveness of stormwater control measures, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Reclamation Contact and conducted by their designated representative(s). Inspection forms will document current conditions, including evidence of or potential for off-site erosion, additional control measures that are needed, or repair and maintenance issues.

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection.

4.2 Maintenance

For maintenance items discovered, proposed repairs or upgrades to stormwater control measures, and reclamation areas will be documented and coordinated with production crews. Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for items requiring ground disturbance / earthwork.

APPENDIX A

Seed Mix

FORM 2B INTERIM RECLAMATION PLAN
(Appendix A): Seed Mix

Project/Site Name	Location	Existing Vegetation	Operator ID
COLUMBINE 4-29HZ Well Pad and Facility	T 2N: 67W Sec 29	Winter wheat, agricultural field	47120

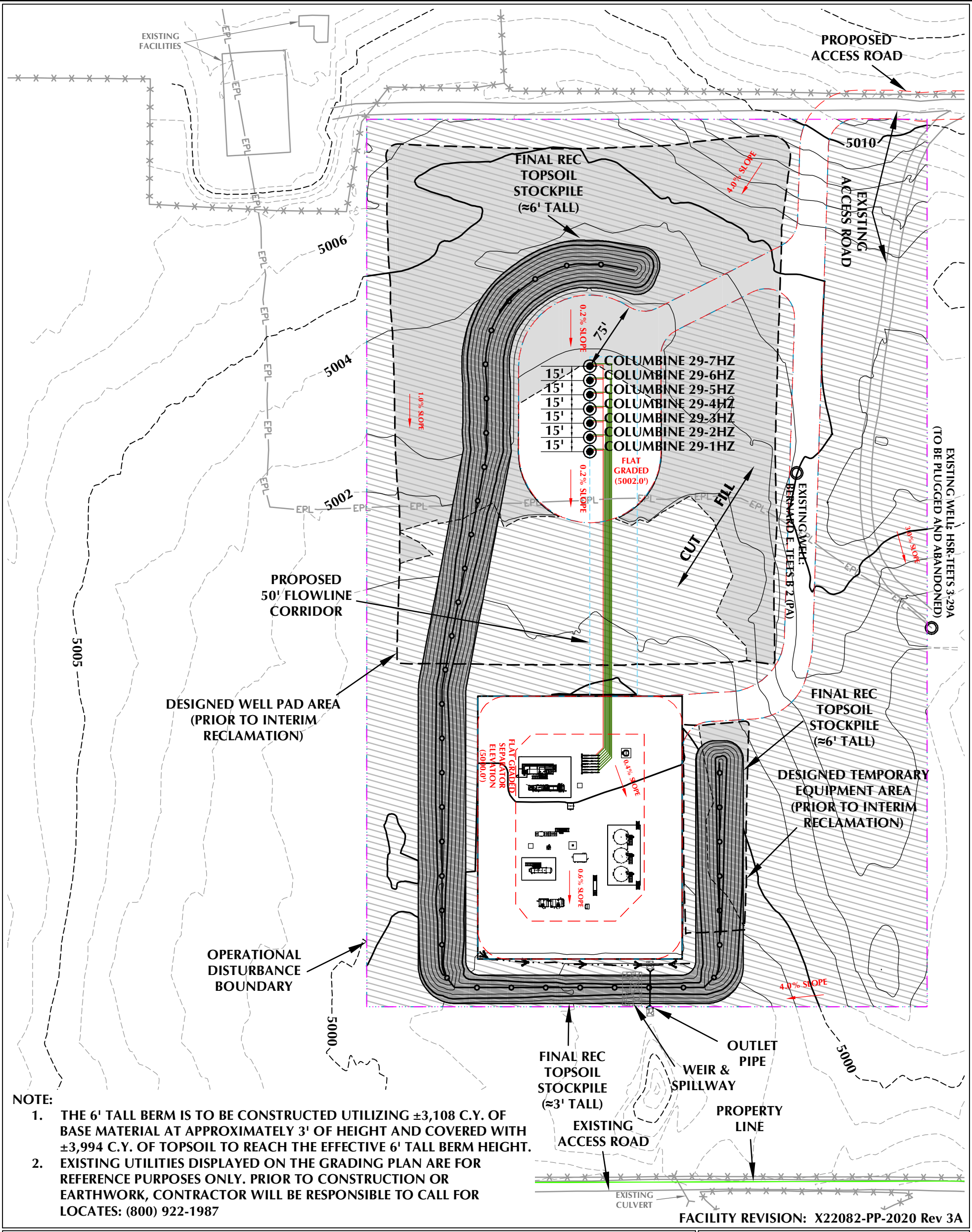
Landowner Requested Seed Mix

Crop Location

Due to the existing agricultural nature of the surrounding land to the proposed project, reclamation will be done to meet the requirements of Rule 1003.e.1. Segregated soil horizons will be replaced to their relative positions and contour, compaction alleviated, and proper preparation of the seed bed will occur.

APPENDIX B

Production Phase Grading Plan



NOTE:

1. THE 6' TALL BERM IS TO BE CONSTRUCTED UTILIZING ±3,108 C.Y. OF BASE MATERIAL AT APPROXIMATELY 3' OF HEIGHT AND COVERED WITH ±3,994 C.Y. OF TOPSOIL TO REACH THE EFFECTIVE 6' TALL BERM HEIGHT.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987

FACILITY REVISION: X22082-PP-2020 Rev 3A

WELL PAD - COLUMBINE 4-29HZ INTERIM RECLAMATION SUMMARY

QUANTITIES AND DESIGN PARAMETERS

SHRINKAGE FACTOR = 1.00
SWELL FACTOR = 1.00
TOTAL DISTURBANCE AREA = 12.66 ACRES
AREA RECLAIMED DURING
INTERIM RECLAMATION = 9.93 ACRES
TOTAL WELL PAD AREA AFTER
INTERIM RECLAMATION = 1.36 ACRES
TOTAL FACILITY PAD AREA AFTER
INTERIM RECLAMATION = 1.37 ACRES

WELL PAD QUANTITIES

TOTAL CUT = 1,119 C.Y.
TOTAL FILL = 1,119 C.Y.
TOPSOIL @ 14" DEPTH
FROM WELL PAD = 9,570 C.Y.
TOPSOIL @ 14" DEPTH
FROM FACILITY/TEMP TANK PAD = 3,310 C.Y.
TOTAL TOPSOIL = 12,880 C.Y.
TOPSOIL USED FOR INTERM REC = 8,886 C.Y.
TOPSOIL STORED FOR FINAL REC = 3,994 C.Y.
LAND USE = DRYLAND CROP

WELL PAD LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION
- EXISTING CONTOURS (1' INTERVAL)
- PROPOSED CONTOURS (1' INTERVAL)
- EXISTING PIPELINE
- PROPOSED FLOWLINE
- EXISTING FENCE
- RECLAMATION AREA
- BERM

HORIZONTAL 0 50' 100' 1" = 100'
1' CONTOURS

WELL PAD - COLUMBINE 4-29HZ

WELL PAD - INTERIM RECLAMATION
COLUMBINE 29-1HZ,
COLUMBINE 29-2HZ, COLUMBINE 29-3HZ,
COLUMBINE 29-4HZ, COLUMBINE 29-5HZ,
COLUMBINE 29-6HZ & COLUMBINE 29-7HZ
LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100'	DATE: 9/23/2020	SHEET NO:
REVISED: HJL 6/17/21		1 1 OF 1

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\COLUMBINE_8_HALFMOON.dwg, 6/23/2021 2:21:32 PM, hayden

Section 15

Community Consultation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Community Consultation Plan

McGavin 6-19HZ and Columbine 4-29HZ Well Pads

DESCRIPTION OF AREA

The McGavin Working Pad Surface (WPS) is owned by the applicant and is located in the Town of Firestone, adjacent to the Town of Frederick. The McGavin pad is located south of Pine Cone Ave (CR 20) and east of Colorado Blvd (CR 13).

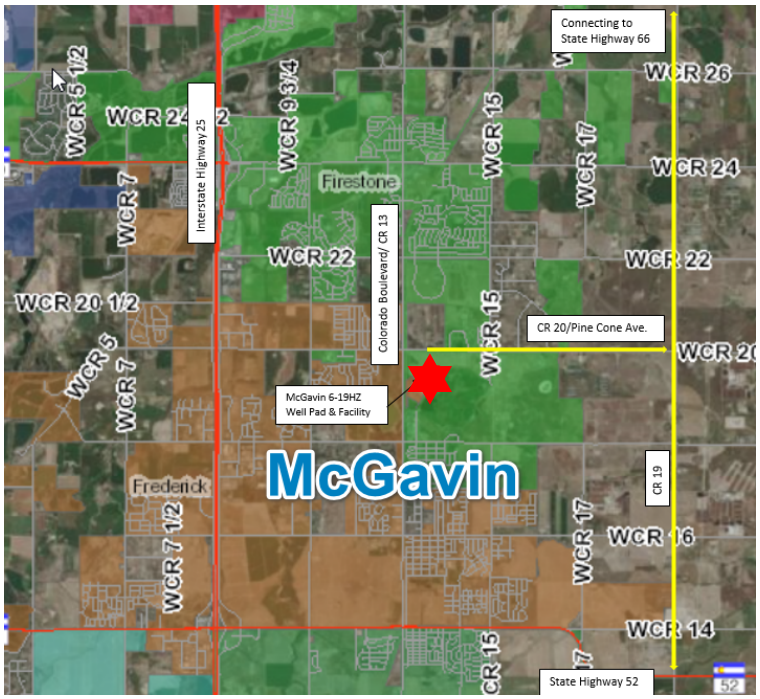


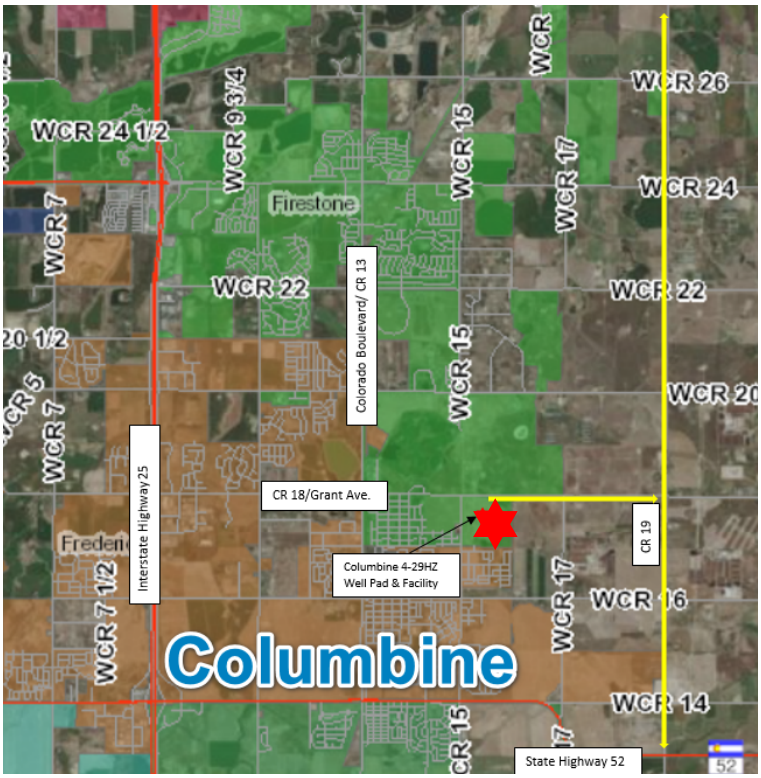
The Columbine WPS is also owned by the applicant and is located southeast of the McGavin pad near the intersection of Grant Ave (CR 18) and Frontier Street (CR 15).



PROPOSED OPERATIONAL HAUL ROUTES

Both the McGavin and Columbine locations will utilize CR 19 connecting to State Hwy 66 to the north and State Hwy 52 to the south. The McGavin location will be accessed via Pine Cone Ave (CR 20) and the Columbine location via Grant Ave (CR 18).

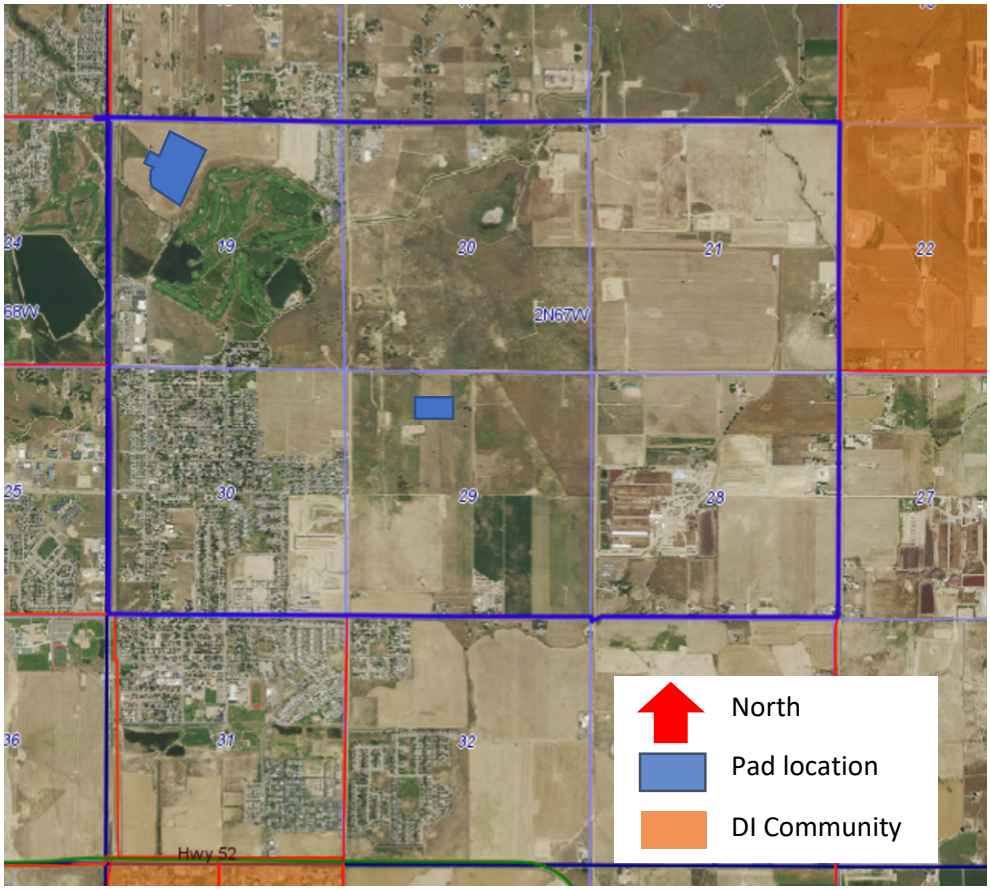




BLOCK GROUP DEMOGRAPHICS

Both the McGavin and Columbine locations fall within the same census block group and are approximately 1.5 miles east of the nearest disproportionally impacted community.

Block Group ID : 081230020161
Block Group Minority Population: 24.6 %
Linguistic Isolation: 1%
Median Household Income: $61,602



PLANNED COMMUNITY CONSULTATION

Because the area is not linguistically isolated (1%), we will send all notices and communications in English. However, we will provide translation services as requested. Our team will be available during daytime and evening hours via the Colorado Response Line and email.

We will consider owners and tenant's suggested mitigation measures and concerns related to public health, safety, welfare.

<u>Previous Communication:</u>

- In July 2020 we invited the neighborhood to a virtual community meeting to discuss the proposed projects. Out of the approximately 130 owners and residents that were invited only two registered to attend and three other residents contacted us after the scheduled meeting date. We contacted each of those residents and engaged and continue to engage with them individually.

Throughout Permitting:

- We will engage with owners and tenants within 2,000' of the WPS and within 300' of the property boundary and invite them to a virtual community meeting to learn more about the proposed projects. The community meeting will provide the owners and tenants with the following information:
    - A description and map of the physical siting of the proposed locations, including legal descriptions
    - A description, proposed timeline, and expected duration of different operations that are planned which include construction, drilling, completions, production, and reclamation
    - The number and orientation of wells, types of equipment, and other on- and off-location infrastructure related to planned operations
    - A description of each stage of operations along with a description of our best management practices to mitigate potential impacts including noise, vibration, light, odor, dust, traffic, and visual
    - Contact information for our Stakeholder Relations team, the Town of Firestone and the COGCC.
- After the first virtual community meeting, we will offer to meet with individuals and groups that have additional questions about the projects
- We will engage with homebuilders and provide information for them to provide to potential homebuyers about the proposed projects including and how to contact us
- Send the Completeness Determination Notice as described in COGCC Rule 303.e
- Complete any additional consultation as required under COGCC Rule 309.c
- Continue to engage with all owners and tenants within 2,000 feet of the WPS and within 300' of the property boundary prior to local and state public hearings

Prior to and after commencement of operations:

- Continue to engage with stakeholders to provide development updates and to answer questions or discuss concerns
- Send all required COGCC notices
- In addition to required notices, we frequently send courtesy notices to owners and tenants to ensure they have the most up to date information about our operations
- Throughout the lifecycle of the wells our Stakeholder Relations team is available to assist the community and can be reached at 866.248.9577 or ColoradoStakeholder@oxy.com Monday through Friday. Our 24-hour Integrated Operations Center can also be reached at 970.515.1500.

Section 16

Final Development Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NE1/4 NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLOUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE COLUMBINE 4-29HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

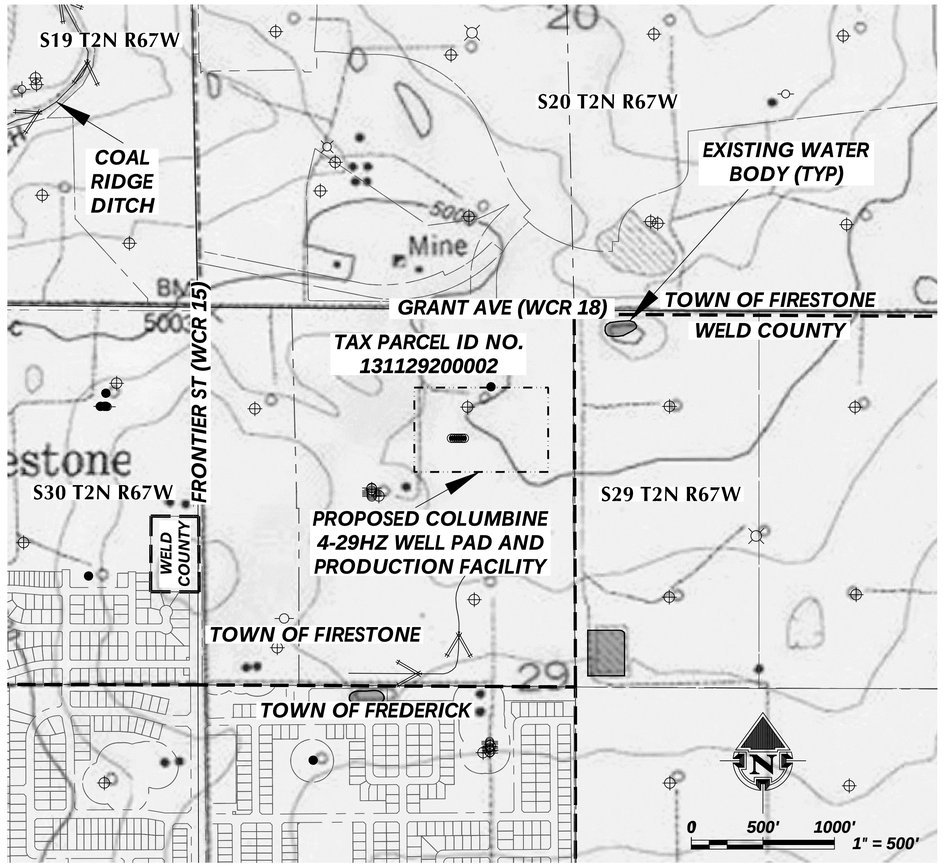
_____ MAYOR

ATTEST_____ TOWN CLERK

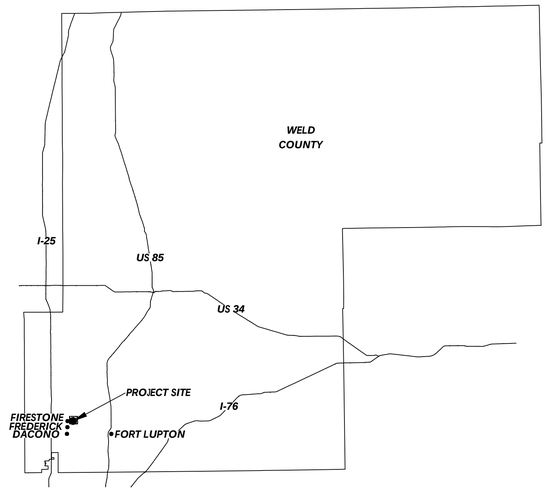
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- *CONSTRUCTION LIMITS OF DISTURBANCE*
- *PROPOSED WELL*
- *EXISTING WELL (PRODUCING)*
- *EXISTING WELL (PLUG & ABANDONED)*
- *EXISTING WELL (SHUT IN)*
- *EXISTING WELL (DRY AND ABANDONED)*
- *EXISTING WELL (TEMPORARILY ABANDONED)*
- *TOWN LIMITS*
- *WATER BODY*
- *PROPERTY LINE*
- *EXISTING DITCH / STREAM*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-013 / FDP21-013

SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP_COVER.dwg, 12/10/2021 3:20:53 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

OWNER: VISTAS AT SADDLEBACK (WELD COUNTY PARCEL I.D. 131119400038) ZONING: FIRESTONE

EXISTING FACILITY

S19 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300001) ZONING: FIRESTONE

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300025) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400034) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400005) ZONING: FIRESTONE

S20 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300002) ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300003) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120300022) ZONING: FIRESTONE

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273 DATE: 10/14/1889

TOWN OF FIRESTONE

GRANT AVE (WCR 18)

WELD COUNTY

OHP

ROAD EXISTING

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SEE ACCESS ROAD DETAIL

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300023) ZONING: FIRESTONE

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

EXISTING ROAD (TO BE IMPROVED)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200002) ZONING: FIRESTONE

PROPOSED ACCESS ROAD

TEMPORARY EQUIPMENT AREA (215' x 60')

20'

20' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1632344) DATE: 03/20/74

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

60'

FRONTIER ST (WCR 15) 60' EXISTING ROW (BOOK 86 PAGE 273) DATE: 10/14/1889

OWNER: ANADARKO E & P ONSHORE LLC TRACT I THE OVERLOOK AT FIRESTONE, REPLAT "A" (WELD COUNTY PARCEL I.D. 131130117000) ZONING: FIRESTONE

S30 T2N R67W

PROPOSED COLUMBINE 4-29HZ WELL PAD

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200001) ZONING: FIRESTONE

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION RPLTA

EXISTING FACILITY

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1751456) DATE: 04/25/78

50'

EXISTING ACCESS ROAD

EXISTING FACILITY

OWNER: PATTON ROY C, PATTON MARGARET D & KANZLER DAWN E (WELD COUNTY PARCEL I.D. 131130100024) ZONING: AG-A

TOWN OF FIRESTONE

WELD COUNTY

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1699366) DATE: 09/20/76

50'

30' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 4084912) DATE: 02/23/15

30'

DRAINAGE EASEMENT (RECEPTION NO. 4176525) DATE: 01/27/16

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691200, 1769650 & 1697790) DATE: 06/16/76, 10/13/78 & 09/01/76

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691207) DATE: 06/16/76

50'

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION

SUBDIVISION: VILLAGE EAST COMMUNITY RPLT #1

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #1

50'

EXISTING WATER BODY

50'

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #4

EXISTING WATER BODY

EXISTING ROAD

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129100013) ZONING: AG-A

S29 T2N R67W

WHEATLAND BLVD (WCR 17)

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129000011) ZONING: AG-A

WCR 17 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 17 PAGE 180

N

0 200' 400'

1" = 200'

ACCESS ROAD DETAIL

GRANT AVE (WCR 18)

106' 60'

30' R

42'

EXISTING FENCE (TYP.)

100' HARD SURFACE

EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273

PROPOSED ACCESS ROAD (26 FT.)

PROPOSED 15" CMP CULVERT

100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)

EXISTING ACCESS ROAD (TO BE IMPROVED)

N

0 50' 100'

1" = 50'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- EXISTING SANITARY SEWER LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING
- EXISTING DITCH / STREAM

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC

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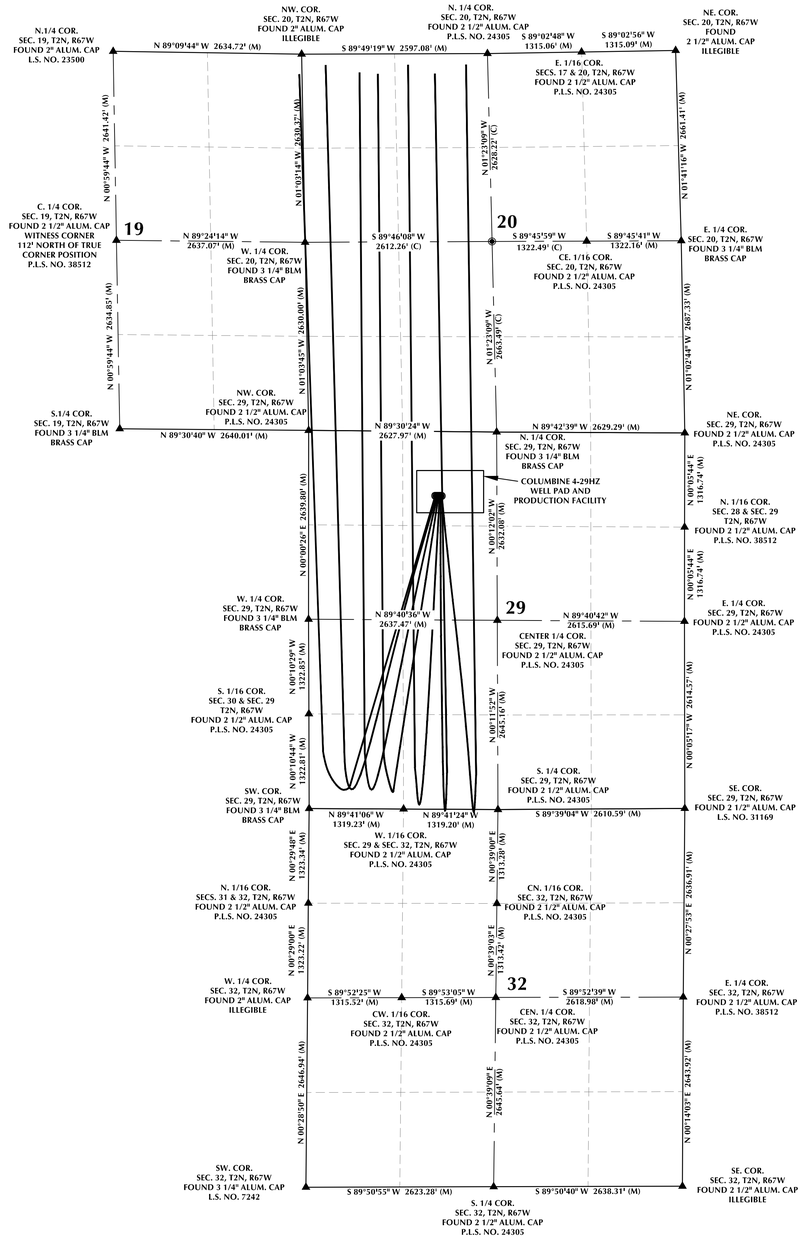
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-013 / FDP21-013

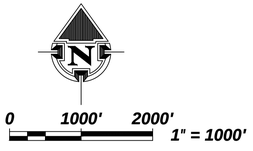
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- INDICATES CALCULATED SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. *BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.*
2. *ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972294 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

609 CONSULTING, LLC

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Phone 970-776-4331

SHERIDAN OFFICE
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Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-013 / FDP21-013

SCALE:	1" = 1000'	SHEET:	FDP-3
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

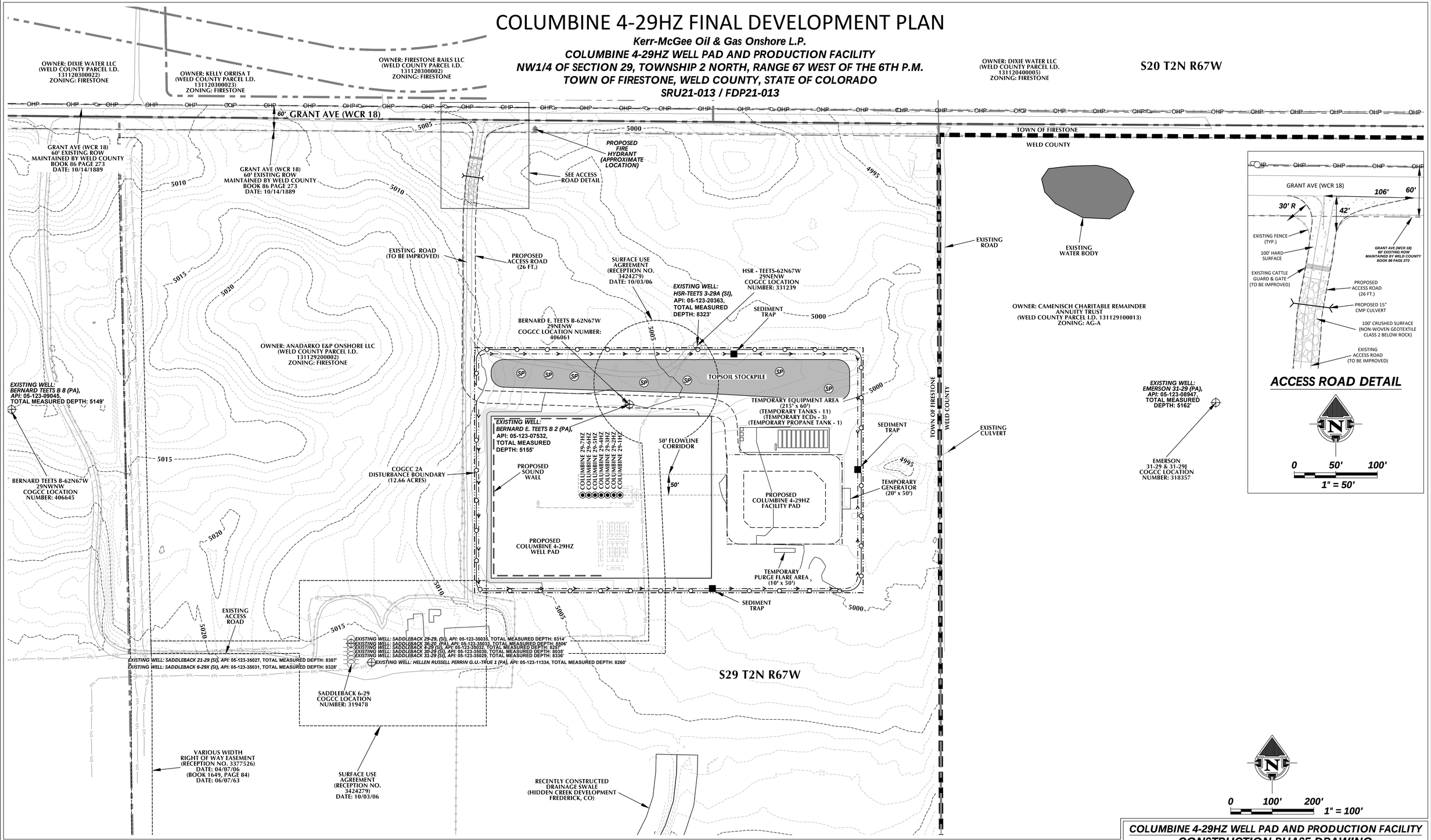
Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

LOVELAND OFFICE
6706 North Franklin Avenue
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Phone 970-776-4331

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609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.

1099 18th Street

Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

CONSTRUCTION PHASE DRAWING

SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2010\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP.dwg, 12/10/2021 3:28:43 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120300022)
ZONING: FIRESTONE

OWNER: KELLY ORRISA T
(WELD COUNTY PARCEL I.D.
131120300023)
ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC
(WELD COUNTY PARCEL I.D.
131120300002)
ZONING: FIRESTONE

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120400005)
ZONING: FIRESTONE

S20 T2N R67W

60' GRANT AVE (WCR 18)

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

TOWN OF FIRESTONE
WELD COUNTY

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

SEE ACCESS ROAD DETAIL

EXISTING ROAD (TO BE IMPROVED)

PROPOSED ACCESS ROAD (26 FT.)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

EXISTING WELL: HSR-TEETS 3-29A (SI), API: 05-123-20363, TOTAL MEASURED DEPTH: 8323'

HSR - TEETS-62N67W 29NENW COGCC LOCATION NUMBER: 331239

BERNARD E. TEETS B-62N67W 29NENW COGCC LOCATION NUMBER: 406061

OWNER: ANADARKO E&P ONSHORE LLC
(WELD COUNTY PARCEL I.D.
13112900002)
ZONING: FIRESTONE

EXISTING WELL: BERNARD TEETS B 8 (PA), API: 05-123-09045, TOTAL MEASURED DEPTH: 5149'

BERNARD TEETS B-62N67W 29NWNW COGCC LOCATION NUMBER: 406645

EXISTING WELL: BERNARD E. TEETS B 2 (PA), API: 05-123-07532, TOTAL MEASURED DEPTH: 5155'

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PROPOSED COLUMBINE 4-29HZ WELL PAD

COLUMBINE 29-7HZ, COLUMBINE 29-6HZ, COLUMBINE 29-5HZ, COLUMBINE 29-4HZ, COLUMBINE 29-3HZ, COLUMBINE 29-2HZ, COLUMBINE 29-1HZ

50' FLOWLINE CORRIDOR

50'

OFF-SITE FLOW DEFLECTION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE VISUAL MITIGATION BERM CROSS SECTION DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

SEEDED TOPSOIL STOCKPILE FOR FINAL RECLAMATION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

EXISTING ROAD

EXISTING WATER BODY

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST
(WELD COUNTY PARCEL I.D. 131129100013)
ZONING: AG-A

TOWN OF FIRESTONE
WELD COUNTY

EXISTING CULVERT

EXISTING WELL: EMERSON 31-29 (PA), API: 05-123-08947, TOTAL MEASURED DEPTH: 5162'

EMERSON 31-29 & 31-29J COGCC LOCATION NUMBER: 318357

EXISTING ACCESS ROAD

EXISTING WELL: SADDLEBACK 29-29, (SI), API: 05-123-35035, TOTAL MEASURED DEPTH: 8314'
EXISTING WELL: SADDLEBACK 36-20 (PA), API: 05-123-35033, TOTAL MEASURED DEPTH: 8506'
EXISTING WELL: SADDLEBACK 4-29 (SI), API: 05-123-35032, TOTAL MEASURED DEPTH: 8257'
EXISTING WELL: SADDLEBACK 30-29 (SI), API: 05-123-35030, TOTAL MEASURED DEPTH: 8035'
EXISTING WELL: SADDLEBACK 31-29 (SI), API: 05-123-35029, TOTAL MEASURED DEPTH: 8336'
EXISTING WELL: HELLEN RUSSELL PERRIN G.U.-TRUE 1 (PA), API: 05-123-11334, TOTAL MEASURED DEPTH: 8260'
EXISTING WELL: SADDLEBACK 21-29 (SI), API: 05-123-35027, TOTAL MEASURED DEPTH: 8387'
EXISTING WELL: SADDLEBACK 6-29X (SI), API: 05-123-35031, TOTAL MEASURED DEPTH: 8328'

SADDLEBACK 6-29 COGCC LOCATION NUMBER: 319478

S29 T2N R67W

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

GRANT AVE (WCR 18)
106' 60'
30' R
42'
EXISTING FENCE (TYP.)
100' HARD SURFACE
EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)
GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273
PROPOSED ACCESS ROAD (26 FT.)
PROPOSED 15" CMP CULVERT
100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)
EXISTING ACCESS ROAD (TO BE IMPROVED)

ACCESS ROAD DETAIL

0 50' 100'
1" = 50'

0 100' 200'
1" = 100'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED PERMANENT SEEDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6***

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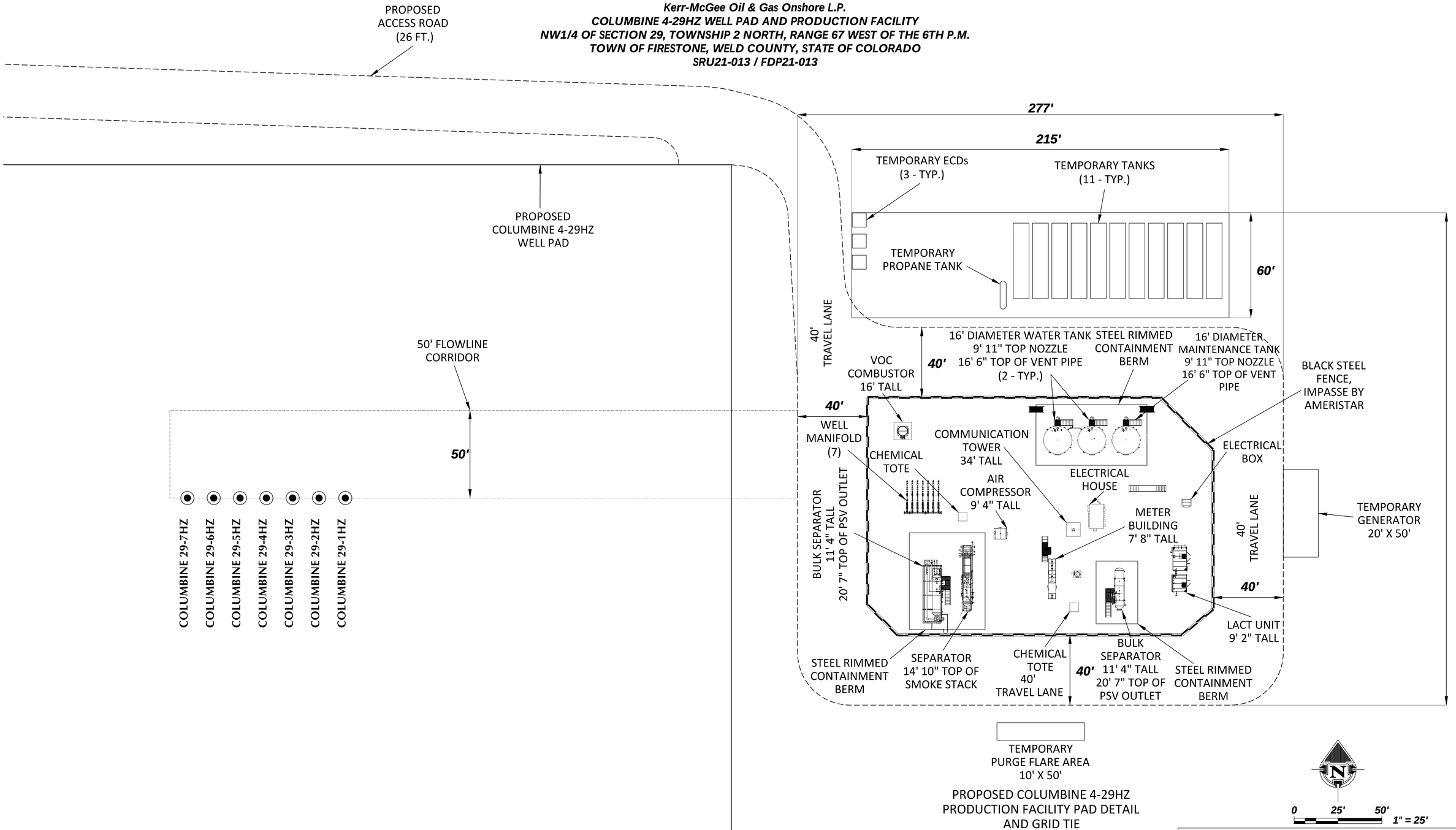
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



GENERAL NOTES:

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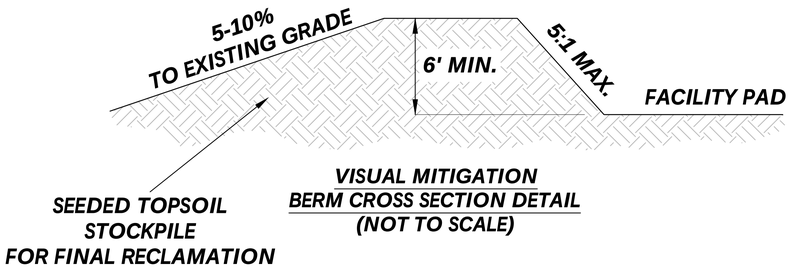
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 25'	SHEET:	FDP-6
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

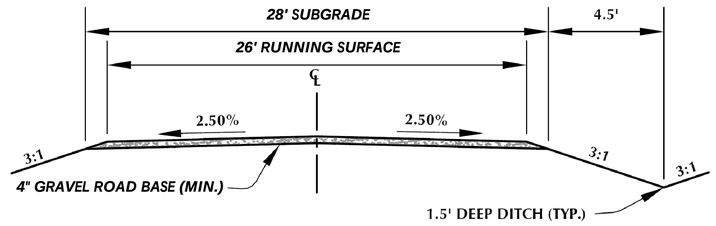
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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

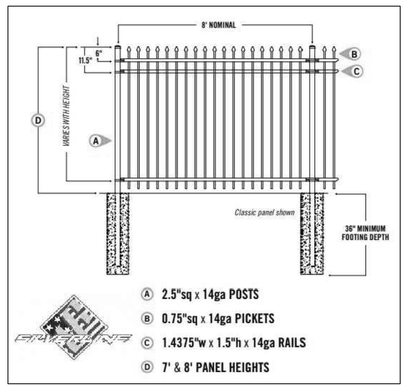
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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



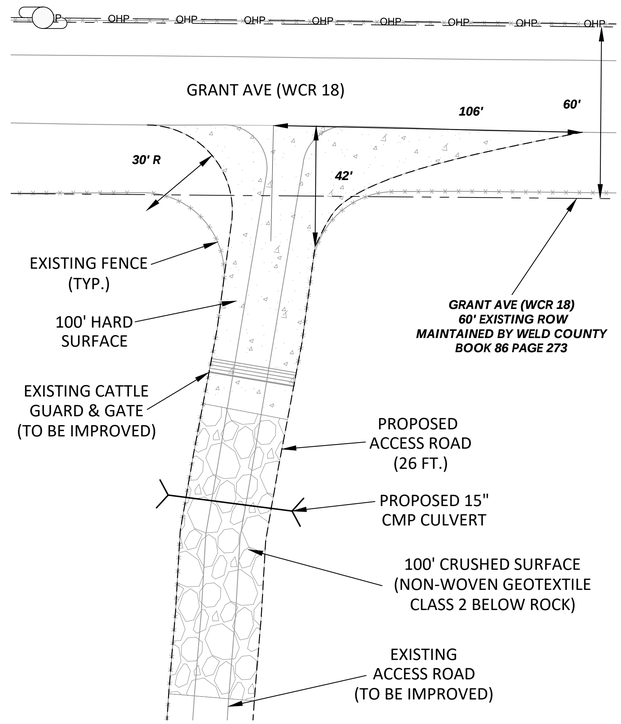
VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



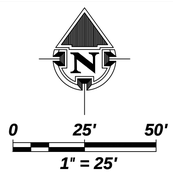
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE COLUMBINE 4-29HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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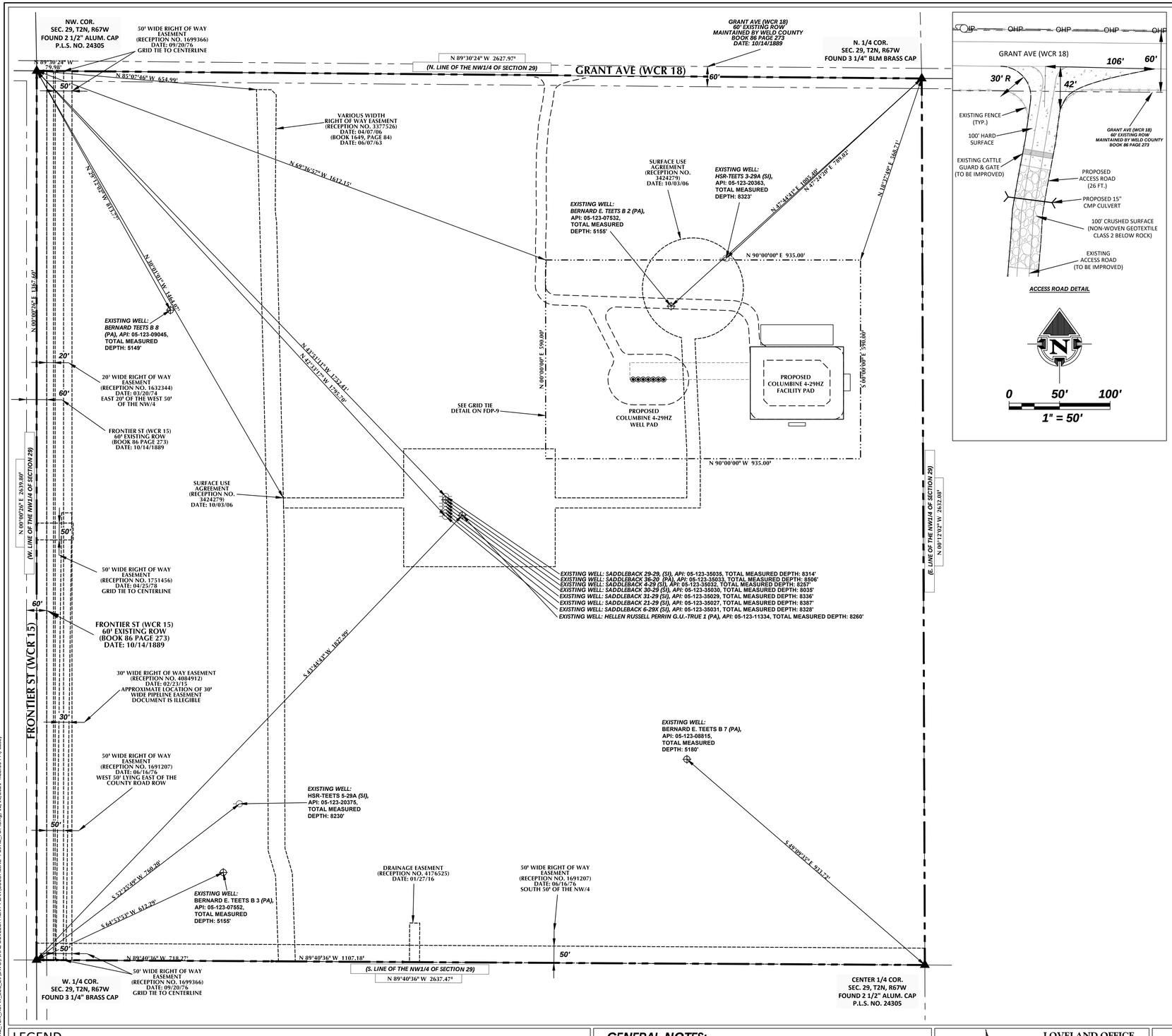
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-013 / FDP21-013

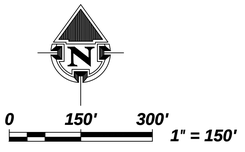
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SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

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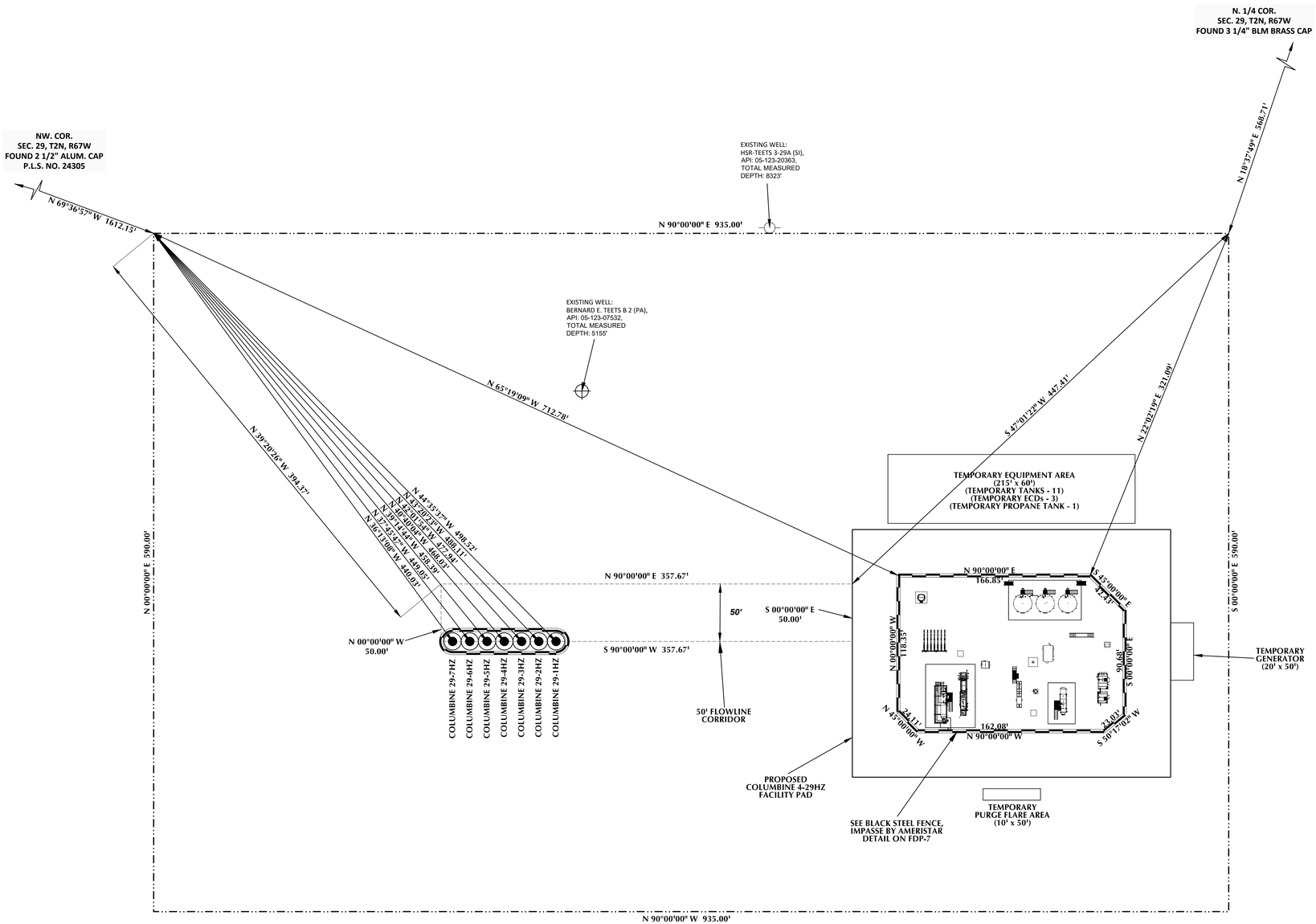
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-013 / FDP21-013

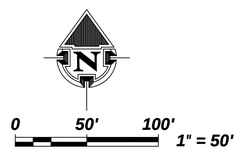
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)

GENERAL NOTES:

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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-013 / FDP21-013

SCALE:	1" = 50'	SHEET:	FDP-9
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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Section 17

Alta Survey

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTHWEST 1/4 OF SECTION 29

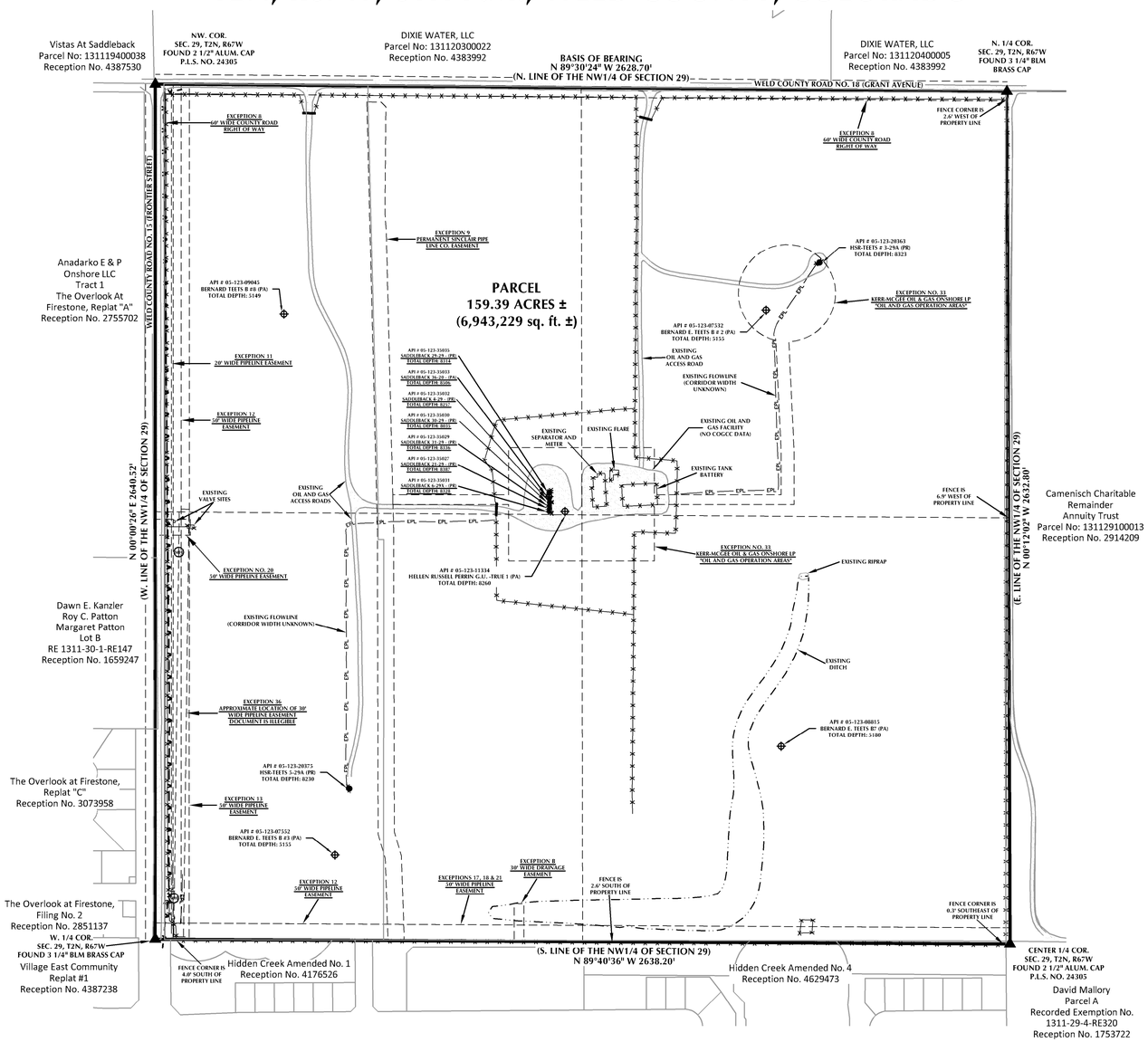
T2N, R67W, 6TH P.M., WELD COUNTY, COLORADO

EXCEPTIONS PER TITLE COMMITMENT, ORDER NUMBER FCC25129139-2:

8. RIGHT OF WAY FOR COUNTY ROADS 30 FEET ON EITHER SIDE OF SECTION AND TOWNSHIP LINES, AS ESTABLISHED BY THE BOARD OF COUNTY COMMISSIONERS FOR WELD COUNTY, RECORDED OCTOBER 14, 1889 IN BOOK 86 AT PAGE 273. PLOTTED HEREON.
9. RIGHT OF WAY EASEMENT AS GRANTED TO SINCLAIR PIPE LINE CO. IN INSTRUMENT RECORDED JUNE 07, 1963, IN BOOK 1649 AT PAGE 84 AND AMENDMENT RECORDED APRIL 7, 2006 AT RECEPTION NO. 3377526. PLOTTED HEREON.
10. SUBJECT TO OIL AND GAS LEASE RECORDED APRIL 03, 1970 UNDER RECEPTION NO. 1544892 IN BOOK 623 AND ANY AND ALL ASSIGNMENTS THEREOF, OR INTEREST THEREIN. NOTE: EXTENSION OF THE ABOVE LEASE AS CLAIMED BY AFFIDAVIT OF PRODUCTION WAS RECORDED MARCH 18, 1971 UNDER RECEPTION NO. 1578841 IN BOOK 657. NOT PLOTTABLE.
11. RIGHT OF WAY EASEMENT AS GRANTED TO CENTRAL WELD COUNTY WATER DISTRICT IN INSTRUMENT RECORDED MARCH 20, 1974, UNDER RECEPTION NO. 1632344 IN BOOK 710. PLOTTED HEREON.
12. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED JUNE 16, 1976, UNDER RECEPTION NO. 1691207 IN BOOK 769. PLOTTED HEREON.
13. RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPE LINE CO. IN INSTRUMENT RECORDED SEPTEMBER 20, 1976, UNDER RECEPTION NO. 1699366 IN BOOK 777. PLOTTED HEREON.
14. RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED OCTOBER 12, 1976, UNDER RECEPTION NO. 1701003 IN BOOK 779 AND RECORDED DECEMBER 1, 1976 AT RECEPTION NO. 1704793 IN BOOK 783. SUBJECT TO RECEPTION NO. 1701003. BASED ON THE DESCRIPTION CONTAINED IN THE RECORD DOCUMENT - DOES NOT AFFECT.
15. SUBJECT TO MINERAL RESERVATIONS AND INTERESTS AS SET FORTH IN DEED RECORDED JULY 31, 1958 IN BOOK 1456 AT PAGE 536. NOT PLOTTABLE.
16. SUBJECT TO UNDIVIDED 90 INTEREST IN ALL OIL, GAS AND OTHER MINERALS LYING IN, ON OR UNDER SUBJECT PROPERTY AND RESERVATION OF EASEMENT AS CONVEYED IN INSTRUMENT RECORDED MARCH 03, 1960 IN BOOK 1552 AT PAGE 264. COAL MINE ACCESS EASEMENT LOCATION CANNOT BE DETERMINED FROM THE RECORD DOCUMENT.
17. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED JUNE 16, 1976, UNDER RECEPTION NO. 1691200 IN BOOK 769. PLOTTED HEREON.
18. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED SEPTEMBER 01, 1976, UNDER RECEPTION NO. 1697790 IN BOOK 776. PLOTTED HEREON.
19. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED SEPTEMBER 03, 1976, UNDER RECEPTION NO. 1698045 IN BOOK 776. BLANKET EASEMENT.
20. RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPELINE CO. IN INSTRUMENT RECORDED APRIL 25, 1978, UNDER RECEPTION NO. 1751456 IN BOOK 829. PLOTTED HEREON.
21. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED OCTOBER 13, 1978, UNDER RECEPTION NO. 1769650 IN BOOK 848. PLOTTED HEREON.
22. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPELINE CO. IN INSTRUMENT RECORDED JANUARY 26, 1984, UNDER RECEPTION NO. 1954198 IN BOOK 1019. BLANKET EASEMENT.
23. RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED JANUARY 13, 1986, UNDER RECEPTION NO. 2038946 IN BOOK 1099. THE SOUTHWEST 1/4 OF THE NORTHWEST 1/4 OF SECTION 29 IS SUBJECT TO THIS EASEMENT. BLANKET EASEMENT.
24. SUBJECT TO ALL OIL, GAS, MINERALS AND OTHER MINERAL RIGHTS AS RESERVED IN INSTRUMENT RECORDED FEBRUARY 17, 1989, UNDER RECEPTION NO. 2171145 IN BOOK 1224, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN. NOT PLOTTABLE.
25. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF ANNEXATION AGREEMENT RECORDED JULY 21, 1997 AT RECEPTION NO. 2558854 AND AMENDED OCTOBER 4, 2004 AT RECEPTION NO. 3224411. NOT PLOTTABLE.
26. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF NOTICE RECORDED JANUARY 27, 2000 AT RECEPTION NO. 2746643. NOT PLOTTABLE.
27. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO HS RESOURCES INC. IN INSTRUMENT RECORDED JUNE 11, 2001, UNDER RECEPTION NO. 2856501. LOCATION CANNOT BE DETERMINED FROM THE RECORD DOCUMENT.
28. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED JULY 02, 2002 AT RECEPTION NO. 2966063. NOT PLOTTABLE.
29. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF MEMORANDUM OF AGREEMENT RECORDED JANUARY 02, 2003 AT RECEPTION NO. 3020296. NOT PLOTTABLE.
30. MATTERS AS SET FORTH ON SURVEY RECORDED OCTOBER 10, 2003 AT RECEPTION NO. 3116133. THIS PROPERTY IS PARCEL "B" ON THIS LAND SURVEY PLAT. NOT PLOTTABLE.
31. SUBJECT TO ALL OIL, GAS AND OTHER MINERALS LYING IN, ON OR UNDER SUBJECT PROPERTY AS CONVEYED IN INSTRUMENT RECORDED JULY 26, 2005 UNDER RECEPTION NO. 3306235. NOT PLOTTABLE.
32. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED APRIL 21, 2006 AT RECEPTION NO. 3381135. NOT PLOTTABLE.
33. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF SURFACE USE AGREEMENT RECORDED OCTOBER 03, 2006 AT RECEPTION NO. 3424279. PLOTTED HEREON.
34. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED DECEMBER 21, 2007 AT RECEPTION NO. 3525268. NOT PLOTTABLE.
35. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF ORDER RECORDED DECEMBER 27, 2007 AT RECEPTION NO. 3526088. NOT PLOTTABLE.
36. RIGHT OF WAY EASEMENT AS GRANTED TO KERR-MCGEE GATHERING LLC IN INSTRUMENT RECORDED FEBRUARY 23, 2015, UNDER RECEPTION NO. 4084912. PLOTTED HEREON.

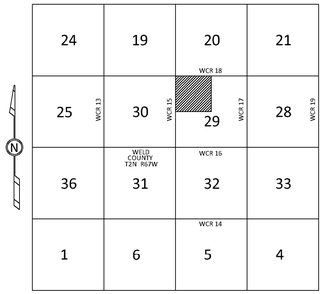
EXCEPTIONS PER ENDORSEMENT: ORDER NUMBER 25129139:

A. SPECIAL WARRANTY DEED RECORDED NOVEMBER 23, 2015 AT RECEPTION NO. 4160011. NOT PLOTTABLE.
B. TERMS, CONDITIONS AND PROVISIONS OF DRAINAGE EASEMENT RECORDED JANUARY 27, 2016 AT RECEPTION NO. 4176525. PLOTTED HEREON.



LEGEND:

- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- PROPERTY LINE
- EDGE OF DIRT ROAD
- EXISTING PIPELINE (EPL)
- EXISTING WATERLINE
- EXISTING EASEMENT
- FENCE
- DITCH
- CATTLE GUARD
- PRODUCING OIL/GAS WELL (PR)
- PLUGGED & ABANDONED OIL/GAS WELL (PA)
- MANHOLE
- FOUND SECTION CORNER MONUMENT AS INDICATED
- GRAVEL/DIRT



LOCATION MAP
NOT TO SCLAE

DESCRIPTION PER TITLE REPORT

THE NORTHWEST 1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M., COUNTY OF WELD, STATE OF COLORADO.

Notes:

1. Easements and exceptions shown hereon are based on Old Republic National Title Insurance Company Commitment, Order Number: FCC25129139-2, with an effective date of February 23, 2015, at 5:00 p.m. and Old Republic National Title Insurance Company Order Number: 25129139, with an effective date of August 7, 2020.
2. Bearings are based on the North line of the Northwest 1/4 as being N89°30'24" W. Monumented as shown.
3. Basis of bearing derived from Colorado Coordinate System NAD83, North Zone.
4. This parcel contains 6,943,229 square feet or 159.39 acres, more or less.
5. Utilities shown hereon are those which were visible on the surface of the ground and were located with paint and flags at the date of the survey.
6. Oil and gas well names and data taken from COGCC website.
7. Distances are U.S. Survey Foot.
8. Address: Vacant Land Firestone.
9. Adjoiner property owner information taken from Weld County, Colorado GIS map server.
10. According to Colorado state law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date on the certification shown hereon.
11. There are no buildings on the property.

Surveyor's Certificate

To: Town of Firestone.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 4, 8, and 11 of Table A thereof. The field work was completed on April 28, 2021.

COLORADO LICENSED
RANDALL K. FRENCH
38512
10/6/21
PROFESSIONAL LAND SURVEYOR

Randall K. French

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

0 200' 400'
SCALE: 1" = 200'

REVISIONS:
10/6/21 - ADD WELL INFORMATION

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTHWEST 1/4 OF SECTION 29, T2N, R67W, 6TH P.M., WELD COUNTY, COLORADO

609 CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY:	
RZP	
CHECKED BY:	
RKF	
DATE:	JOB:
6/22/21	16-98

SHEET NO: 1 OF 1

K:\JOBS\16-98\SURVEY\16-98_ALTA_NSPS_TITLE_SURVEY_FCC25129139-2_10-6-21.dwg, 10/6/2021 3:33:05 PM, rkf

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COOPERATIVE DEVELOPMENT PLAN AGREEMENT

This Cooperative Development Plan Agreement ("Agreement") is made and entered into this 14th day of April, 2021 (the "Effective Date"), by and between the Town of Firestone, a Colorado municipal corporation ("Firestone" or "Town"), whose address is 151 Grant Ave, P.O. Box 100, Firestone, Colorado 80520, Kerr-McGee Oil & Gas Onshore LP ("Kerr-McGee"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202, and Anadarko E&P Onshore LLC, a Delaware limited liability company ("AEP"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202. Kerr-McGee, AEP, and Firestone or Town may be referred to individually as a "Party" or collectively as the "Parties."

BACKGROUND

Firestone and Kerr-McGee recognize the importance of the public health, safety and welfare, as well as the environment and wildlife resources to Colorado's economy and culture, including the citizens of Firestone. The Parties also recognize that responsible and orderly development of oil and gas resources in the Town must be consistent with and subject to Firestone's land use authority and general police powers to protect the health, safety, and welfare of the Town's residents, including the protection of the environment and wildlife resources, to prevent waste in the production and utilization of oil and gas, and to avoid or minimize any adverse impacts to public health, safety and welfare and the environment associated with oil and gas development. To achieve such mutual objectives in a cooperative manner, Firestone and Kerr-McGee enter into this Agreement to accomplish the following:

1. To site new well pads and associated facilities and rights-of-way that Kerr-McGee plans to develop within Firestone at locations that will protect public health, safety, and welfare and the environment by avoiding impacts associated with oil and gas operations and minimizing and mitigating the extent and severity of those impacts that cannot be avoided, consistent with Firestone's land use authority and general police powers;

2. To further minimize and mitigate the unavoidable impacts and other land use effects associated with this type of development, by developing oil and gas operational standards needed for responsible development, including requirements for odor mitigation, noise mitigation, lighting installation, road maintenance, and landscape restoration that supplement state environmental requirements in an efficient and cost-effective manner, all to benefit the Town and its residents; and

NOW THEREFORE, the Parties agree as follows:

ARTICLE I. GENERAL PROVISIONS

1. Intent to Supplement State Rules and Regulations. The Parties recognize that pursuant to the Colorado Oil and Gas Conservation Act, Colo. Rev. Stat. § 34-60-101 et seq., as amended, the Colorado Oil and Gas Conservation Commission ("COGCC") regulates the development and

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production of oil and gas resources in Colorado, and the Act authorizes the COGCC to adopt statewide rules and regulations, which the COGCC has done. The Operational Standards developed jointly by the Parties and identified in this Agreement are not intended to abrogate, repeal or impair any state rules and regulations, but instead are intended to supplement any existing or future state rules and regulations. The Parties acknowledge that the Operational Standards set forth herein are subject to future rulemaking by the COGCC; thus, in the event of a conflict or overlap between any Operational Standards set forth herein and any existing or future rule or regulation promulgated by the COGCC, whichever standard, rule, or regulation imposes the more stringent restriction shall prevail, and Kerr-McGee shall abide by the more stringent restriction.

2. **Exercise of Local Land Use Authority**. The Parties further recognize that Firestone, through its land-use authority and general police powers, can regulate various aspects of oil and gas operations in a reasonable manner as specified in C.R.S. § 29-20-104(1)(h)(I)-(IV) and to protect and minimize adverse impacts to public health, safety and welfare and the environment. Furthermore, the Parties recognize that to implement the powers and authority granted in C.R.S. § 29-20-104(1)(h), Firestone has the authority to inspect facilities, impose fines for leaks, spills and emissions, and impose fees to cover the costs of permitting and regulating oil and gas operations within its boundaries, in accordance with C.R.S. § 29-20-104(2). Provided, however, the Town will comply with any and all written or oral safety requirements when entering Kerr-McGee facilities, including, but not limited to, complying with the use of personal protective equipment and complying with necessary distance restrictions. Finally, the Parties also recognize that Kerr-McGee must apply for, and obtain approval from, Firestone for siting oil and gas surface locations before it can obtain approval for, an Application for Permit to Drill or Spacing Unit Applications, as set forth in C.R.S. § 34-60-106(f)(I)(A).

3. **Applicability.** This Agreement and the Operational Standards will apply to all new wells that Kerr-McGee drills on the Identified Well Pads during the Term of this Agreement. This Agreement will not apply to any wells for which Kerr-McGee is not the operator.

4. **Term.** This Agreement shall commence on the Effective Date, and shall expire four (4) years from the Effective Date ("Term"). The Term may be extended by mutual written agreement of the Parties.

5. **Effect of Termination on Special Use Permit Approval.** Termination of this Agreement by either Party shall in no way affect or limit either Parties' legal or equitable remedies it may have under the Code (defined below) or at law or in equity. In the event this Agreement expires or is otherwise terminated, such expiration or termination shall not prevent any operations and/or development of the Identified Well Pads and well(s) that were previously permitted or otherwise approved by the Town prior to the expiration or termination of this Agreement, nor shall expiration or termination of this Agreement exempt such operations and/or development of the Identified Well Pads, new wells drilled at the Identified Well Pads during the Term of this Agreement, or previously approved wells from any applicable Town development review regulations and processes. Additionally, such expiration or termination shall in no way affect or limit the Town's right in the future to refuse to grant a special use permit, or suspend any special use permit for oil and gas wells requested by or granted to Kerr-McGee pursuant to the Code. Nothing in this Agreement shall be construed as granting or creating any statutory vested development rights at the Identified Well Pads.

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6. **Drilling and Development Schedule.** In consultation with Firestone, Kerr-McGee has developed a Drilling and Development Schedule that includes: McGavin and Columbine well pad sites (the "Identified Well Pads"); and (ii) the operational standards that will apply to such development. The operational standards are listed in Exhibit A ("Operational Standards"), and the Identified Well Pads are depicted in the Cooperative Development Area and Land Contribution Map attached as Exhibit B. Kerr-McGee will not drill more than thirty-three (33) wells total from the two identified well pad sites collectively.

ARTICLE II. APPROVAL PROCESS, OPERATIONS, AND CONSIDERATION

1. **Special Review Use and Final Development Plan Submission Requirements.** For each new oil and gas well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will follow the requirements, procedures, and application elements outlined in Section 7.11, Special Review Use and Section 7.10, Final Development Plan of the Firestone Development Code (the "Code"), as amended, for special review use and final development plan approvals. The Town's Board of Trustees will review the applications using the criteria outlined in Section 7.11 and Section 7.10 of the Code, as amended. If Section 7.11 and Section 7.10 of the Code are amended and any such ordinance amending Section 7.11 and Section 7.10 of the Code is legally pending on the date of a special review use and final development plan application submissions, Kerr-McGee will comply with the amended requirements and procedures for its operations established in such ordinance. The Town recognizes that time is of the essence with respect to approval of special review use and final development plans, and will use its best efforts to process Kerr-McGee's applications submitted pursuant to this Article II, Section 1 in a prompt and timely manner. To that end, the Town agrees that staff review of the applications will take no longer than ninety (90) calendar days after the Town determines the application is complete.

2. **Incorporation of Operational Standards as Conditions of Special Review Use and Final Development Plan.** Each application for special review use and final development plan approval for an oil and gas well that Kerr-McGee submits shall include, as part of the application elements required under the Code, the Operational Standards set forth on Exhibit A, and each special review use and final development plan granted by the Town shall contain the Operational Standards as conditions of operations for such special review use and final development plan.

3. **Kerr-McGee's Operations.** For each new well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will operate such well in compliance with the Operational Standards as set forth in Exhibit A, the Code, as amended, and any other conditions or requirements of the special review use and final development plan approvals issued by the Town for such well.

4. **Kerr-McGee's Contributions.** To minimize and mitigate potential impacts from the Identified Well Pads and associated wells, and to otherwise foster future development opportunities for the Town, AEP, on behalf of Kerr-McGee, shall make contributions to the Town as follows:

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a. Land Contribution.

(i) Within sixty days of Kerr-McGee receiving all necessary local and state permits, approvals, and all necessary easements, Anadarko E&P Onshore LLC ("AEP or Grantor") shall convey to the Town by special warranty deed good, marketable, title (the "Interest"), but specifically reserving and excluding any mineral interest, to approximately seventy-eight (78) acres of real property generally located at the southwest corner of Grant Avenue and Frontier Street and west of the Columbine well pad site ("Grant and Frontier Parcel"), as depicted on Exhibit B (. The Parties agree that the Town may obtain title insurance for the Interest at its own cost, expense, and risk.

The Interest. The Interest includes all of AEP's rights, title and interest, if any, in and to all appurtenances thereto, including but not limited to any fences, buildings, landscaping, and other improvements now located thereon, including all fixtures of a permanent nature, but specifically excluding any fixtures used for or associated with oil and natural gas development, if any, but shall specifically exclude any and all interests or ownership of AEP in any and all minerals in place or under the entirety of the Grant and Frontier Parcel ("Mineral Interest"). The Parties acknowledge and agree that the Mineral Interest shall be reserved to the Grantor in the deed of conveyance executed by AEP and delivered to the Town. The Interest shall also include all of AEP's right, title and interest, if any, in and to all strips and gores of land lying between the Interest and adjoining property or streets, roads or highways, open or proposed. Finally, the Interest shall include all surface and subsurface water and water rights, ditches and ditch rights, ponds and pond rights, springs and spring rights, wells and well rights, whether decreed or not, if any, attached or appurtenant to or used in connection with the Grant and Frontier Parcel and owned by AEP and any title, interest, or right that AEP may have to convey water to the Grant and Frontier Parcel.

Title and Taxes. AEP shall deliver to the Town a special warranty deed, in the form set forth on Exhibit C, attached hereto, duly executed and acknowledged by an authorized corporate representative or officer, sufficient to convey good and marketable title to the Grant and Frontier Parcel to the Town, but reserving to AEP the Mineral Interest described above, free and clear of all liens, tenancies and encumbrances except only those permitted exceptions mutually agreed upon by the parties. Neither Kerr-McGee nor AEP shall not, after the Effective Date hereof, sell, convey, option or contract to do any of the foregoing or otherwise convey, abandon, relinquish, cloud or encumber title to the Grant and Frontier Parcel or any part thereof or contract to do any of the foregoing in a manner which would survive delivery of the special warranty deed. AEP shall be responsible for all real and personal property taxes on the Grant and Frontier Parcel, prorated to the date of

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delivery of the special warranty deed based on the most recent assessed valuations and mill levy available, which proration shall be deemed a final settlement between the parties.

(ii) AEP hereby agrees to grant to the Town a right of first refusal to acquire approximately fifteen (15) acres of real property generally located at the southeast corner of Colorado Boulevard and Pine Cone Avenue and west of the McGavin Well Pad (the "Pine Cone Parcel") as generally depicted on Exhibit B, subject to the terms and conditions specified herein.

Right of First Refusal. For a period of five years from the date of execution of this Agreement, AEP will not sell the Pine Cone Parcel, or any part thereof, without first offering it to the Town for purchase. The right of first refusal granted to the Town shall be honored by AEP and exercised in the following manner:

(1) If, during the period of the right of First Refusal, AEP receives a third-party offer to purchase or otherwise acquire title to the Pine Cone Parcel, or any part thereof, any contract which may be entered into between AEP and such purchaser shall specifically provide that the transaction shall be subject to the right of first refusal set forth in this Agreement.

(2) In the event that AEP enters into such contract with a third-party purchaser, the Town shall have the prior right to purchase and acquire title to the Pine Cone Parcel, or the portion thereof described in such contract, upon the same terms and conditions as therein provided or, at the Town's option, for cash.

(3) AEP shall submit to the Town a term sheet, containing the same terms and conditions as the purchase and sale contract with the third-party purchaser. If, after the receipt of such documents, the Town shall fail to exercise the Town 's right of first refusal by signing and returning to AEP within thirty (30) days of receipt, a signed copy of a contract, together with the earnest money payment therein provided, AEP shall have the right to conclude the proposed sale and conveyance on the same terms and conditions, and no other, as in a contract reflective of the term sheet with the bona fide third-party purchaser.

(4) The Town's failure to exercise the Town's right of first refusal, or the Town 's written disclaimer of such right, shall be deemed a waiver and cancellation of such right of first refusal if the proposed sale and conveyance to the same bona fide third party purchaser is consummated. If the proposed sale and conveyance to the same bona fide third-party purchaser is not consummated, the right of first refusal herein set forth shall not be deemed waived or cancelled, but shall remain in full force and effect.

(5) If any offer made by AEP according to the terms and conditions herein stated is rejected or is allowed to expire without acceptance by

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the Town, the Town agrees, within 10 days after receipt of a written request from AEP, to give to AEP or to any third person AEP shall designate, a written statement properly signed and acknowledged in recordable form that: i) an offer has been made by AEP in accordance with the terms and conditions of this Agreement, together with disclosure of the offering price and the terms and conditions of a proposed sale; ii) said offer has been rejected by the Town or has been allowed to expire; and AEP or any designated third person may rely upon such statement by the Town as evidence of the submission and rejection or expiration of a valid offer made to the Town pursuant to and in accordance with this Agreement.

(6) This right of first refusal shall apply to all transactions involving a conveyance of title to the Pine Cone Parcel, or any portion thereof, including but not limited to a purchase, an exchange, or any other transfer of an interest in the Pine Cone Parcel for consideration, other than a lease of no more than three years' duration.

Exempt Transfers. The parties agree that a transfer of the Pine Cone Parcel, or any portion thereof, shall be made only after compliance with all of the provisions of this Agreement, except that the following transfers shall be exempt from the terms and conditions of this Agreement to the extent herein provided and subject to all the other terms and conditions of this Agreement:

(1) A transfer to one or more corporations, partnerships, limited liability companies, trusts, or other entities in which AEP or AEP's heirs, successors, or assigns have sufficient control to be able to cause said entities at any time to transfer the Pine Cone Parcel or portion thereof to the Town and fulfill the other obligations of AEP under the terms and conditions of this Agreement; further, AEP's covenants that during the existence of this Agreement, AEP or AEP's heirs, successors, or assigns will continue to retain sufficient control of said entities to be able to cause said entities to transfer the Pine Cone Parcel or portion thereof, as aforesaid, and to fulfill all of AEP's obligations under this Agreement; and all certificates evidencing ownership of said entities shall be issued bearing a notation thereon that the transfer thereof is restricted and subject to the terms and conditions of this Agreement.

(2) A transfer by foreclosure or deed in lieu of foreclosure to any bona fide mortgagee or deed of trust beneficiary holding a first or second lien on the Pine Cone Parcel, provided that any subsequent sale and conveyance of the Pine Cone Parcel or any part thereof by such lien or shall be restricted and subject to the terms and conditions of this Agreement.

(3) If an exempt transfer is made, the transferee(s) shall be bound by all the covenants, terms, and conditions of this Agreement to the same extent as AEP.

Term. All rights and interests herein created and set forth in this Agreement shall

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remain in existence and shall constitute a valid encumbrance upon the Pine Cone Parcel for a term of five (5) years, commencing on the Effective Date; except that the same shall be extinguished by the occurrence of any one or more of the following events:

(1) a sale of the entire Pine Cone Parcel to the Town pursuant to the exercise of the right of first refusal, as herein provided, and upon compliance by AEP with all of the terms and conditions of this Agreement; or

(2) a sale of the entire Pine Cone Parcel to any person other than the Town or those persons mentioned in exempt transfers above pursuant to and upon compliance by AEP with all of the terms and conditions of this Agreement.

Binding Effect. This right of first refusal shall be binding upon, and inure to the benefit of, the parties and their respective heirs, assigns, legal representatives, and successors.

5. **Submissions to the COGCC.** Provided that they are in conformity with the terms of this Agreement, the Town will not object to any of Kerr-McGee's submissions to the COGCC pertaining to the Identified Well Pads and the wells located thereon. Furthermore, upon Town approval of operations pertaining to a new well, Town will promptly notify the COGCC in writing that the Town has approved such operations under its land use review procedures and pursuant to this Agreement.

ARTICLE III. OTHER PROVISIONS

1. No Waiver of Rights. The Parties acknowledge and agree that this Agreement will not be used as evidence that either Party has waived any rights to assert its claims concerning the validity of Firestone's land use authority or jurisdiction or Kerr-McGee's rights to develop its mineral resources. Nothing herein will be construed as an admission by either Party of any legal right or obligation.

2. Force Majeure. Neither Party will be liable for any delay or failure in performing under this Agreement in the event and to the extent that the delay or failure arises out of causes beyond a Party's reasonable control, including, without limitation, war, civil commotion, act of God, strike or other stoppage (whether partial or total) of labor, any law, decree, regulation or order of any government or governmental body (including any court or tribunal), or inability to obtain permits, licenses, consents, easements, or rights-of way. If any Party is rendered, wholly or in part, unable to carry out its obligations under this Agreement due to any such force majeure event, it is agreed that, upon the affected Party's giving notice and a description of such delay in reasonable detail in writing to the other Party as soon as reasonably possible after the occurrence of the causes relied on, the obligation of the Party giving such notice, so far as it is affected by such condition or event, will be suspended and any time periods will be extended for a period equal to the period of the continuance of the event or condition.

3. **Authority to Execute Agreement.** Each Party represents that it has the full right and authority to enter into this Agreement.

4. **Governing Law.** This Agreement will be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of law's provisions.

5. **No Third-Party Beneficiaries.** This Agreement is not intended to, and does not, create any right, benefit, responsibility or obligation that may be enforced by any non-party. Additionally, nothing in this Agreement will entitle any third party to any claims, rights or remedies of any kind.

6. **Notices.** All notices and other correspondence related to this Agreement will be in writing and will be delivered by: (i) certified mail with return receipt, (ii) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.), (iii) fax transmission if verification of receipt is obtained, or (iv) email with return receipt, to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

Firestone: Town of Firestone
151 Grant Ave
P.O. Box 100
Firestone, Colorado 80520
Attn: Town Manager
Telephone: 303.833.3291
Fax: 303.833.4863
Email: [_____]

Kerr-McGee: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Danielle Piernot
Telephone: 720-929-6157
Fax:
Email: danielle_piernot@oxy.com

AEP: Anadarko E&P Onshore LLC
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Surface Land Manager
Telephone: 720-929-6026
Fax:
Email: Don_Jobe@oxy.com

With a copy to:

Robert C. Mathes

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Managing Counsel – Rockies
Telephone: 720-929-4326
Email: Robert_Mathes@Oxy.com

7. **No Presumption.** The Parties to this Agreement and their attorneys have had a full opportunity to review and participate in the drafting of the final form of this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction against the Party causing the Agreement to be drafted.

8. **Severability.** If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws. If any section, paragraph, provision, or portion thereof of this Agreement is held by any Court to be void and/or unenforceable for any reason, such section, paragraph, provision, or portion thereof shall be excised from the Agreement and shall be replaced with terms and provisions that are most consistent with, and which reflect, the Parties' intention. All remaining sections, paragraphs, provisions, or portions thereof shall remain in full force and effect.

9. **Dispute Resolution.** If either Party believes that the other Party has violated any provision of this Agreement, the Party claiming that a violation has occurred will send written notice to the other Party, identifying the violation and invoking the dispute resolution process in this Section. Upon receiving such written notice, the other Party will have thirty (30) calendar days to remedy the alleged violation, unless such violation involves operations at a well pad site, in which case the time period will be ten (10) days. If the other Party denies the alleged violation, then the Parties will meet to resolve the alleged violation within ten (10) or thirty (30) calendar days (as the case may be) of the date of delivery of the initial written notice. If a resolution of the matter cannot be achieved at the meeting, both Parties agree to make a reasonable effort to work through and with a mutually acceptable mediator to attempt to resolve the dispute. Notwithstanding the foregoing, if either Party believes that the dispute will not otherwise be resolved in a sufficiently prompt and effective manner, such Party may, at its discretion, institute a legal proceeding in a court of proper jurisdiction to seek appropriate remedies. Such remedies may include, without limitation, an injunction to stop an alleged violation or an order requiring the performance of all acts and things required by the Agreement. Provided, however, that no such legal proceeding will be initiated for a period of at least thirty (30) calendar days after delivery of the initial written notice.

10. **Amendments to Agreement.** No changes, alterations or modifications to any of the provisions hereof will be effective unless contained in a written agreement signed by both Parties.

[*Signature page follows.*]

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by a duly authorized representative on the day and year first above written.

FIRESTONE:

THE TOWN OF FIRESTONE

By: Bobbi Sindelar
Name: Bobbi Sindelar
Title: Mayor
Date: April 14, 2021

KERR-MCGEE:

Kerr-McGee Oil & Gas Onshore LP

DocuSigned by:
By: Danielle Piernot
DCF1AB1984DD497...
Name: Danielle Piernot
Title: Regulatory Affairs Director
Date: 3/29/2021

Anadarko E&P Onshore LLC

DocuSigned by:
By: David J. Woest
794A124B0778445...
Name: David J. Woest
Title: Attorney-in-fact
Date: 3/29/2021

DocuSign Envelope ID: A133C6C4-FA93-4872-8B09-2B91DA546AB8

EXHIBIT A
OPERATIONAL STANDARDS FOR IDENTIFIED WELL PADS

1. **Odor Mitigation**: Kerr-McGee will suppress odors, to the maximum extent practicable, through the use of closed loop systems. Odor emissions from Well Pads must be controlled as soon as reasonably practicable with utmost diligence and dispatch. Kerr-McGee will minimize odors by proactively addressing citizen concerns within 24 hours. Kerr-McGee will add additives to drilling fluids to minimize odors using natural odor neutralizing compounds, not masking agents. In order to meet the provisions of this section, Kerr-McGee will implement the following measures:

   A. Utilization of certain additives to drilling mud to neutralize odors using a specific designed blend of essential oils from natural plant extracts;

   B. Continue to evaluate different additive formulations that have the potential to better suppress odors, including but not limited to non-diesel-based additives;

   C. During flowback and well completions, utilize closed-loop green completion techniques to the maximum extent practicable to minimize emissions and the flaring of natural gas;

   D. Wiping down the drill pipe, to the extent practicable without creating a safety hazard or unsafe work condition, each time that the drilling operation "trips" out of the hole; and

   E. Drill cuttings, while temporarily on location, will be run through a centrifugal dryer to remove residual drilling fluid to the maximum extent practical prior to transportation for disposal.

2. **Noise Mitigation.** To reduce the noise effects on the Town and its residents during drilling, and to provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

   A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

   B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

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C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at least 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based noise mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

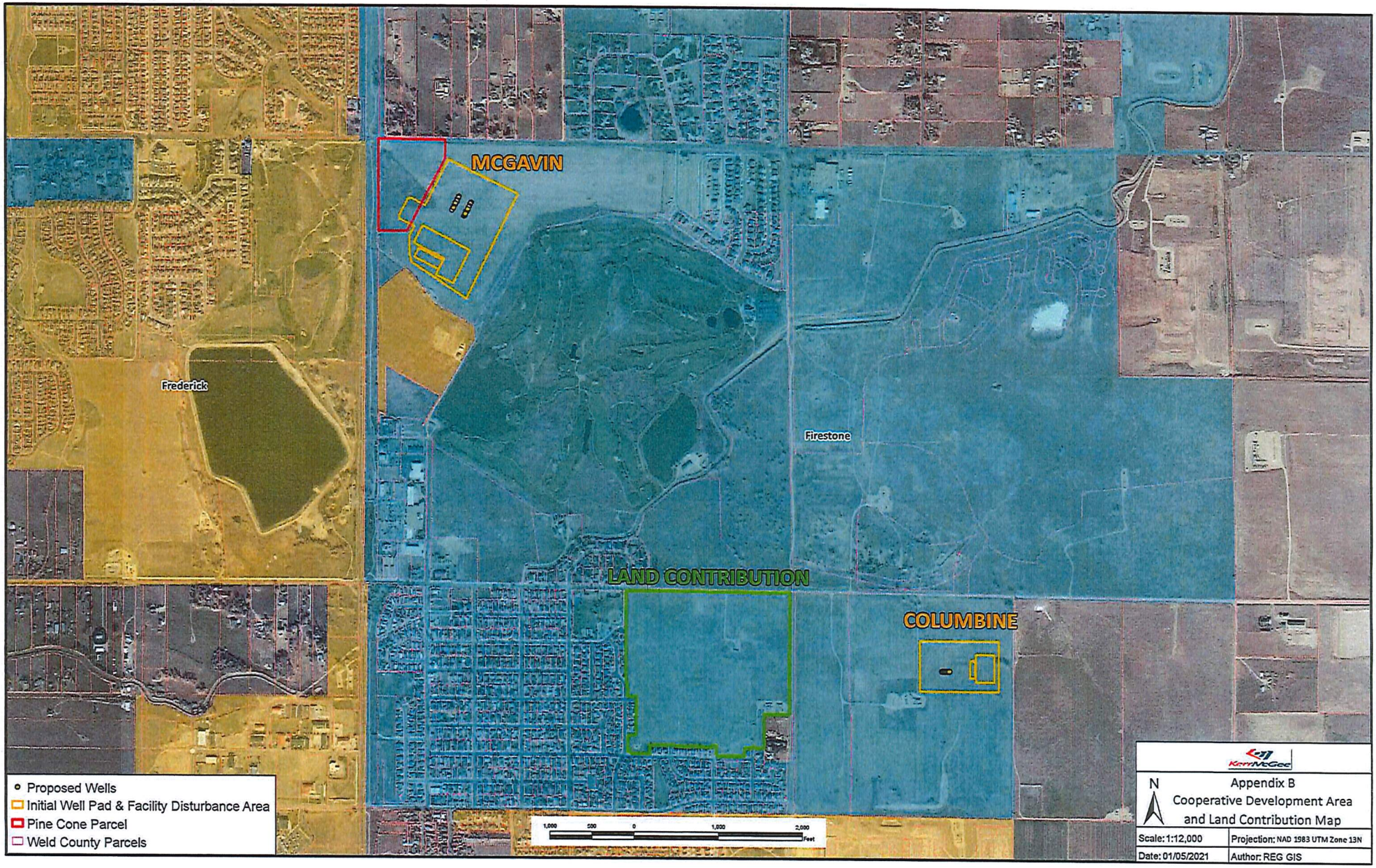
3. **Lighting.** Kerr-McGee will install down cast lighting or some other form of lighting that mitigates light pollution and spill-over onto adjacent properties; provided, however, that Kerr-McGee may still use lighting that is necessary for public and occupational safety.

4. **Road Repairs.** The Parties recognize that truck traffic accessing the Identified Well Pads may cause damage to Firestone roads and that road repairs may be needed to mitigate such damage. Kerr-McGee will arrange for a qualified outside consultant to perform a road impact study for all Firestone roads that are used to access an Identified Well Pad during the Term. The consultant will conduct the first part of the study prior to Kerr-McGee's drilling phase of operations at such Identified Well Pad and the second part of the study after Kerr-McGee completes all drilling, completions, and reclamation activities at such Identified Well Pad. The Parties will use these studies to determine the extent of any damage accruing to the road during the study period. Kerr-McGee will then promptly pay proportionate share to Firestone to repair such damage or else arrange and pay the cost of such repairs itself based on Firestone's preference.

5. **Drilling Pipe and other Large Tubulars Loading.** Kerr-McGee will make all attempts possible to avoid loading large tubulars between 10:00 pm and 7:00 am Mountain Time.

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EXHIBIT B
COOPERATIVE DEVELOPMENT AREA AND LAND CONTRIBUTION MAP


MCGAVIN
Frederick
Firestone
LAND CONTRIBUTION
COLUMBINE
Proposed Wells
Initial Well Pad & Facility Disturbance Area
Pine Cone Parcel
Weld County Parcels
1,000 500 0 1,000 2,000
Feet
N
Appendix B
Cooperative Development Area
and Land Contribution Map
Scale: 1:12,000
Projection: NAD 1983 UTM Zone 13N
Date: 01/05/2021
Author: REG GIS

Firestone Neighborhood Meeting Summary
McGavin 6-19HZ and Columbine 4-29HZ Oil and Gas Applications

Kerr McGee Oil & Gas Onshore, LP (KMOG), a subsidiary of Occidental, conducted a virtual neighborhood meeting on Wednesday, August 25th from 6-7:00 p.m. for stakeholders within close proximity to the proposed McGavin 6-19HZ and Columbine 4-29HZ pads. The purpose of the meeting was for KMOG's subject matter experts to provide an overview of the proposed projects, listen to feedback, and provide answers to stakeholder questions. On August 9th, KMOG mailed invitations to all owners and tenants within 300 feet of the property boundaries, those within 2,000 feet of the working pad surface, and businesses in the shopping center south of the McGavin 6-19HZ pad. Additionally, neighborhood meeting signs were posted on both properties on August 9th.

Fifty-three stakeholders and seven local and state government representatives registered for the meeting. Thirty-five stakeholders, four unknown cell phone numbers, plus fourteen KMOG panelists participated in the neighborhood meeting. Please see the list below including names of attendees. KMOG extended the meeting from 7:00 to 7:15 to finish addressing the ninety-nine questions and comments submitted by twenty-two stakeholders. KMOG uploaded the meeting slide deck to our website (OxyColoradoStakeholder.com) on August 26th and emailed the deck to stakeholders on August 30th. KMOG's Stakeholder team, a dedicated resource for community members, will continue to work with owners and residents to provide frequent and transparent information, answer questions, and seek feedback.

Meeting Attendees:

1. Sheryl Adam
2. Scott Anderson
3. Garrett B
4. Garold Bell
5. Kate Cloud
6. Steven & Alene Colvin
7. Donna Dansdill
8. William Deegan
9. Carl Enright
10. Kris Escalante
11. Beth Faller
12. Belinda Hanke
13. Kari Hebert
14. Bill Hohs
15. Suzanne Johnson
16. Marty Lagae
17. Robert Landrey
18. Michele Martinez
19. Randy Matsushima
20. William McGehee
21. Lisa McGehee
22. Kristin Mercer
23. D Okada
24. Ellen & Gary Pakel
25. Kristin Peart
26. Debra Pierce
27. Dave Rossiter
28. Cody Scott
29. Pat Seifert
30. Paul Seyler
31. Jeannette Sisario
32. Randal Smith
33. Crystal Soderman
34. Bret & Amy Ward
35. Susan Whittaker

Agency Attendees:

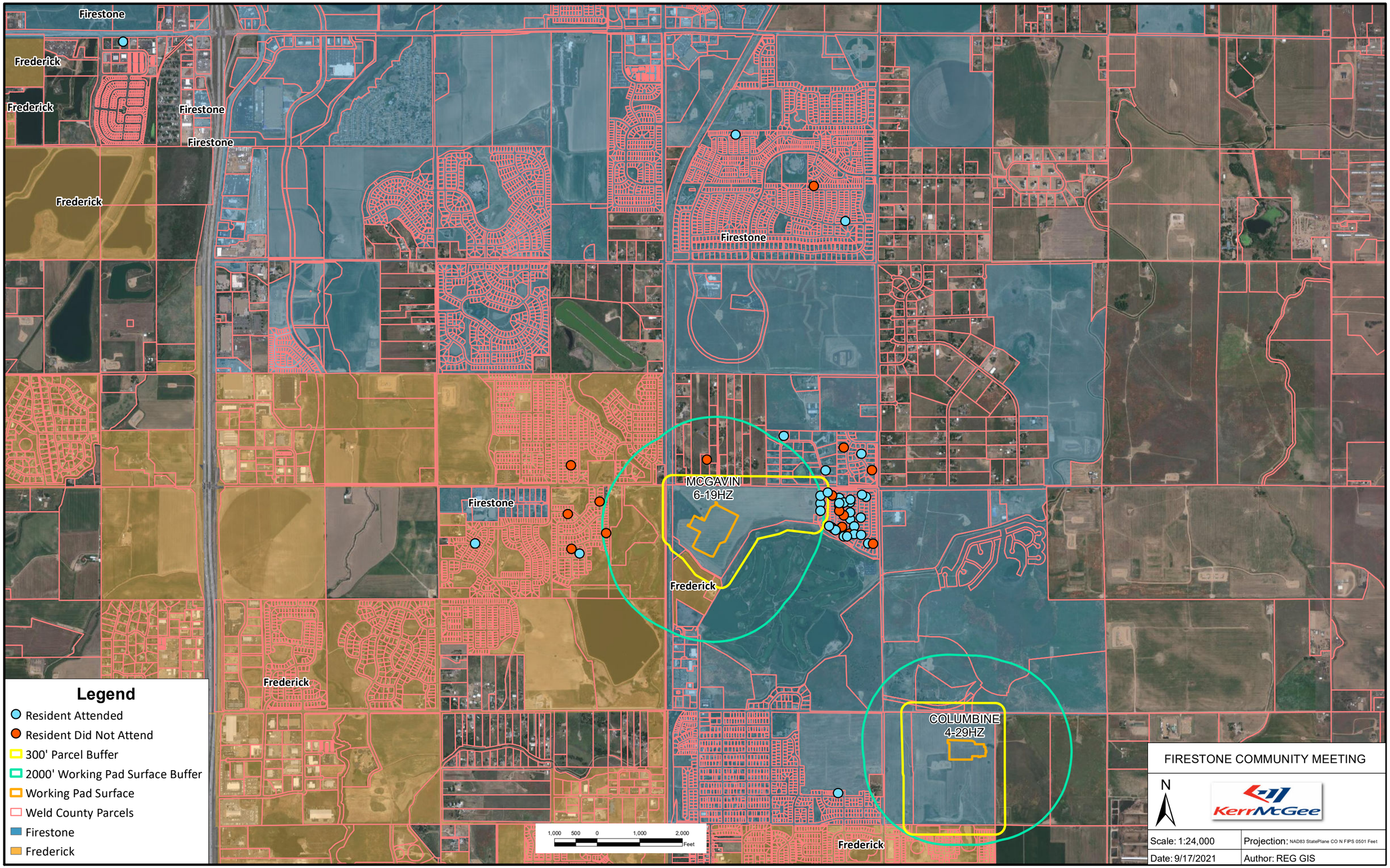
36. Weld County
37. Firestone
38. COGCC
39. Frederick

Other Attendees:
Four additional attendees called in on cell phones

KMOG Panelists:

1. Andy Lytle
2. Anthony Rader
3. Beth Bosworth
4. Chad Schlichtemeier
5. Dani Piernot

6. Jay Bridgeman
7. Jennifer Brice
8. Justin Nelson
9. Lisa Denk
10. Moe Felman
11. Rob Mathes
12. Shaye Marshall
13. Stephanie Madrid
14. Tom Crouch



Depicted information is subjective and its accuracy has not been verified. Attendee locations may not be accurate or extend beyond map extent.

Firestone Neighborhood Meeting

August 2021

Welcome

- Please submit your questions anytime using the Q&A button in the control panel at the bottom of your screen
- If you have questions or would like to provide feedback, please reach out to a member of our Stakeholder Relations team at coloradostakeholder@oxy.com or at 1.866.248.9577
- Also visit us at OxyColoradoStakeholder.com for additional information and resources



About Occidental - Commitment to Safety



- Oxy has a 100-year history of operating oil and gas assets in a variety of unique communities
- Our highest priority is the health, safety and welfare of communities, our employees, and the environment
- We are committed to listening, proactively addressing community concerns, and incorporating your feedback into our plans and operations

McGavin 6-19HZ Pad



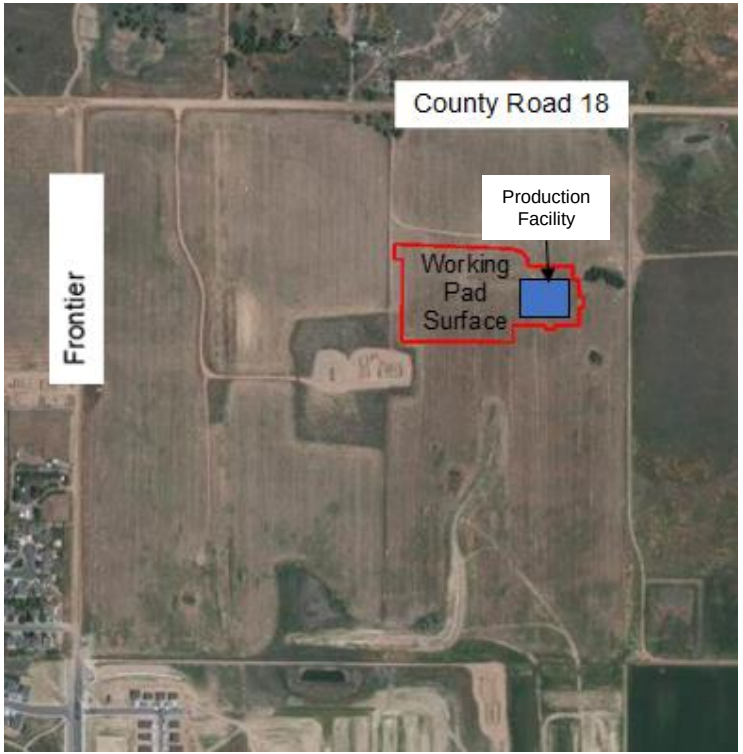
Work Activity	Estimated Timeline
Pad Construction	May 2022 – June 2022
Surface Drilling	June 2022 – July 2022
Horizontal Drilling	August 2022 – January 2023
Well Completions	March 2023 – June 2023
Production Facility	December 2022 – March 2023
Reclamation	November 2023 – December 2023

*For up-to-date timelines
OxyColoradoStakeholder.com

Columbine 4-29HZ Pad

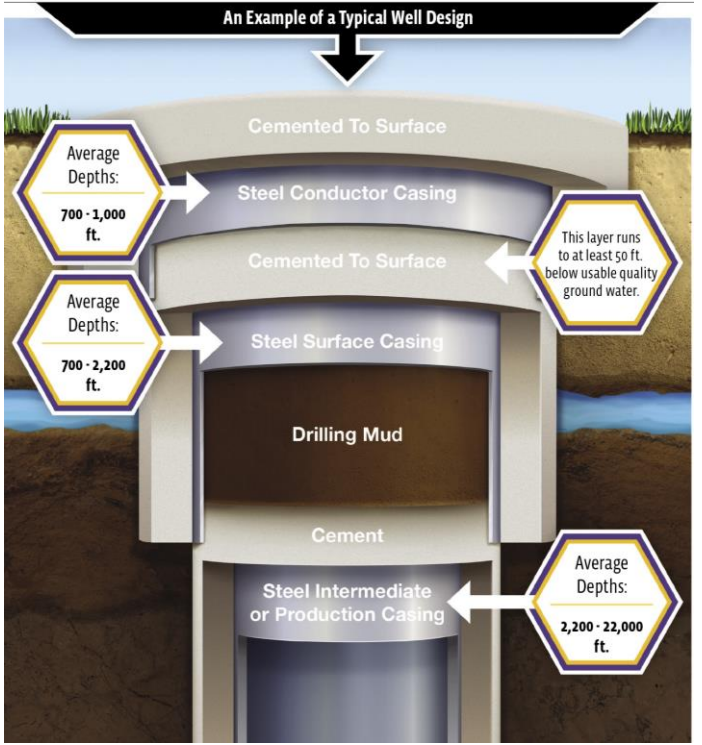
Work Activity	Estimated Timeline
Pad Construction	July 2022 – August 2022
Surface Drilling	August 2022
Horizontal Drilling	September 2022 – November 2022
Well Completions	February 2023 – April 2023
Production Facility	December 2022 – February 2023
Reclamation	June 2023 – August 2023

*For up-to-date timelines
OxyColoradoStakeholder.com



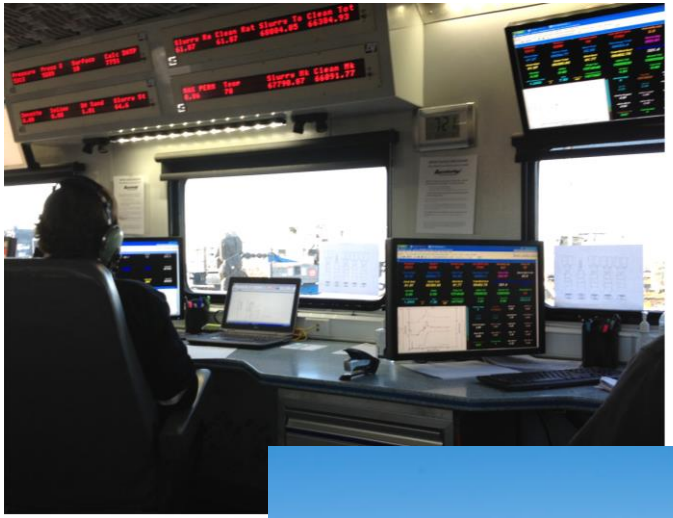
Drilling

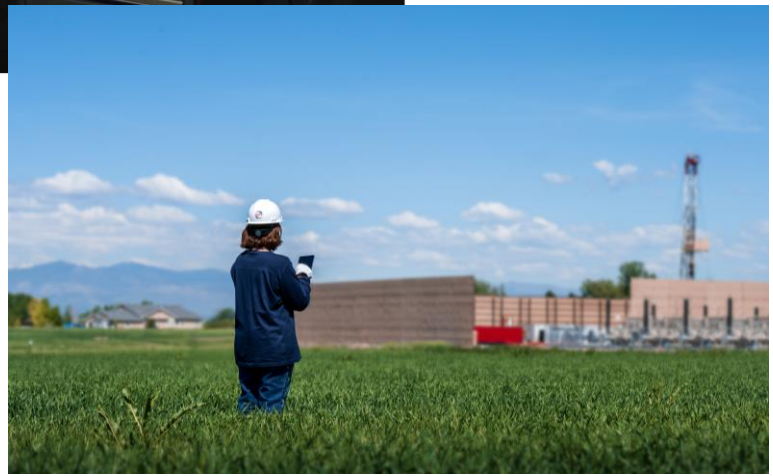


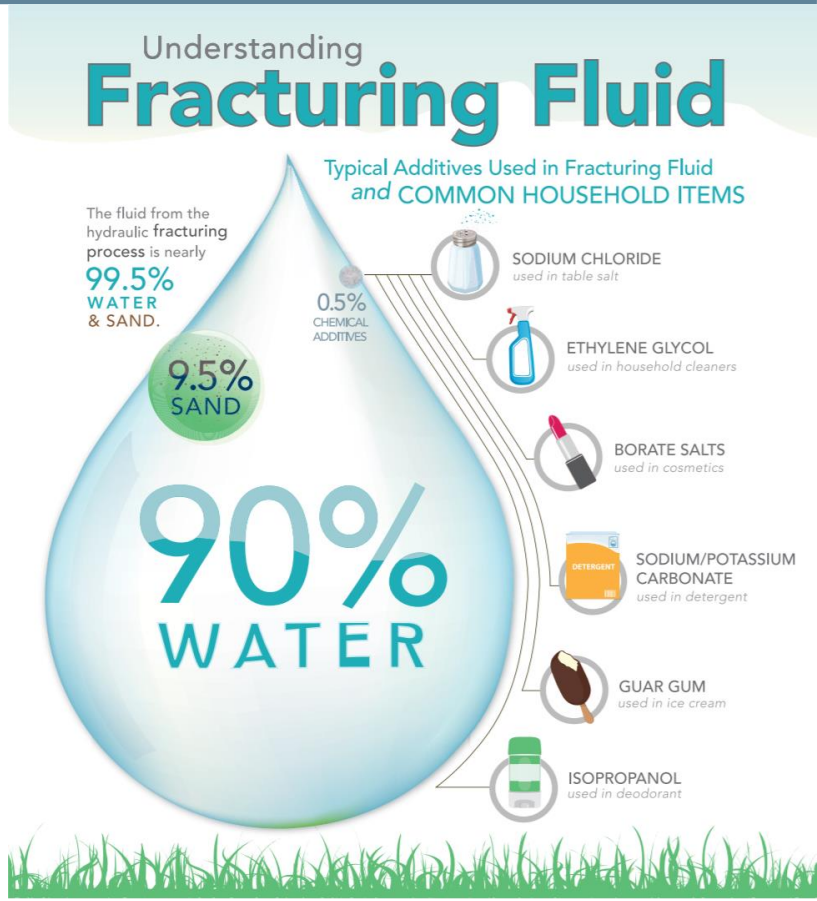


- Surface drilling – Installing casing to protect groundwater
- Horizontal Drilling – Drilling to depth of ~7,000 feet and then horizontally up to 2 miles
- Low emission drilling engines upgraded with noise reducing features

Well Completions







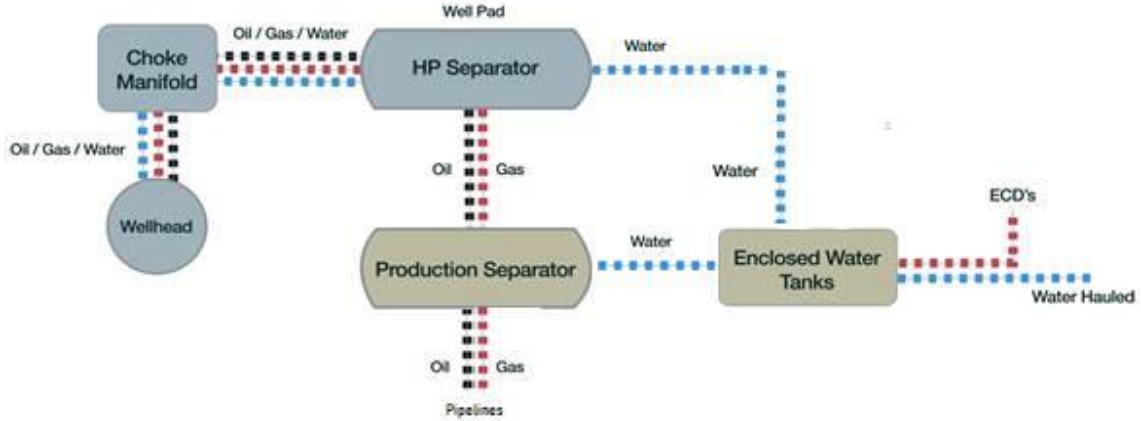
Source: Groundwater Protection Council, API, Energy and Communities (2017)

Production

- Zero routine flaring
- Tankless design, no hydrocarbons stored on-site
- 24-hour monitoring
- Reclaimed to match existing landscape

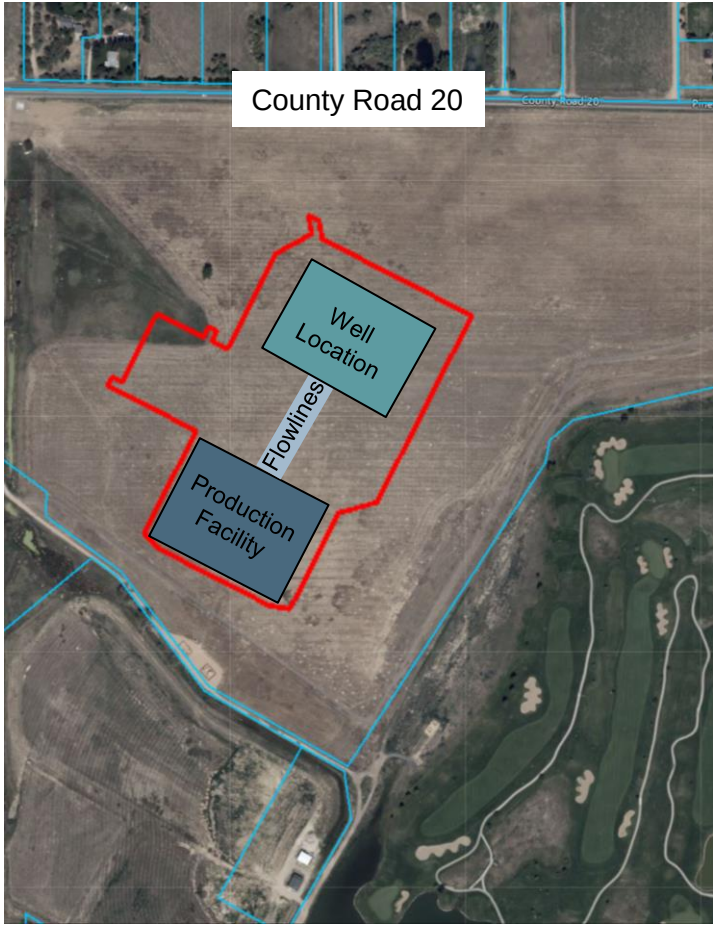


Production facility



Flowlines and Pipelines

- Oil and gas flow from the well heads to the production facility
- Each well has one, 2” steel flowline pipe
- Flowlines are continuously monitored by our Integrated Operations Center and undergo yearly pressure tests
- Exact pipeline locations are still under review and will be owned and operated by Western Midstream (WES)



Reclamation





- When development work is completed, the well pad footprints will be reduced
  - McGavin from 25.63 acres to 7.08 acres
  - Columbine from 12.66 acres to 2.76 acres
- To screen the locations, we plan to install berms and black steel fences around the facilities and wells
- We are evaluating 39 wells for potential retirement near the development area
  - Approximately 1.5 acres are restored and revegetated per well that is retired

Good Neighbor Commitment – Noise, Light, Odor



Noise: State of the art sound walls and continuous sound monitors will be installed

Light: LED lights strategically oriented downward and away from nearby homes

Odor: Odor neutralizer used as part of Oxy's standard drilling system

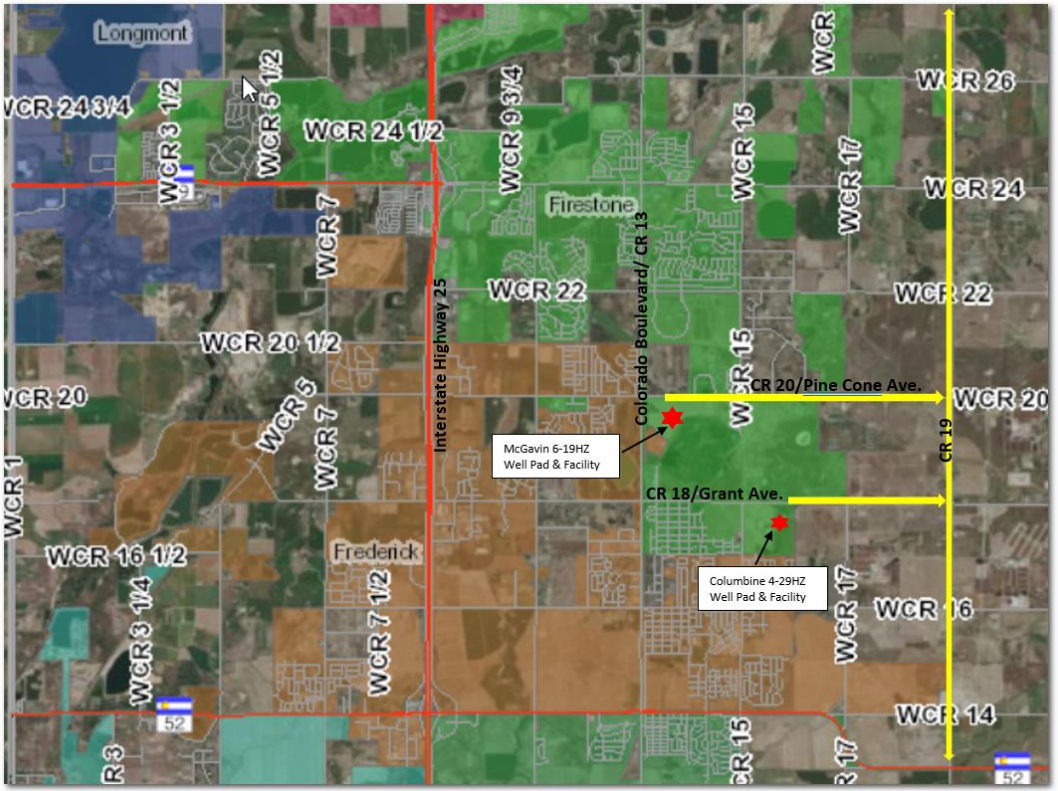
Good Neighbor Commitment – Air Quality

- Continuous air monitoring during drilling and completion activities
- Air monitoring data will be available at OxyColoradoStakeholder.com
- Low emission drilling and completion equipment
- Zero routine flaring
- Tankless design



Good Neighbor Commitment – Traffic

- Comprehensive Traffic Management Plan
  - Plan includes pre/post road studies
- Water-on-demand system, consisting of over 180 miles of underground pipelines, will be utilized to source and transport water
  - This system eliminates more than 2,000 truck trips per day
  - The traffic reduction greatly reduced noise, dust and emissions



State and Local Permitting Process

Permitting milestones
Cooperative Development Agreement - **Completed**
Submit Local Permits - **Submitted**
Submit State Permits - **Submitted**
Planning Commission Hearing
Board of Trustees Hearing
State Public Comment Period
State Public Hearing Date

*For up-to-date timelines
OxyColoradoStakeholder.com

Contacts





Stakeholder Relations Team
1099 18th Street, 7th floor
Denver, CO 80202
866.248.9577
ColoradoStakeholder@oxy.com
OxyColoradoStakeholder.com

Integrated Operations Center (IOC)
970.515.1500

- Real-time monitoring of wells, water tanks, and production facilities
- 24 hours a day, 365 days a year

Q&A

- Please submit your questions using the Q&A button
- We will send you a survey via email and welcome your feedback and questions



www.oxycoloradostakeholder.com

Thank you for joining!



Staff Report

Columbine 4-29HZ Pad and Production Facility

Special Review Use
and
Final Development Plan

Prepared by the
Town of Firestone for the
Planning and Zoning Commission

January 6, 2022

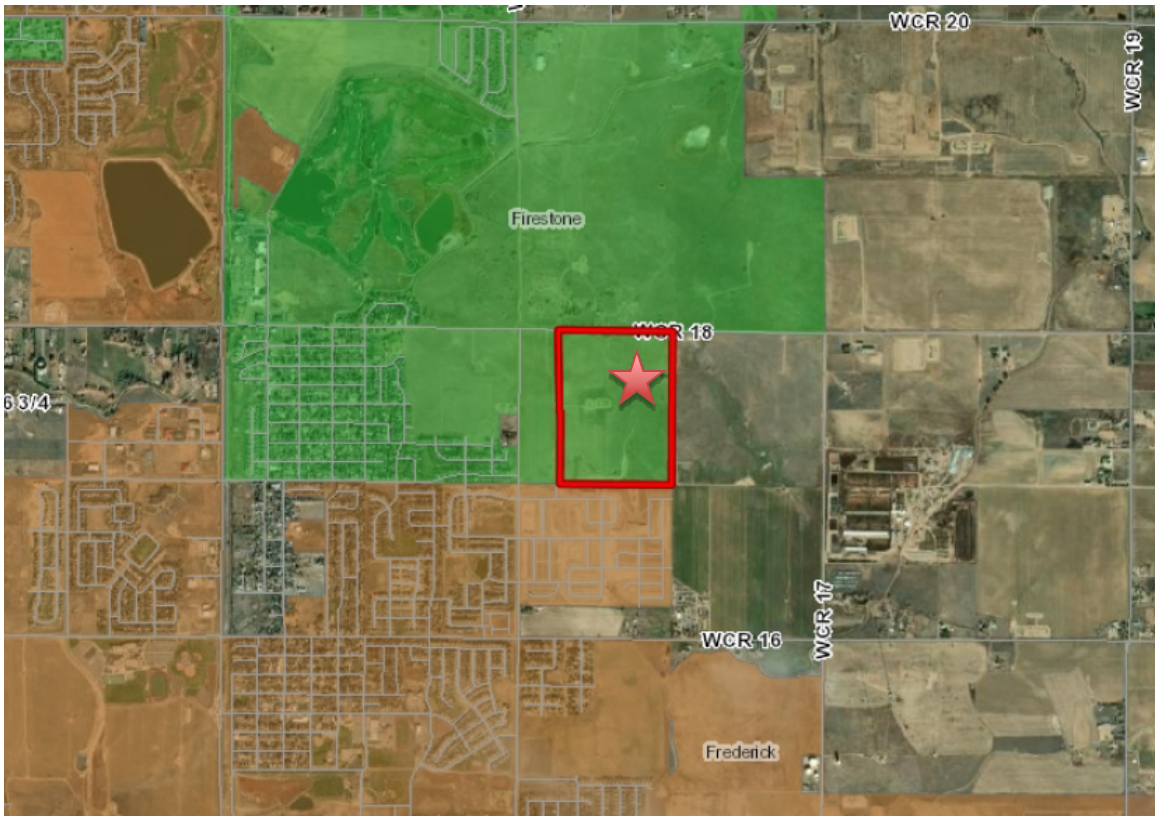
GENERAL INFORMATION

Purpose: This staff report is for the Columbine 4-29HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate seven (7) horizontal oil and gas wells and associated production facilities within the Town.

Applicant: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, CO 80202

Surface Owner: Anadarko E & P Onshore LLC
1099 18th Street
Denver, CO 80202

Location: The proposed well pad is located south of Grant Street (WCR 18) and east of Frontier Street (WCR 15).



Existing Conditions:

Existing Zoning: R-A (Residential-A)
Existing Use: Vacant land and oil/gas operations

Adjacent Land Use/Zoning:

	ZONING	LAND USE
NORTH	R-A – Residential-A	Vacant land + single-family residential
SOUTH	R-2 – Residential Medium (Town of Frederick)	Developing single-family residential
EAST	A – Agricultural (Weld County)	Vacant land + oil/gas operations
WEST	R-B – Residential-B	Vacant land + oil/gas operations

State Oil and Gas Regulations:

The Colorado Oil and Gas Conservation Commission (COGCC) governs the permitting and regulation of oil and gas wells throughout the state.

Town of Firestone Oil and Gas Regulations:

The Town of Firestone Development Code regulates siting, access roads, fencing and color of oil and gas wells and associated above ground production facilities through the review of the required Special Review Use and Final Development Plan applications for proposed oil and gas facilities. Other operational aspects of and oil and gas facility are regulated by the COGCC.

Columbine 4-29HZ Pad and Production Facility Analysis:

The proposed Columbine 4-29HZ Pad and Production Facility consists of seven (7) horizontal wells, well heads, well related equipment and facilities (combustors/separators, etc.), meter houses, access roads, drainage facilities and pipelines.

Pad Size:

- Approximately 12.6 acres of the site will be used for drilling and completions operations. When drilling and completions activities are finished, a large portion of the disturbed area will be reclaimed, leaving approximately 2.7 acres of disturbed area while the site is in the production phase.
- Construction of the pad site and improvements to the existing access road will take approximately 4 weeks to complete.
- When the wells have reached the end of production, the wells will be plugged and abandoned and the site will be reclaimed, including the removal of flowlines.

Access:

- Access into the Columbine pad will be from an existing oil and gas access road off of Grant Avenue.
- Per the FDC, the applicant will be required to pave (asphalt or concrete) the first 100-feet of the access road from Grant Avenue.
- Per standards in the Cooperative Development Plan Agreement, the applicant will be responsible for any damage caused to Town roads.
- Per a condition of approval, the applicant will be responsible for paving Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street.

Drilling Operations:

- Each well will take approximately 5 to 6 days to drill.
- Drilling occurs 24 hours per day.
- Well completions will occur after the drilling phase and takes approximately 4 to 6 days per well.
- Permanent production facilities installed after drilling and completions are completed.
- Interim reclamation of the site from 12.6 acres to 2.7 acres.

Mitigation Measures:

- Temporary 32-foot sound walls will be installed to control sound to the maximum extent practicable.
- Shrouding of lighting to the maximum extent practicable.
- Closed loop water system will be utilized to reduce truck trips and minimize site disturbance.
- Tankless facility is proposed to eliminate hydrocarbon storage tanks and associated emissions and to reduce truck trips.
- Air monitoring during pre-production and during the first six months of production.

Production Equipment/Facilities:

- All production equipment and facilities on the pad will be fenced and painted according to FDC requirements.
- No permanent liquid hydrocarbon tanks are included at this facility as the liquid hydrocarbons will be piped off-site.

Pipelines:

- Flowlines are proposed from the well heads to the production equipment and are internal to the pad. No flowlines are proposed outside of the pad area.

APPROVAL CRITERIA AND STAFF ANALYSIS

Special Review Use Approval Criteria and Staff Analysis:
The Special Review Use application for the Columbine 4-29HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.11 of the FDC. Staff makes the following findings.

A. The proposed use is generally consistent with the Town's Comprehensive Master Plan and all applicable provisions of this FDC and applicable State and Federal regulations;

Staff: *The proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan and Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

B. The proposed use is generally consistent with the purpose and intent of the zoning district in which it is located;

Staff: *The proposed use is consistent with the purpose and intent of the R-A zone district in that "Mining and Mineral Extraction" is permitted within the R-A zone district under the Special Review Use regulations of the Town.*

C. The proposed use is generally consistent with any applicable use-specific standards set forth in Section 3.2;

Staff: *There are no use-specific standards for "Mining and Mineral Extraction" within Section 3.2, however, the proposed use is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

D. The proposed use is compatible with adjacent uses in terms of scale, site design, and operating characteristics (hours of operation, traffic generation, lighting, noise, odor, dust, and other external impacts);

Staff: *The proposed use is compatible with adjacent uses in that the applicable development and design standards set forth in Section 16.6.14 of the FDC are met. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

E. Any significant adverse impacts anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable;

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. Facilities and services (including sewage and waste disposal, water, gas, election, police and fire protection, and streets and transportation, as applicable) will be available to serve the subject property while maintaining adequate levels of service for existing development;

Staff: *The proposed pad and production facility will not have a significant impact on any Town facilities or other utility providers.*

G. Adequate assurances of continuing maintenance have been provided; and

Staff: *The applicant will be responsible for the ongoing maintenance of the well pad and production facilities, including the reclamation of disturbed areas. In addition, all wells and production facilities are remotely monitored 24 hours/7 days a week.*

H. Any significant adverse impacts on the natural environment will be mitigated to the maximum extent reasonably practicable.

Staff: *The applicant will meet Town and State regulations relative to impacts on the natural environment to the maximum extent practicable. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

Final Development Plan Approval Criteria and Staff Analysis:
The Final Development Plan application for the Columbine 4-29HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.10 of the FDC. Staff makes the following findings.

A. The Final Development Plan is generally consistent with the Town's Comprehensive Master Plan;

Staff: *The FDP showing the proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan.*

B. The Final Development Plan is generally consistent with any previously approved subdivision plat, planned development, or any other precedent plan or land use approval as applicable;

Staff: *The FDP is consistent with previously approved land use actions for the subject property.*

C. No buildings or structures infringe on any easements so as to impact the full use of the easement;

Staff: *No buildings or structures proposed on the FDP will infringe on any easements.*

D. The Final Development Plan complies with all applicable development and design standards set forth in this FDC;

Staff: *The FDP is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

E. Any significant adverse impacts reasonably anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable; and

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. The development proposed on the Final Development Plan and its general location is or will be compatible with the character of surrounding land uses.

Staff: *The proposed pad and production facility meets applicable Town setback standards. In addition, the applicant is also the surrounding land owner and in control of any surface development in and around the pad and production facility.*

NEIGHBORHOOD MEETING

As required by the Firestone Development Code, a Neighborhood Meeting was held on August 25, 2021 at 6:00 pm as a virtual neighborhood meeting. The required notice for the Neighborhood Meeting was provided.

PUBLIC NOTICE

Notice of the Public Hearings has been provided as follows:

Published in the Longmont Times Call:	December 22, 2021
Property Posted:	December 20, 2021
Letters to Adjacent Property Owners:	December 20, 2021

RECOMMENDATIONS

Special Review Use:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-01, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to roadway improvements on Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

Final Development Plan:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-02, a resolution recommending approval of the Final Development Plan application to the Board of Trustees with conditions:

a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to roadway improvements on Grant Avenue from Sherilynn Circle to one-half mile east of Frontier Street, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

FIRESTONE PLANNING AND ZONING COMMISSION

RESOLUTION NO. PC-22-02

A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A FINAL DEVELOPMENT PLAN APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, who is the owner of certain real property located in the Town of Firestone, having a legal description of NE ¼ of NW ¼ of Section 29, 2N, 67W ("Property"), has submitted an application for Final Development Plan to construct and operate a new oil and gas well pad, including 7 wells and one production facility, to be known as the "Columbine 4-29HZ Pad and Production Facility," on the Property (the "Application"); and

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, also submitted an application for Special Review Use relating to such final development plan; and

WHEREAS, the Firestone Planning and Zoning Commission has conducted a public hearing on the Application, and has considered all the evidence presented at the public hearing, the relevant standards to accommodate oil and gas wells and facilities set forth in Sections 16.6.14 of the Firestone Development Code ("Code") and the Final Development Plan criteria set forth in Step 9, Section 16.7.10.D. of the Code; and

WHEREAS, the Firestone Planning and Zoning Commission wishes to make a recommendation to the Board of Trustees regarding the Application.

NOW, THEREFORE, BE IT RESOLVED BY THE FIRESTONE PLANNING AND ZONING COMMISSION:

1. That the Firestone Planning and Zoning Commission recommends approval of the Application, with the following conditions:

   a. All minor, technical corrections to the Columbine 4-29HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

   b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement attached hereto as Exhibit A.

   c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the Columbine 4-29HZ Pad and Production Facility, including but not limited to, roadway/paving improvements on Grant Avenue (from Sherilynn Circle to one-half mile east of Frontier Street), which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, Applicant shall plat/dedicate additional right-of-way for Grant Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

PASSED AND ADOPTED this ____ day of _____, 2022.

_____
Chairperson

ATTEST:

_____
Lisa Bartley, Secretary

EXHIBIT A
Cooperative Development Plan Agreement

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NE1/4 NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLOUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE COLUMBINE 4-29HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

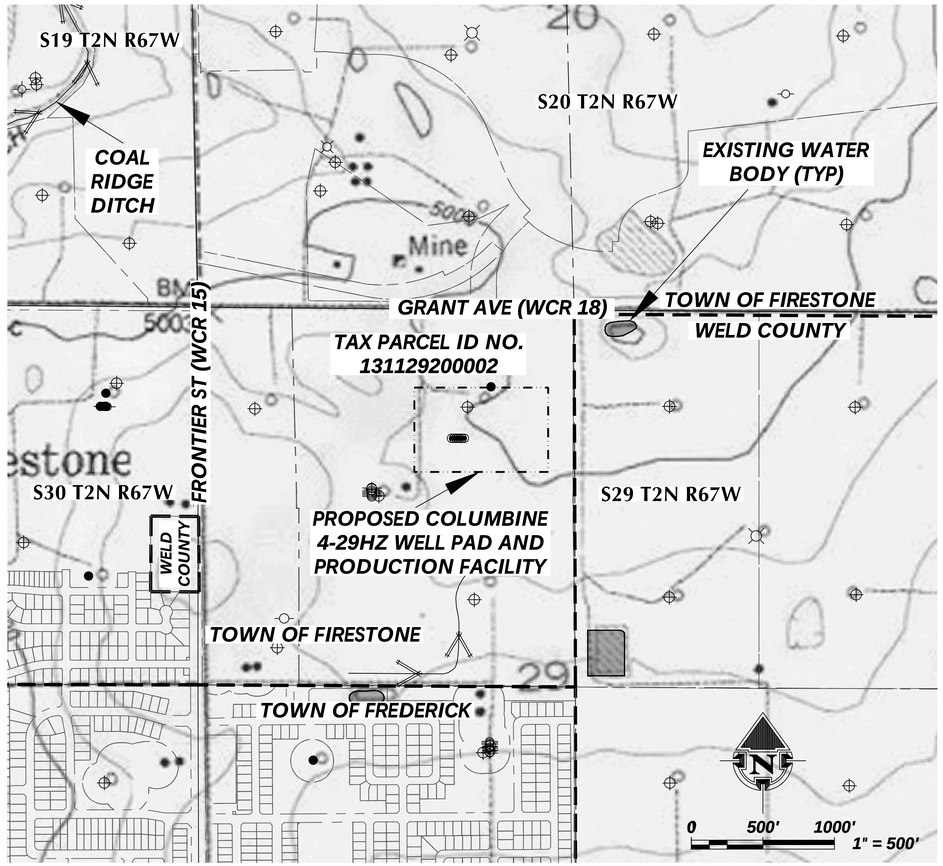
_____ MAYOR

ATTEST_____ TOWN CLERK

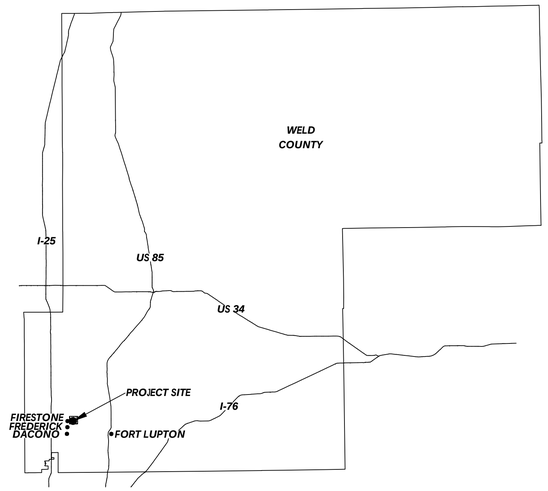
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- *CONSTRUCTION LIMITS OF DISTURBANCE*
- *PROPOSED WELL*
- *EXISTING WELL (PRODUCING)*
- *EXISTING WELL (PLUG & ABANDONED)*
- *EXISTING WELL (SHUT IN)*
- *EXISTING WELL (DRY AND ABANDONED)*
- *EXISTING WELL (TEMPORARILY ABANDONED)*
- *TOWN LIMITS*
- *WATER BODY*
- *PROPERTY LINE*
- *EXISTING DITCH / STREAM*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-013 / FDP21-013

SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP_COVER.dwg, 12/10/2021 3:20:53 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

OWNER: VISTAS AT SADDLEBACK (WELD COUNTY PARCEL I.D. 131119400038) ZONING: FIRESTONE

EXISTING FACILITY

S19 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300001) ZONING: FIRESTONE

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300025) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400034) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400005) ZONING: FIRESTONE

S20 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300002) ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300003) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120300022) ZONING: FIRESTONE

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273 DATE: 10/14/1889

TOWN OF FIRESTONE

GRANT AVE (WCR 18)

WELD COUNTY

OHP

ROAD EXISTING

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SEE ACCESS ROAD DETAIL

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300023) ZONING: FIRESTONE

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

EXISTING ROAD (TO BE IMPROVED)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200002) ZONING: FIRESTONE

PROPOSED ACCESS ROAD

TEMPORARY EQUIPMENT AREA (215' x 60')

20'

20' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1632344) DATE: 03/20/74

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

60'

FRONTIER ST (WCR 15) 60' EXISTING ROW (BOOK 86 PAGE 273) DATE: 10/14/1889

OWNER: ANADARKO E & P ONSHORE LLC TRACT I THE OVERLOOK AT FIRESTONE, REPLAT "A" (WELD COUNTY PARCEL I.D. 131130117000) ZONING: FIRESTONE

S30 T2N R67W

PROPOSED COLUMBINE 4-29HZ WELL PAD

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200001) ZONING: FIRESTONE

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION RPLTA

EXISTING FACILITY

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1751456) DATE: 04/25/78

50'

EXISTING ACCESS ROAD

EXISTING FACILITY

OWNER: PATTON ROY C, PATTON MARGARET D & KANZLER DAWN E (WELD COUNTY PARCEL I.D. 131130100024) ZONING: AG-A

TOWN OF FIRESTONE

WELD COUNTY

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1699366) DATE: 09/20/76

50'

30' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 4084912) DATE: 02/23/15

30'

DRAINAGE EASEMENT (RECEPTION NO. 4176525) DATE: 01/27/16

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691200, 1769650 & 1697790) DATE: 06/16/76, 10/13/78 & 09/01/76

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691207) DATE: 06/16/76

50'

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION

SUBDIVISION: VILLAGE EAST COMMUNITY RPLT #1

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #1

50'

EXISTING WATER BODY

50'

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #4

EXISTING WATER BODY

EXISTING ROAD

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129100013) ZONING: AG-A

S29 T2N R67W

WHEATLAND BLVD (WCR 17)

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129000011) ZONING: AG-A

WCR 17 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 17 PAGE 180

N

0 200' 400'

1" = 200'

ACCESS ROAD DETAIL

GRANT AVE (WCR 18)

106' 60'

30' R

42'

EXISTING FENCE (TYP.)

100' HARD SURFACE

EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273

PROPOSED ACCESS ROAD (26 FT.)

PROPOSED 15" CMP CULVERT

100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)

EXISTING ACCESS ROAD (TO BE IMPROVED)

N

0 50' 100'

1" = 50'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- EXISTING SANITARY SEWER LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING
- EXISTING DITCH / STREAM

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

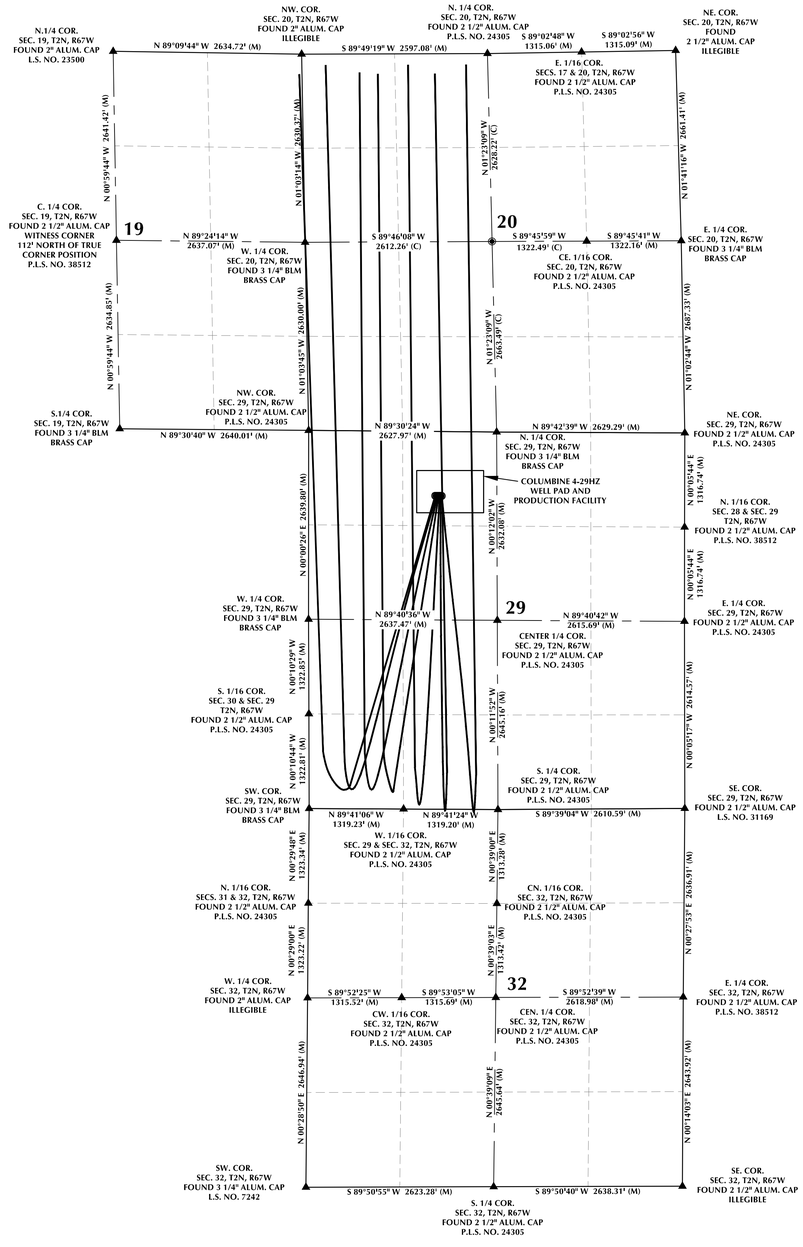
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-013 / FDP21-013

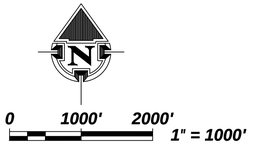
SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP.dwg, 12/10/2021 3:31:11 PM, cdey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- INDICATES CALCULATED SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. *BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.*
2. *ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972294 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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Phone 307-674-0609

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1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-013 / FDP21-013

SCALE:	1" = 1000'	SHEET:	FDP-3
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

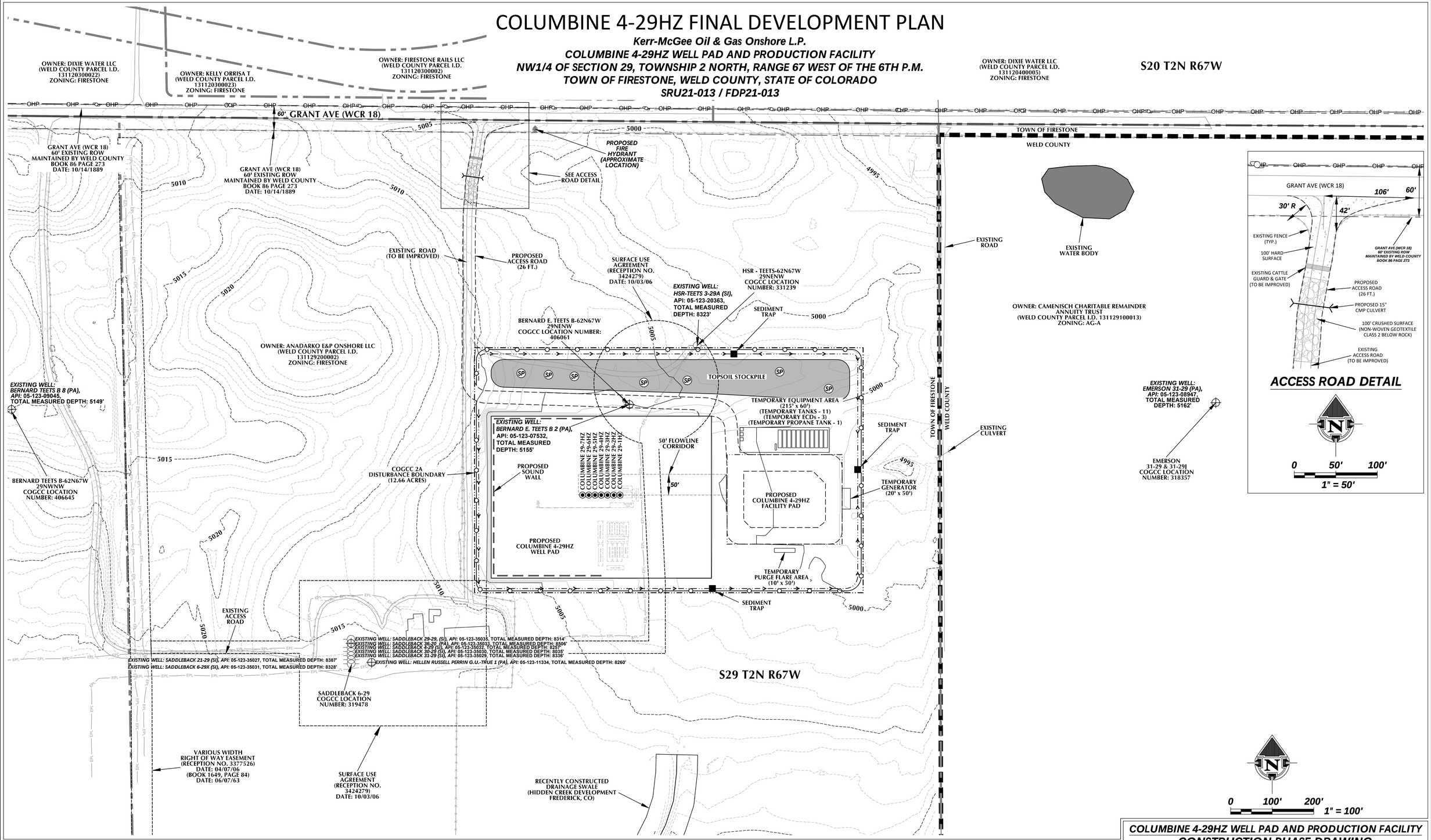
Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.

1099 18th Street

Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

CONSTRUCTION PHASE DRAWING

SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2010\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP.dwg, 12/10/2021 3:28:43 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120300022)
ZONING: FIRESTONE

OWNER: KELLY ORRISA T
(WELD COUNTY PARCEL I.D.
131120300023)
ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC
(WELD COUNTY PARCEL I.D.
131120300002)
ZONING: FIRESTONE

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120400005)
ZONING: FIRESTONE

S20 T2N R67W

60' GRANT AVE (WCR 18)

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

TOWN OF FIRESTONE
WELD COUNTY

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

SEE ACCESS ROAD DETAIL

EXISTING ROAD (TO BE IMPROVED)

PROPOSED ACCESS ROAD (26 FT.)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

EXISTING WELL: HSR-TEETS 3-29A (SI), API: 05-123-20363, TOTAL MEASURED DEPTH: 8323'

HSR - TEETS-62N67W 29NENW COGCC LOCATION NUMBER: 331239

BERNARD E. TEETS B-62N67W 29NENW COGCC LOCATION NUMBER: 406061

OWNER: ANADARKO E&P ONSHORE LLC
(WELD COUNTY PARCEL I.D.
13112900002)
ZONING: FIRESTONE

EXISTING WELL: BERNARD TEETS B 8 (PA), API: 05-123-09045, TOTAL MEASURED DEPTH: 5149'

BERNARD TEETS B-62N67W 29NWNW COGCC LOCATION NUMBER: 406645

EXISTING WELL: BERNARD E. TEETS B 2 (PA), API: 05-123-07532, TOTAL MEASURED DEPTH: 5155'

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PROPOSED COLUMBINE 4-29HZ WELL PAD

COLUMBINE 29-7HZ, COLUMBINE 29-6HZ, COLUMBINE 29-5HZ, COLUMBINE 29-4HZ, COLUMBINE 29-3HZ, COLUMBINE 29-2HZ, COLUMBINE 29-1HZ

50' FLOWLINE CORRIDOR

50'

OFF-SITE FLOW DEFLECTION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE VISUAL MITIGATION BERM CROSS SECTION DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

SEEDED TOPSOIL STOCKPILE FOR FINAL RECLAMATION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

EXISTING ROAD

EXISTING WATER BODY

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST
(WELD COUNTY PARCEL I.D. 131129100013)
ZONING: AG-A

TOWN OF FIRESTONE
WELD COUNTY

EXISTING CULVERT

EXISTING WELL: EMERSON 31-29 (PA), API: 05-123-08947, TOTAL MEASURED DEPTH: 5162'

EMERSON 31-29 & 31-29J COGCC LOCATION NUMBER: 318357

EXISTING ACCESS ROAD

EXISTING WELL: SADDLEBACK 29-29, (SI), API: 05-123-35035, TOTAL MEASURED DEPTH: 8314'
EXISTING WELL: SADDLEBACK 36-20 (PA), API: 05-123-35033, TOTAL MEASURED DEPTH: 8506'
EXISTING WELL: SADDLEBACK 4-29 (SI), API: 05-123-35032, TOTAL MEASURED DEPTH: 8257'
EXISTING WELL: SADDLEBACK 30-29 (SI), API: 05-123-35030, TOTAL MEASURED DEPTH: 8035'
EXISTING WELL: SADDLEBACK 31-29 (SI), API: 05-123-35029, TOTAL MEASURED DEPTH: 8336'
EXISTING WELL: HELLEN RUSSELL PERRIN G.U.-TRUE 1 (PA), API: 05-123-11334, TOTAL MEASURED DEPTH: 8260'
EXISTING WELL: SADDLEBACK 21-29 (SI), API: 05-123-35027, TOTAL MEASURED DEPTH: 8387'
EXISTING WELL: SADDLEBACK 6-29X (SI), API: 05-123-35031, TOTAL MEASURED DEPTH: 8328'

SADDLEBACK 6-29 COGCC LOCATION NUMBER: 319478

S29 T2N R67W

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

GRANT AVE (WCR 18)
106' 60'
30' R
42'
EXISTING FENCE (TYP.)
100' HARD SURFACE
EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)
GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273
PROPOSED ACCESS ROAD (26 FT.)
PROPOSED 15" CMP CULVERT
100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)
EXISTING ACCESS ROAD (TO BE IMPROVED)

ACCESS ROAD DETAIL

0 50' 100'
1" = 50'

0 100' 200'
1" = 100'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED PERMANENT SEEDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6***

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

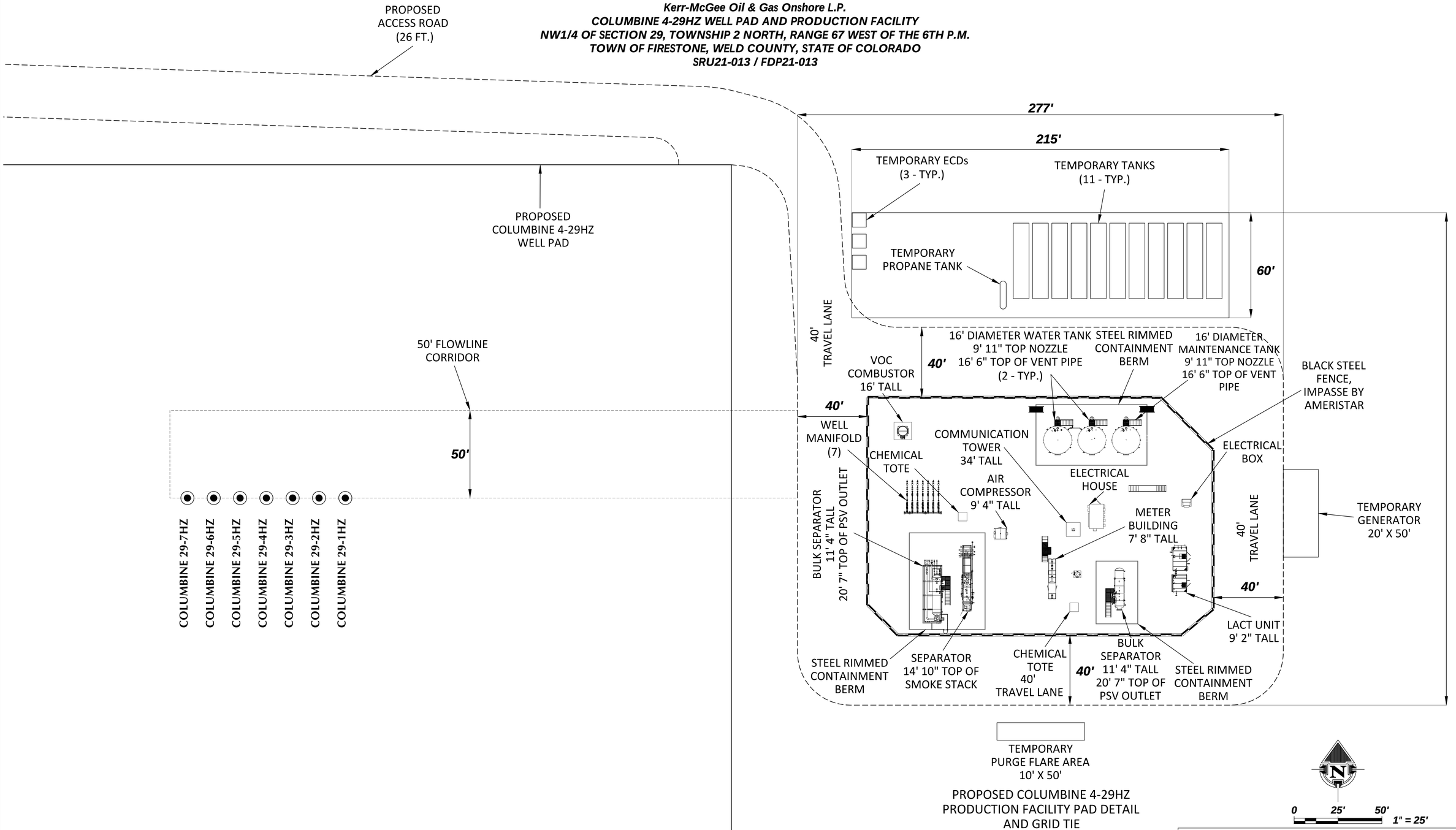
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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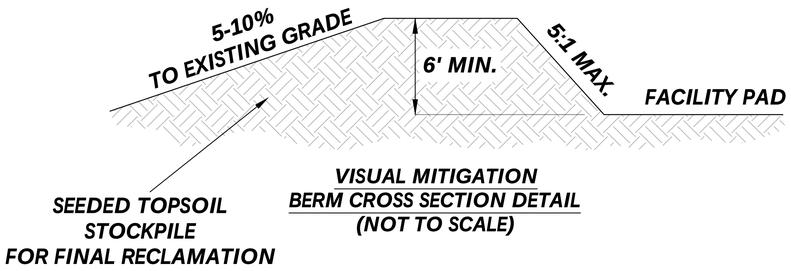
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 25'	SHEET:	FDP-6
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

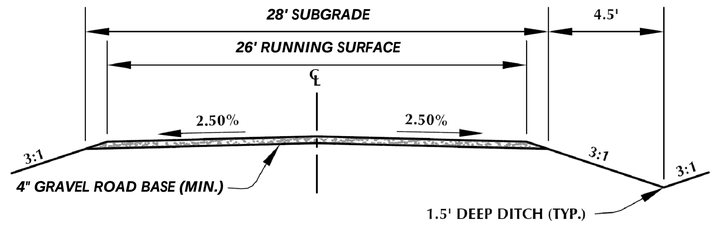
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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

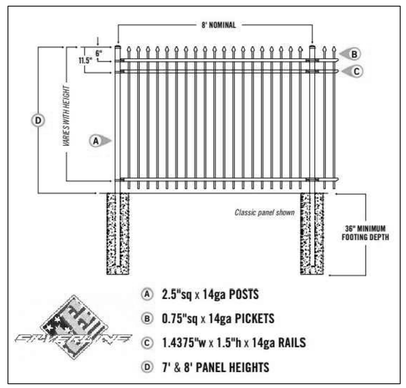
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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



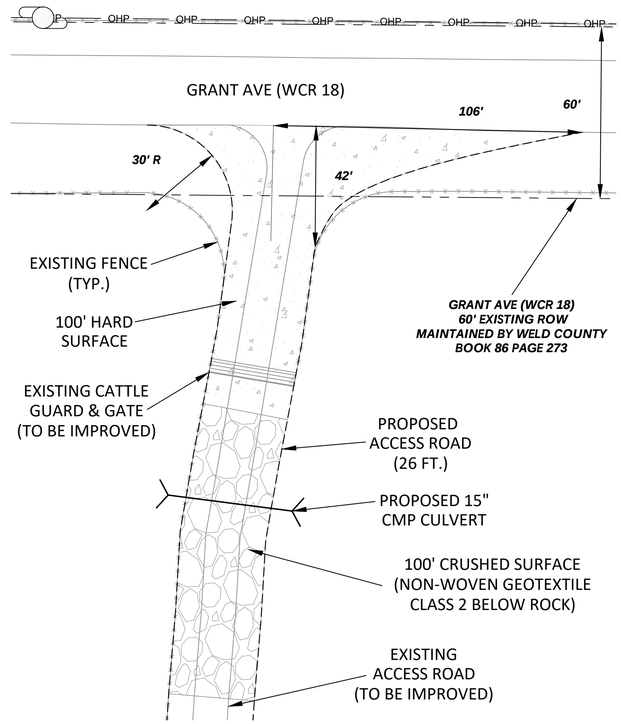
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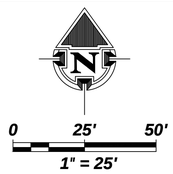
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE COLUMBINE 4-29HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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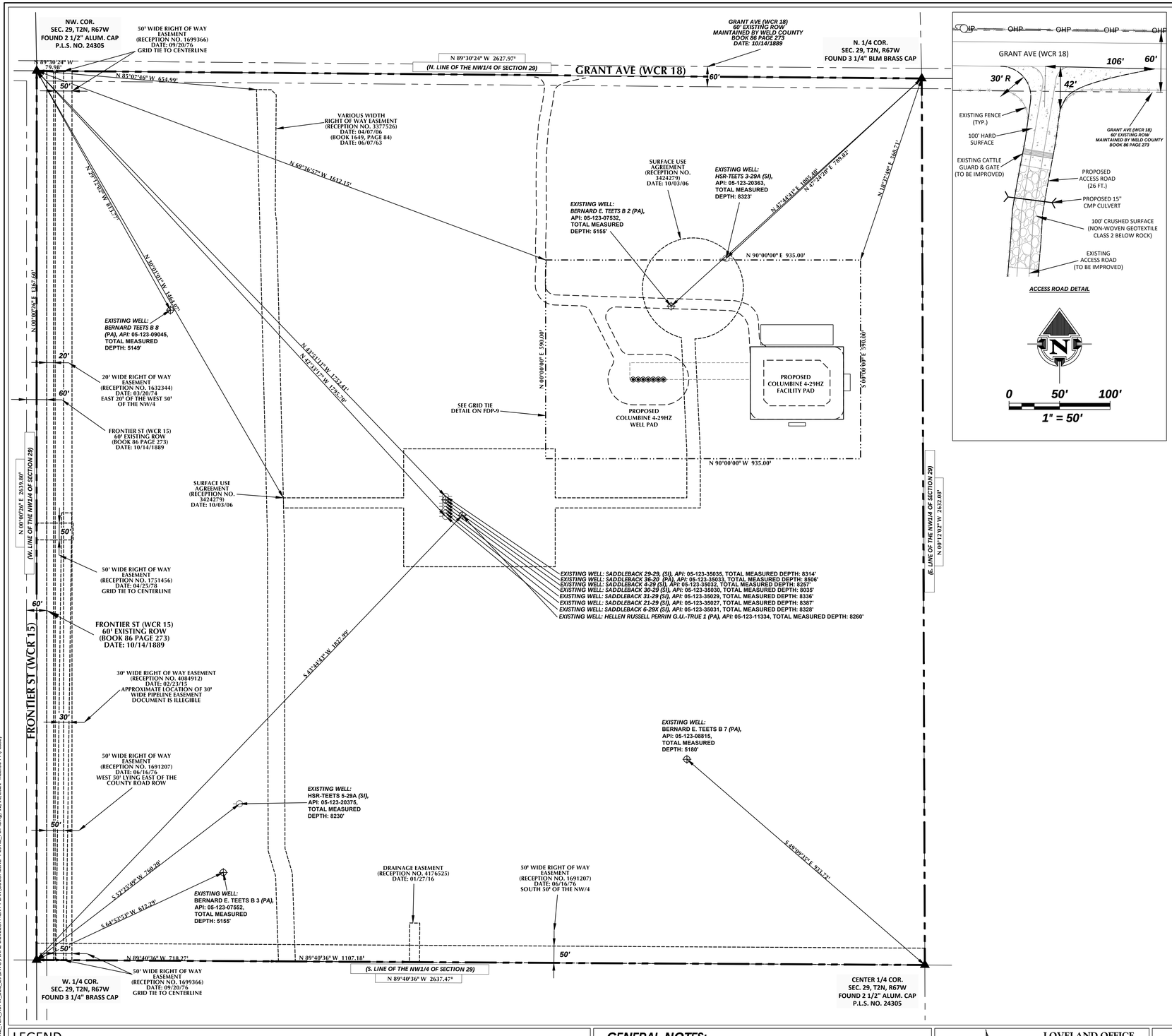
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-013 / FDP21-013

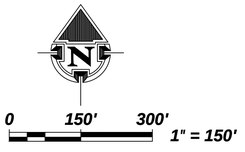
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

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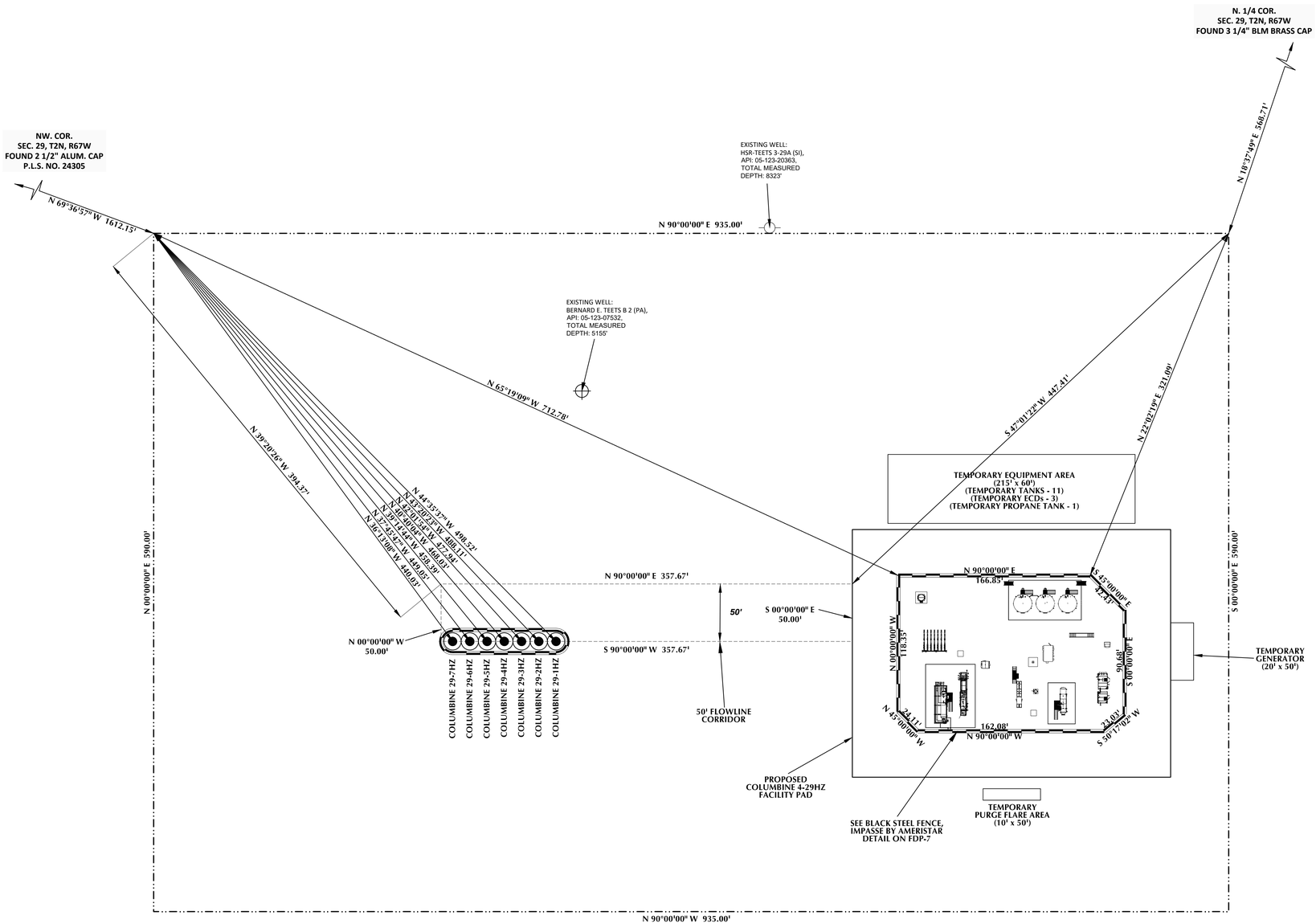
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-013 / FDP21-013

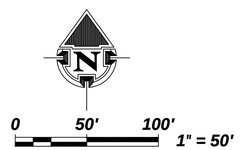
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DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
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1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-013 / FDP21-013

SCALE:	1" = 50'	SHEET:	FDP-9
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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Special Review Use Application
Town of Firestone

Columbine 4-29HZ Pad and Production Facility

Township 2 North, Range 67 West, 6th P.M.
Section 29: NENW
Firestone, Colorado
Parcel # 131129200002
7274 Grant Avenue

Location Lat/Long (NAD 83): 40.114092, -104.915717
Access Road Lat/Long (NAD 83): 40.116598, -104.918317

APPLICANT:

Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Revised December 2021

Table of Contents

Section

Application Form 1
Narrative 2
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Phase III Drainage Study (REVISED) 5
Stormwater Management Plan 6
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Phase I Environmental Study 9
Cultural Assessment.....10
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Noise Mitigation Plan 12
Traffic Management Plan and Baseline Road Study (REVISED) 13
Reclamation Plan 14
Community Consultation Plan 15
Final Development Plan (REVISED) 16
Alta Survey 17

Section 1

Application Form

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

TOWN OF FIRESTONE
DEVELOPMENT REVIEW APPLICATION

Incomplete applications will not be processed. Attach additional sheets if necessary. Application fees must accompany application.

PROJECT INFORMATION	
Project Name: Columbine 4-29HZ well pad and facility	
Address/Location: NENW of Section 29, 2N 67W	
Brief Project Description: KMOG proposes to construct a new oil and gas well pad including seven wells and one production facility.	
Date of Pre-Application Conference with Staff: 6/26/2020	
Submittal Check List Attached: Yes	Fee Payment Included with Application: Yes
Mark As Applicable:	
Current Zoning: PUD	Proposed Zoning: No change
Current Use: AG	Proposed Use: N/A
# of Lots Proposed: N/A	Density Proposed: N/A
Gross Floor Area Proposed: N/A	
SITE INFORMATION	
Legal Description: NENW of Section 29, 2N 67W	
Location Size: ~ 12.66 Acres (DA); ~ 2.73 Acres (Interim Rec)	Floodplain On Site: No
SERVICE PROVIDERS	
Water: N/A	School District: N/A
Sewer: N/A	Fire District: Frederick Firestone Fire District
Gas: N/A	Ditch Company: N/A
Electric: N/A	Other:
Metro District: N/A	Other:
PROPERTY OWNER	**APPLICANT**
Name/Company: Anadarko E&P Onshore LLC	Name/Company: Kerr McGee Oil and Gas Onshore LP
Address: 1099 18th St., Denver CO 80202	Address: 1099 18th St., Denver CO 80202
Phone Number: 720-929-6026	Phone Number: 720-929-6907
Email Address: don_jobe@oxy.com	Email Address: shayelyn_marshall@oxy.com
MINERAL RIGHTS OWNER	**MINERAL LEASE HOLDER**
Name/Company: Please see list attached.	Name/Company: **Please see list attached.**
Contact Information:	Contact Information:

Please see page 2 of this application.

FOR OFFICE USE ONLY	
Date submitted:	Project #:
Fees Paid:	Planner:

ACKNOWLEDGEMENT & AUTHORIZATION

The undersigned is fully aware of the request/proposal being made and the actions being initiated on the referenced property. The undersigned understand that the application must be found to be complete by the Town of Firestone before the request can officially be accepted and the development review process initiated.

The undersigned is aware that the applicant is fully responsible for all reasonable costs associated with the review of the application/request being made to the Town of Firestone. Applicants shall pay all costs billed by the Town for legal, engineering and planning costs incurred by staff, including consultants acting on behalf of staff, necessary for project review. By this acknowledgement, the undersigned hereby certify that the above information is true and correct.

Property Owner Signature: Don C. Jost III

Date: 6/23/2021

Applicant Signature: Shayelyn Marshall

Digitally signed by: Shayelyn Marshall
DN: CN = Shayelyn Marshall email = shayelyn_marshall@oxy.com C = AD
Date: 2021.06.23 12:50:31 -06'00'

Date: 6/23/2021

DEVELOPMENT REVIEW FEE SCHEDULE

	Application Type	Fee	Deposit
Annexation			
☐	Major (10+ Acres)	$4,000	$2,500
☐	Minor (<10 acres)	$2,000	$1,500
Zoning / Rezoning			
☐	Initial Zoning	$1,500+$10/acre	n/a
☐	Rezoning	$1,500+$10/acre	$2,500
☐	PUD Rezoning	$3,000+10/acre	$5,000
☐	Overlay Rezoning	$2,000+10/acre	$2,500
☐	Minor Amendment	$500	n/a
Final Development Plan			
☐	Major Amendment	$1,000	n/a
☐	Minor Amendment	$400	n/a
☐	Residential	$1,400+$10/unit	$5,000
☐	Non-Residential (>10,000 sf)	$2,500	$1,500*
☐	Non-Residential (<10,000 sf)	$1,500	$1,500*
Miscellaneous			
☐	Metro District Service Plan	$10,000	n/a
☐	Other**:		

	Application Type	Fee	Deposit
Comprehensive Plan Amendment			
☐	Major Amendment	$3,000	$1,500
☐	Minor Amendment	$1,000	n/a
Subdivision			
☐	Preliminary Plat	$2,000+$40/lot	$5,000
☐	Final Plat	$2,000+$20/lot	$10,000
☐	Minor Subdivision Plat	$2,000+$20/lot	$1,500
☐	Non-residential Minor Plat	$2,000+$20/lot	$5,000
☐	Minor Plat Amendment	$500	n/a
Special Use Review			
☐	Major	$1,000	n/a
☐	Minor	$500	n/a
☑	Oil & Gas	$1,000 per well	$1,500

*All fees **include** both Town of Firestone Planning & Engineering review. These fees **do not include** referral agency review fees, outside consultant review fees, or review fees incurred by consultants acting on behalf of staff.*

** may be waived at staff's discretion*

*** fee provided at pre-application meeting*

Columbine Surface Location: 2N-67W-29: NW				
Lease Holder	**Address**	**City**	**State**	**Zip**
Kerr-McGee Oil & Gas Onshore LP	PO Box 173779	Denver	CO	80217
Mineral Owner	**Address**	**City**	**State**	**Zip**
Richard John Hartman	1651 Adams Street	Denver	CO	80206
Kim Wallace Hartman	3337 S. Chester Court	Denver	CO	80231
KAB Acquisition LLLP-VII	410 17th Street, Suite 1151	Denver	CO	80202
Morse Energy Partners LLC	410 17th Street, Suite 1150	Denver	CO	80202
Dios Del Mar Petroleum, Inc.	PO Box 621128	Littleton	CO	80162
MDC Partners, LLC	3415 S. Clayton Blvd.	Englewood	CO	80113
Anadarko E&P Onshore LLC	PO Box 173779	Denver	CO	80217
Anne Hurley Luke	11636 NE 149th St.	Kirkland	WA	98034
James Perrin Rice	733 East Glenhaven Dr.	Phoenix	AZ	85048
Ronald L. Anderson & Imrie V. Anderson, Co-Trustees of The Ronald & Imrie Anderson Family Trust dated July 21, 2006	25647 Paseo La Cresta	Laguna Nigu	CA	92677
Hellen Rice Crowe Living Trust	30300 Antelope Rd., #1913	Menifee	CA	92584
Incline Minerals, LLC	5011 N. Central Expressway	Dallas	TX	75205
Magnolia Minerals Trust, LLC	1660 17th Street, Suite 325	Denver	CO	80202
Raisa II Minerals, LLC	PO Box 987	Denver	CO	80201
Raisa II Minerals, LLC	1560 BROADWAY, SUITE 2050	Denver	CO	80202
Vivian R. Teets	10091 Prima Run Place	Colorado Sp	CO	80924
Arnette Resources, LLC	PO Box 16781	Golden	CO	80401
Kenneth C. Sawyer III & Mary Presley Sawyer, JT	245 Dahlia Street	Denver	CO	80220

Section 2

Narrative

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

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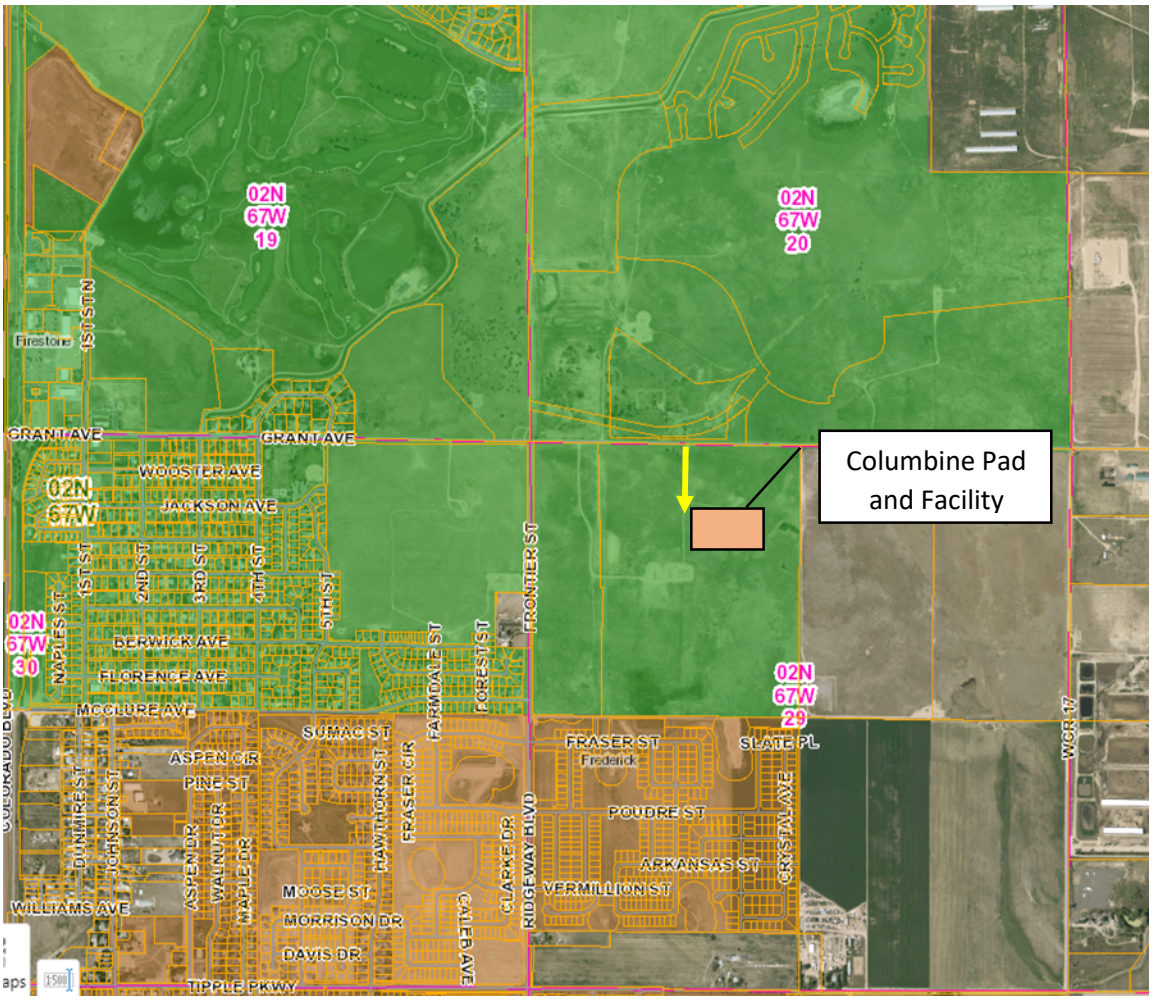
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1. Narrative

1.1 DESCRIPTION OF INTENDED USE

Kerr-McGee Oil & Gas Onshore LP (KMOG), intends to horizontally drill seven (7) oil and gas wells from one well pad location. The well names are listed in Section 1.2. The desired outcome of this application is to permit the wells to all formations. The purpose of the wells is to produce hydrocarbons from underlying formations known to have commercial potential from the production of such substances.

The proposed well and production facility are located in Section 29, Township 2 North, Range 67 west 6th P.M. See the aerial vicinity map below showing an arrow for the site access from WCR 18/Grant Ave.



1.2 SITE IMPROVEMENTS

KMOG is proposing one temporary operations area of approximately 12.66 acres for drilling and completions operations. After drilling and completions activities the site will be reclaimed to approximately 2.73 acres, as the permanent disturbance area.

Columbine 4-29HZ Well Pad:

Columbine 29-1HZ
Columbine 29-2HZ

Columbine 29-3HZ
Columbine 29-4HZ
Columbine 29-5HZ
Columbine 29-6HZ
Columbine 29-7HZ

A Final Develoment Plan is included with this application for further use and review.

After the wells have been drilled to their total depths and completed as wells capable of production, KMOG will reclaim the drill site. The reclamation will be in accordance with the applicable rules and regulations of the Colorado Oil and Gas Conservation Commission (COGCC). The completed well sites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the well sites regularly upon completion of the wells. Flowlines will be laid to connect the wells to the production facility.

If any of the wells are not capable of production, that specific well (or wells) will be plugged and abandoned as a dry hole and the same reclamation of the site will apply.

1.3 CHARACTERISTICS OF INSTALLATION

These wells will have a wellhead assembly installed on site as well as production and gathering facilities. Pumping units may be installed should pressure within the wells necessitate their use.

1.4 CHARACTERISTICS OF DRILLING AND COMPLETION OPERATIONS

KMOG management will utilize authorized employees and professional contractors to conduct the drilling and completion operations on site. The actual drilling phase is approximately 5 to 6 days per well, under normal circumstances. Drilling will be continuous, 24 hours a day, for this period. Completion operations will be performed on each well following the drilling phase. The production facility will be installed, and the wells put on-line. KMOG anticipates mobilization and pad construction to begin the fourth quarter 2022 contingent upon approval from the Town of Firestone. Completion of all construction activities including site preparation, drilling, completion, facility and pipeline installation and final re-grading will occur within six months of the completion of hydraulic fracturing, construction of production facility and the initiation of oil and gas production.

1.5 CHARACTERISTICS OF MAINTENANCE

A lease operator will inspect the wells on a regular basis under normal conditions and as required by any special circumstances under the supervision of the KMOG Area Manager. In addition, all wells and production facilities are remotely monitored 24 hours a day / seven days a week from our Integrated Operations Center (IOC) located in Platteville, Colorado.

1.6 DISPOSAL METHODS STATEMENT

- Drilling mud will be spread on lands outside of the town limits in a manner approved by the COGCC or taken to a commercial disposal.
- A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation.
- Human waste will be properly handled by portable sanitary facilities located on site. KMOG will contract a sanitary service company to provide and maintain the self-contained sanitary facilities throughout the oil and gas operation.

- Produced water will be disposed of off-site as approved by the COGCC.

2. Operator Information

2.1 OPERATOR IDENTIFICATION

Kerr-McGee Oil & Gas Onshore LP
(Subsidiary of Occidental Petroleum Corporation)
1099 18th Street
Denver, Colorado 80202
Tel:(720) 929-6000
Fax: (720) 929-7297

Kerr-McGee Oil & Gas Onshore LP (KMOG), a subsidiary of Occidental Petroleum Corporation, is a fully insured and bonded oil and gas operator, organized as a Delaware Limited Partnership and authorized to do business in the State of Colorado as Kerr-McGee Oil & Gas Onshore LP. All insurance and bonds held by KMOG meet the requirements as set forth in the rules and regulations as adopted by the Colorado Oil and Gas Conservation Commission.

2.2 SURFACE OWNER

Anadarko E&P OnShore LLC
PO Box 173779
Denver, Colorado 80217

The surface owner is the applicant and therefore a surface use agreement is not applicable.

3. Operating Plan

3.1 CONSTRUCTION & DRILLING PHASE

The construction and drilling operations for this location are expected to take about three months (under normal circumstances). The subject land is first surveyed, and a well location is staked in accordance with Colorado Oil and Gas Conservation Commission (COGCC) regulations. The drilling pad is designed to prevent run off so that any spills would be contained on-site. The pad is lined with a layer of compacted clay materials to help prevent fluids from migrating vertically to the subgrade. From this point forward, twenty-four (24) hour operations of dirt work equipment begins preparing the location including leveling the surface where the drilling rig will be located. After the location has been prepared, a drilling rig will move in to drill the surface intervals of the wells and cement the surface pipe to protect ground water formations. This process will take approximately one day per well under normal circumstances, subsequently a seven well pad will take seven days to drill and cement the surface casing pipes. Depending on the size/type of rig utilized to drill the surface interval, production drilling operations will either begin immediately with the same rig or a different rig will be moved onto location at a later date to drill the production interval. Drilling the production interval of the well will take four to five days per well, under normal circumstances. The actual drilling proceeds at a constant rate unless below the surface or mechanical problems are encountered.

If the well is deemed viable, casing is run in the hole and cemented (alternatively the well is plugged according to COGCC regulations). The casing, constructed of steel pipe, is designed to specific criteria to provide an integral conduit for transporting hydrocarbons to the surface. The casing strength is further enhanced by the cementing process. Cement is placed in the space between the casing and the wall of the

hole. The cement anchors the casing, provides increased burst resistance, and contains the fracturing and produced fluids. The cement is also designed to special criteria. The cement is then allowed to cure and concurrently the rig is moved off location. At this point the drilling phase is complete.

3.2 DRAINAGE AND EROSION CONTROL PLAN

Changes in the current drainage patterns are not anticipated. The well site will be monitored during the drilling and completion phases for any problems with drainage or erosion. Necessary measures will be taken to correct any problems. Once the drilling and completion phases are complete, the drill site will be restored as near as practical, to its original grade and vegetation planted as required by regulations and surface use agreements. KMOG will continue to monitor the site until all applicable regulatory requirements for revegetation have been met.

KMOG uses a closed loop or "pitless" system for drilling and fluid management and does not construct a reserve pit. The drilling company will actively manage the area around the rig equipment such that any minor fluid spills will be diverted and drain to small pumps strategically located and from there, if only water, will be pumped into the drilling fluid system. If the fluid is contaminated by fluids other than water, it will be pumped into a separate container and removed from the site to an approved disposal facility.

Please see the Phase III Drainage Study in Section five (of the permit) for more detail.

3.3 WATER SOURCES FOR ACTIVITIES

Water for use in completions operations will be secured by KMOG through its own "Water On Demand" system, or from a water supplier in the immediate area of the drill site. Water use will be approved for commercial and industrial use and will be subject to a mutually acceptable agreement between KMOG and the water supplier. The water-on-demand system is a network of over 180 miles of underground pipeline that stretches the length of the 20-mile by 30-mile field to source and transport water to completions crews. This system eliminates more than 2,000 truck trips per day field wide, also reducing associated concerns of traffic, noise, emissions and dust.

KMOG plans to install temporary lay flat waterlines to transfer water from its permanent infrastructure ending on parcel #131121000003 to the well pad for use during completions operations.

3.4 COMPLETIONS PHASE

Sometime after the drilling rig has rigged down, horizontal completions operations may begin.
The construction of the production facility, where practical, may occur concurrent with the drilling and/or completions operations. Completions operations include all operations performed after drilling the well up to delivering a producing well to be managed by the Production Operations group. These completions operations consist of well preparation, fracture stimulation, and preparing the well for production to sales.

The well preparation phase of completions operations is performed to prepare for the fracture stimulation operation. Initially, the necessary wellhead equipment is installed to conduct well preparation operations. KMOG wells are designed, built, operated and maintained to the highest standards. Logging is performed to confirm the cement quality behind the well casing meets KMOG and regulatory standards. The wellbore is pressure-tested to confirm the casing can withstand the high pressures associated with a fracture stimulation. The casing is then perforated at the toe end of the wellbore to prepare the well for the initial fracture stimulation. Lastly, the remaining necessary wellhead equipment is installed to ready the well for fracture stimulation. A crew of one to six people are required to perform the above operations. The cumulative duration of the well preparation operations is three to four days.

The fracture stimulation operation is conducted to stimulate the flow of hydrocarbons from the targeted geologic formation to the wellbore and up to the wellhead. Fracture stimulation consists of pumping a water and sand mixture into the wellbore at a high pressure and flow rate. The water/sand mixture exits the wellbore to contact the rock formation through perforations made to the well casing. The stimulation operation for each well is performed in stages to concentrate the stimulation of the rock formation at designed intervals along the wellbore. In the event multiple wells are included in the fracture stimulation operations, only one well is under stimulation at one time. During stimulation, a crew of 35 to 45 people are required. The cumulative duration of the fracture stimulation operation is three to seven days per well.

At the end of the fracture stimulation operation, the well is prepared for long-term production. A coiled tubing unit is utilized to mill the plugs set in the wellbore to isolate the stimulation stages and to clean out the wellbore. Production tubing is installed to direct the flow of hydrocarbons inside the wellbore to the wellhead at surface. Once the production tubing is landed, the well is managed by the Production Operations group. The cumulative duration of the post fracture stimulation operations is two to five weeks with a crew of three to ten people.

The completion process is a 24 hour a day / seven-days a week operation and crews are rotated every 12 hours for continuous operations. Once fracture stimulation operations begin there will be varying activity on location until the well is turned over to permanent production operations.

3.5 PRODUCTION PHASE

The production phase may overlap the completion phase. After the completions fleet has cleared location, the wells are connected to a production facility. Gathering equipment may also be installed on location by a third-party gathering company. The production and gathering facility, may consist of maintenance/oil tank(s), water tank(s), separator(s), LACT(s) units (Lease Automatic Custody Transfer), vapor recovery unit(s) (VRU), emission control device(s) (ECDs), meter(s) house, chemical tote(s), purge flare(s), communications tower, temporary produced water tanks, temporary ECDs and temporary generator. The temporary equipment will be on site for six to 12 months and then will be removed. In addition, pumping units may be installed. The production facility will be connected to the wells by pressure tested flowline buried approximately four feet deep. At this point, the gas and oil purchasers are preparing to connect the gas and oil sales meter loop.

The production facility installation is completed by constructing an earthen or metal berm around the production tank(s) and separator. The enclosed area will have sufficient volume to contain the entire contents of the largest tank plus adequate freeboard to contain a 24-hour 25-year precipitation event. The berms will be inspected at regular intervals and maintained in good condition. When a berm is provided around tanks no potential ignition sources shall be installed inside that area.

The lease operator then begins his monitoring of the wells. Reports consist of tank measurements, gas sales estimates, and pressure reading. This information is compiled monthly and filed with the COGCC.

When a well is completed for production, all disturbed areas no longer needed will be restored and re-vegetated as soon as practicable. All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established. All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions. The segregated soil horizons will contour as near as practicable to achieve erosion control

and long-term stability and shall be tilled adequately to establish a proper seedbed. The disturbed area then shall be re-seeded in the first favorable season.

At some point in the well's life, tubing may be run in the well with the possible addition of a plunger lift and/or pumping unit. This will extend the well's producing life and maximize reserves.

3.6 PLUGGING AND ABANDONMENT PHASE

Plugging and abandonment is the cementing of a well and removal of its associated production facility. This also includes the removal of flowlines after all the wells on the pad are plugged and the remediation and reclamation of the well site.

Upon the plugging and abandonment of a well, all cellars will be backfilled. All debris abandoned gathering line risers, and flowline risers, and surface equipment will be removed, and the location will be graded and re-contoured. Within 90 days after a well is plugged and abandoned, the well site shall be cleared of all non-essential equipment, and debris. All access roads to the plugged and abandoned wells and associated production facilities shall be closed, graded and re-contoured in accordance with the COGCC regulations and Surface Use Agreement (if applicable). Culverts and any other obstructions that were part of the access road(s) shall be removed. Well locations, access roads and associated facilities shall be reclaimed. As applicable, compaction alleviation, restoration, and revegetation of well sites and access roads shall be performed. After plugging a well, reclamation work will be completed within three months on crop land, and six months on non-crop land, or with landowner consent reclamation will occur during optimal re-vegetation times of the year.

Successful Final Reclamation of the well sites and access roads will be considered completed when:

1. Reclamation of crop land has been performed and over two growing seasons has indicated no significant un-restored subsidence.
2. Reclamation of non-crop land has been performed and the total cover of live perennial vegetation, excluding noxious weeds, provides sufficient soils erosion control. The total cover of live perennial vegetation of adjacent or nearby undisturbed land, not including overstory or tree canopy cover, having similar soils, slope and aspect of the reclaimed area.
3. Disturbances resulting from flow line installations shall be adequately reclaimed when the disturbed area is reasonably capable of supporting the pre-disturbance land use.
4. A Sundry Notice, Form 4, will be submitted to the COGCC, which describes the final reclamation procedures and any mitigation measures associated with final reclamation

KMOG will evaluate the 39 wells below for potential plug and abandon operations. The 39 wells are associated with 10 locations and if plugged, nearly 37 acres of previously created pads will be reclaimed.

FIRESTONE 20-29D
FIRESTONE V 20-03
FIRESTONE V 20-04D
FIRESTONE V 20-18D

ROCKY MOUNTAIN FUEL 19-4N (currently being plugged and abandoned)
ROCKY MOUNTAIN FUEL V 19-6JI
ROCKY MTN FUEL V 19-5JI
CENTEX 40-25

TOM L RUSSELL UNIT 1
DUNAWAY U 13-10 (currently being plugged and abandoned)
VICTORIA U 01-14JI
DACONO STATE 22-36 (currently being plugged and abandoned)
DACONO STATE 6-36 (currently being plugged and abandoned)
HSR-TEETS 11-20A
TEETS 12-20A
FIRESTONE 12-30
KUGEL 12-18
KUGEL V 18-4
OVERLOOK 21-30
OVERLOOK 2-30
OVERLOOK 27-30
OVERLOOK 28-30
OVERLOOK 8-30

WALSH GAS UNIT 6-24
WALSH U 24-15 JI
HIDDEN CREEK 12-29
HIDDEN CREEK 13-29X
HIDDEN CREEK 14-29
HIDDEN CREEK 19-29
HIDDEN CREEK 22-29
HIDDEN CREEK 25-29
HIDDEN CREEK 35-29
DACONO STATE 17-36
DACONO STATE 24-36
DACONO STATE 39-36
FREDERICK STATE 1-36 (currently being plugged and abandoned)
NEWTON 1
HSR-TEETS 5-29A
FIRESTONE V 20-2 (currently being plugged and abandoned)

4. Graphics

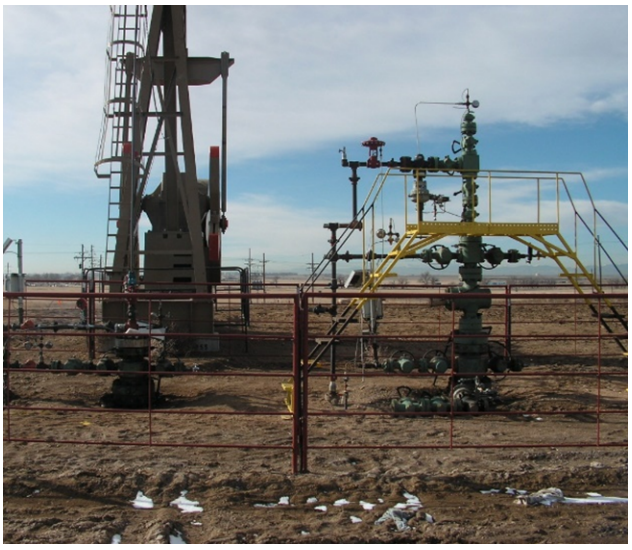
4.1 TYPICAL DRILLING RIG

Temporary, used during the drilling phase.



4.2 TYPICAL WELLHEADS

Permanent equipment for the life of the well.





4.3 TYPICAL SEPARATORS

Permanent equipment, part of the production facility.



Bulk Separators – approximately 11 to 21-foot-tall to top of Pressure Safety Valve (PSV) outlet.



Production Separators - 12 to 15 -foot tall to top of exhaust stack.

4.4 TYPICAL MAINTENANCE – CONDENSATE/OIL AND WATER TANKS

Permanent equipment, part of production facility – approximately ten -foot tall top of tank, 17 -feet tall to top of vent pipes.

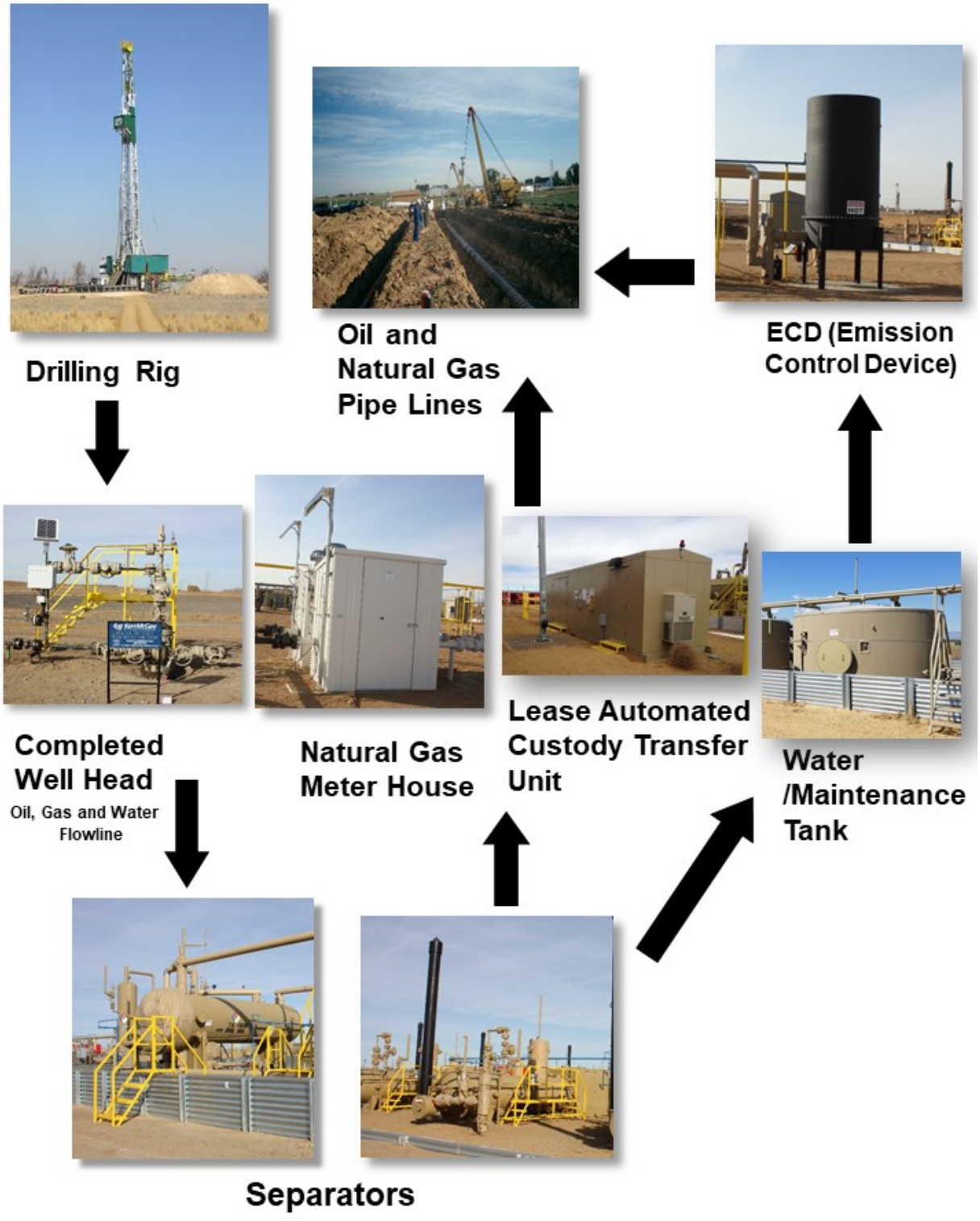


4.5 LACT UNIT - (LEASE AUTOMATED CUSTODY TRANSFER)

Permanent Equipment part of the production facility – nine to ten foot tall.



4.6 TYPICAL FLOW DIAGRAM



Section 3

COGCC Permits

Please see the submitted COGCC permit attached.

FORM 2A Rev 01/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Oil and Gas Location Assessment

Document Number: 402667820

Date Received: 07/12/2021

Location ID:

Expiration Date:

This Oil and Gas Location Assessment is to be submitted to the COGCC for approval prior to any ground disturbance activity associated with oil and gas operations. Approval of this Oil and Gas Location Assessment will allow for the construction of the below specified Location; however, it does not supersede any land use rules applied by the local land use authority. Please see the COGCC website at https://cogcc.state.co.us/ for all accompanying information pertinent this Oil and Gas Location Assessment.

[X] New Location [ ] Refile [ ] Amend Existing Location # _____

If this Location assessment is a component of an Oil and Gas Development Plan (OGDP) application, enter the OGDP docket number(s).

Docket Number	OGDP ID	OGDP Name
210700114		

If this Location assessment is part of an existing Oil and Gas Development Plan, enter the OGDP ID number(s).

<No existing OGDP number provided>

CONSULTATION

[ ] This location is included in a Comprehensive Area Plan (CAP). CAP ID # _____

[ ] This Location or its associated new access road, utility, or Pipeline corridor meets Rule 309.e.(2).A, B, or C.

[ ] This Location is within 2,640 feet of a GUDI or Type III Well per Rule 411.b.(4).

[ ] This Location includes a Rule 309.e.(2).E variance request.

[ ] This location includes a Rule 309.f.(1).A.ii. variance request.

Operator

Operator Number: 47120

Name: KERR MCGEE OIL & GAS ONSHORE LP

Address: P O BOX 173779

City: DENVER State: CO Zip: 80217-3779

Contact Information

Name: Shayelyn Marshall

Phone: (720) 9296907

Fax: ( )

email: shayelyn_marshall@oxy.com

FINANCIAL ASSURANCE

[X] Plugging and Abandonment Bond Surety ID (Rule 706): 20010124

[ ] Gas Facility Surety ID (Rule 711): _____

[ ] Waste Management Surety ID (Rule 704): _____

LOCATION IDENTIFICATION

Name: COLUMBINE Number: 4-29HZ

Provide the location description and the latitude and longitude of a single point near the center of the Working Pad Surface as a reference for this Location.

QuarterQuarter: NENW Section: 29 Township: 2N Range: 67W Meridian: 6 Ground Elevation: 5003

Latitude: 40.114127 Longitude: -104.917132

GPS Quality Value: 1.3 Type of GPS Quality Value: PDOP Date of Measurement: 06/18/2021

RELATED REMOTE LOCATIONS

(Enter as many Related Locations as necessary. Enter the Form 2A document # only if there is no established COGCC Location ID#)

This proposed Oil and Gas Location is:	LOCATION ID #	FORM 2A DOC #
☐		

RELEVANT LOCAL GOVERNMENT SITING INFORMATION

County: WELD Municipality: Firestone

Per § 34-60-106 (1)(f)(I)(A), the following questions pertain to the "Relevant Local Government approval of the siting of the proposed oil and gas location."

This proposed Oil and Gas Location is in an area designated as one of State interest and subject to the requirements of § 24-65.1-108, C.R.S. No

Does the Relevant Local Government regulate the siting of Oil and Gas Locations, with respect to this location? Yes

A siting permit application has been submitted to the Relevant Local Government for this proposed Oil and Gas Location: Yes

Date Relevant Local Government permit application submitted: 07/08/2021

Current status or disposition of the Relevant Local Government permit application for this proposed Oil and Gas Location: In Process

Status/disposition date: 07/08/2021

If Relevant Local Government permit has been approved or denied, attach final decision document(s).
Provide the contact information for the Relevant Local Government point of contact for the local permit associated with this proposed Oil and Gas Location:

Contact Name: MARTY OSTHOLTHOFF Contact Phone: 303.531.6275

Contact Email: mostholthoff@firestoneco.gov

PROXIMATE LOCAL GOVERNMENT INFORMATION

For every Proximate Local Government (PLG) associated with this proposed Oil and Gas Location, provide the PLG's point of contact and their contact information.

< No row provided >

FEDERAL PERMIT INFORMATION

A Federal drilling permit (or related siting application) has been submitted for this proposed Oil and Gas Location: No

Date submitted:

Current status or disposition of the Federal drilling permit (or related siting application) for this proposed Oil and Gas Location:

Status/disposition Date:

If Federal agency permit has been approved or denied, attach the final decision document(s).
Provide the contact information of the Federal point of contact for the Federal permit associated with this proposed Oil and Gas Location.

Contact Name: Contact Phone:

Contact Email: Field Office:

Additional explanation of local and/or federal process:

Since 2019, KMOG has worked with the Town of Firestone to negotiate a Cooperative Development Agreement which includes the proposed location. After years of thoughtful planning and significant input from the Town staff, the Board of Trustees approved the Agreement in April of 2021. KMOG submitted the local permit to the town on July 8, 2021.

RELEVANT LOCAL GOVERNMENT OR FEDERAL PRE-APPLICATION CONSULTATION

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Did a pre-application Formal Consultation Process occur with the Relevant Local Government per Rule 301.f.(3)?` No

Date of local government consultation:

Did a pre-application Formal Consultation Process occur with the Federal land manager per Rule 301.f.(3)? No

Date of federal consultation:

Was an ALA that satisfies Rule 304.b.(2).C (or substantially equivalent information per Rule 304.e) developed during a federal or local government permit application process? If yes, attach the ALA to the Form 2A. Yes

ALA APPLICABILITY AND CRITERIA

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Does the proposed Oil and Gas Location meet any of the criteria listed in Rule 304.b.(2)B? Yes

If YES, indicate by checking the box for every Rule 304.b.(2).B criterion met by this proposed Location, and attach an ALA. See Rule 304.b.(2).B.i-x for full text of criteria.

- [X] i. WPS < 2,000 feet from RBU/HOBU
- [ ] ii. WPS < 2,000 feet from School/Child Care Center
- [ ] iii. WPS < 1,500 feet from DOAA
- [ ] iv. WPS < 2,000 feet from jurisdictional boundary and PLG objects/requests ALA
- [ ] v. WPS within a Floodplain
- [ ] vi.aa. WPS within a surface water supply area
- [ ] vi.bb. WPS < 2,640 feet from Type III or GUDI well
- [ ] vii. WPS within/immediately upgradient of wetland/riparian corridor
- [ ] viii. WPS within HPH and CPW did not waive
- [ ] ix. Operator using Surface bond
- [ ] x. WPS < 2,000 feet from RBU/HOBU/School within a DIC

Is the proposed Oil and Gas Location within the exterior boundaries of the Southern Ute Indian Reservation, and the Tribe objects to the Location or requests an ALA? If YES, attach an ALA to the Form 2A. No

Operator requests the Director waive the ALA requirement per Rule 304.b.(2).A.i: [ ]

Provide an explanation for the waiver request, and attach supporting information (if necessary).

ALTERNATIVE LOCATIONS DASHBOARD

List every alternative location reviewed and included in the ALA. Provide a latitude and longitude for the approximate center of the alternative location, all Rule 304.b.(2).B Criteria met, if a variance would be required to permit the location, and a brief comment on the key points of the alternative location.

304.b.(2).B.i-x Criteria Met:

< No row provided >

SURFACE & MINERAL OWNERSHIP

Surface Owner Info:

Name: Anadarko E&P Onshore LLC Phone: 720-929-6000
Address: 1099 18th St. Fax:
Address: Email:
City: Denver State: CO Zip: 80202

Surface Owner at this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Check only one:

- [X] The Operator/Applicant is the surface owner.
- [ ] The Operator has a signed Surface Use Agreement for this Location – attach SUA.
- [ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the surface owner owns the minerals beneath this Location and is committed to an oil and gas lease – attach lease map or provide lease description.
- [ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the Operator intends to use a surface bond per Rule 703 to secure access to this Location – attach lease map or provide lease description.

Surface Owner protection Financial Assurance type: N/A Surety ID Number:

Mineral Owner beneath this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: Yes

Lease description if necessary:

SITE EQUIPMENT LIST

Indicate the number and type of major equipment components planned for use on this Oil and Gas Location:

Wells	7	Oil Tanks	0	Condensate Tanks	1	Water Tanks	2	Buried Produced Water Vaults	0
Drilling Pits	0	Production Pits	0	Special Purpose Pits	0	Multi-Well Pits	0	Modular Large Volume Tank	0
Pump Jacks	7	Separators	3	Injection Pumps	0	Heater-Treaters	0	Gas Compressors	0
Gas or Diesel Motors	0	Electric Motors	0	Electric Generators	0	Fuel Tanks	0	LACT Unit	1
Dehydrator Units	0	Vapor Recovery Unit	0	VOC Combustor	1	Flare	0	Enclosed Combustion Devices	0
Meter/Sales Building	1	Pigging Station	0			Vapor Recovery Towers	0		

OTHER PERMANENT EQUIPMENT

< No Row Provided >

OTHER TEMPORARY EQUIPMENT

< No Row Provided >

GAS GATHERING COMMITMENT

Operator commits to connecting to a gathering system by the Commencement of Production Operations? Yes

If the answer is NO, a Gas Capture Plan consistent with the requirements of Rule 903.e MUST be attached on the Plans tab.

FLOWLINE DESCRIPTION

Per Rule 304.b.(6), provide a description of all onsite and off-location oil, gas, and/or water flowlines.

Please see Operator Comments Section for flowline description.

CONSTRUCTION

Size of disturbed area during construction in acres: 12.66

Size of location after interim reclamation in acres: 2.73

Estimated post-construction ground elevation: 5002

DRILLING PROGRAM

Will a closed-loop drilling system be used? Yes

Is H2S gas reasonably expected to be encountered during drilling operations at concentrations greater than or equal to 100 ppm? No If YES, attach H2S Drilling Operations Plan.

Will salt sections be encountered during drilling: No

Will salt based (>15,000 ppm Cl) drilling fluids be used? No

Will oil based drilling fluids be used? Yes

DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

Please see the Waste Management Plan attached.

Beneficial reuse or land application plan submitted? Yes

Reuse Facility ID: _____ or Document Number: _____

Centralized E&P Waste Management Facility ID, if applicable: 149021

CURRENT LAND USE

Current Land Use: check all that apply per Rule 304.b.(9).

Crop Land: ☐ Irrigated ☒ Non-Irrigated ☐ Conservation Resource Program (CRP)

Non-Crop Land: ☐ Rangeland ☐ Forestry ☐ Recreation ☐ Other

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

Describe the current land use:

The current land use is agriculture, more specifically dry cropland. There are no plans to subdivide the property or add any other types of land use at this time.

Describe the Relevant Local Government's land use or zoning designation:

Current zoning designation is a Planned Unit Development.

Describe any applicable Federal land use designation:

N/A

FINAL LAND USE

Final Land Use: check all that apply per Rule 304.b.(9).

Crop Land: ☐ Irrigated ☒ Non-Irrigated ☐ Conservation Resource Program (CRP)

Non-Crop Land: ☐ Rangeland ☐ Forestry ☐ Recreation ☐ Other

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

REFERENCE AREA INFORMATION

If Final Land Use includes Non-Crop Land (as checked above), the following information is required:
Describe landowner's designated final land use(s):

Reference Area Latitude: Reference Area Latitude:

Provide a list of plant communities and dominant vegetation found in the Reference Area.

< No row provided >

Noxious weeds present:

SOILS

List all soil map units that occur within the maximum extent of the proposed Oil and Gas Location. Attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" listing the typical vertical soil profile(s). This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS website at https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/ or from the COGCC website GIS Online map page. Instructions are provided within the COGCC website help section.

NRCS Map Unit Name: 73—Vona loamy sand, 3 to 5 percent slopes

NRCS Map Unit Name: 44—Olney loamy sand, 1 to 3 percent slopes

NRCS Map Unit Name:

GROUNDWATER AND WATER WELL INFORMATION

Provide the distance and direction, as measured from the Working Pad Surface, to the nearest:

water well: 648 Feet S

Spring or Seep: 5280 Feet W

Estimated depth to shallowest groundwater that can be encountered at this Oil and Gas Location: 15 Feet

Basis for estimated depth to and description of shallowest groundwater occurrence:

648' S, Permit 62167-MH, depth 20' (proposed), Static Water Level unknown, Elev 5011' (permit issued)
2202' W, Permit 45389, depth 43', static water level 23', Elev 5011'
Loc Elev 5003
SWL Calc: (5003 - 5011) + 23 = 15'

SURFACE WATER AND WETLANDS

Provide the distance and direction to the nearest downgradient surface Waters of the State, as defined 746 Feet NE

in the 100-Series Rules, measured from the Working Pad Surface:

If less than 2,640 feet, is the Waters of the State identified above within 15 stream miles upstream of a Public Water System intake? No

Provide the distance and direction to the nearest downgradient wetland, measured from the Working Pad Surface: 746 Feet NE

Provide a description of the nearest downgradient surface Waters of the State:

This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is ponded, and the surrounding land use appears to be agricultural.

If the proposed Oil and Gas Location is within a Rule 411.a Surface Water Supply Area buffer zone, select the buffer zone type:

If the proposed Oil and Gas Location is within a Rule 411.b GUDI/Type III buffer zone, select the buffer zone type:

Is a U.S. Army Corps of Engineers Section 404 permit required for the proposed Oil and Gas Location, access road, or associated pipeline corridor? No

If a U.S. Army Corps of Engineers Section 404 permit is required, provide the permit status, and permit number if available:

Is the Location within a Floodplain? No Floodplain Data Sources Reviewed (check all that apply):

[X] Federal (FEMA) [ ] State [X] County [ ] Local

[ ] Other

Does this proposed Oil and Gas Location lie within a Sensitive Area for water resources, as defined in the 100-Series Rules? Yes

CONSULTATION, WAIVERS, AND EXCEPTIONS

When Rule 309.e.(2) Consultation must occur, check all that apply:

- [ ] This location is included in a Wildlife Mitigation Plan
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within federally designated critical habitat or an area with a known occurrence for a federal or Colorado threatened or endangered species. Provide description in Comments section of Submit tab.
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within an existing conservation easement established wholly or partly for wildlife habitat. Provide description in Comments section of Submit tab.

When Rule 309.e.(3) Consultation is not required, check all that apply:

- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Protection Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Mitigation Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable conservation plan.

Pre-application Consultation:

- [ ] A pre-application consultation with CPW, regarding this Oil and Gas Location, occurred on:

CPW Waivers and Exceptions (check all that apply and attach all CPW waivers to this Form 2A):

- [ ] The applicant has obtained a Rule 304.b.(2).B.viii CPW waiver for the requirement to complete an ALA.
- [ ] The applicant has obtained a Rule 309.e.(2).G CPW waiver and consultation is not required.
- [ ] The applicant has obtained a Rule 309.e.(5).D.i CPW waiver and is requesting an exception from Rule 1202.c.(1).R.
- [ ] The applicant has obtained a Rule 309.e.(5).D.ii CPW waiver and is requesting an exception from Rule 1202.c.(1).S.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iii CPW waiver of Rule 1202.c.(1).T.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iv CPW waiver and is requesting an exception from Rule 1202.c.(1) in accordance with an approved CAP.
- [ ] The applicant has obtained a Rule 1202.a CPW waiver.
- [ ] The applicant has obtained a Rule 1202.b CPW waiver.
- [ ] In accordance with Rule 1203.a.(3), the applicant requests an exception from compensatory mitigation

Rule(s):

HIGH PRIORITY HABITAT AND COMPENSATORY MITIGATION

This Oil and Gas Location, associated access roads, utility, or Pipeline corridor falls wholly or partially within the following High Priority Habitats (Note: dropdown options are abbreviated - see Rule 1202 for full rule text):

< No row provided >

The following questions are for Oil and Gas Locations that cause the density to exceed one Oil and Gas Location per square mile in Rule 1202.d High Priority Habitat:

Direct Impacts:

Is Compensatory Mitigation required per Rule 1203.a for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address direct impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Direct impact habitat mitigation fee amount: $

Indirect Impacts:

Is Compensatory Mitigation required per Rule 1203.d for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address indirect impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Indirect impact habitat mitigation fee amount: $

Operator Proposed Wildlife BMPs

No BMP

CPW Proposed Wildlife BMPs

No BMP

AIR QUALITY MONITORING PROGRAM

Will the Operator install and administer an air quality monitoring program at this Location? Yes

Operator Proposed BMPs

No BMP

CDPHE Proposed COAs OR BMPs

No BMP

PLANS

Total Plans Uploaded: 0

- [ ] (1) Emergency Spill Response Program consistent with the requirements of Rules 411.a.(4).B, 411.b.(5).B, & 602.j
- [ ] (2) Noise Mitigation Plan consistent with the requirements of Rule 423.a
- [ ] (3) Light Mitigation Plan consistent with the requirements of Rule 424.a
- [ ] (4) Odor Mitigation Plan consistent with the requirements of Rule 426.a
- [ ] (5) Dust Mitigation Plan consistent with the requirements of Rule 427.a
- [ ] (6) Transportation Plan
- [ ] (7) Operations Safety Management Program consistent with the requirements of Rule 602.d
- [ ] (8) Emergency Response Plan consistent with the requirements of Rule 602.j
- [ ] (9) Flood Shut-In Plan consistent with the requirements of Rule 421.b.(1)
- [ ] (10) Hydrogen Sulfide Drilling Operations Plan consistent with the requirements of Rule 612.d
- [ ] (11) Waste Management Plan consistent with the requirements of Rule 905.a.(4)
- [ ] (12) Gas Capture Plan consistent with the requirements of Rule 903.e
- [ ] (13) Fluid Leak Detection Plan
- [ ] (14) Topsoil Protection Plan consistent with the requirements of Rule 1002.c
- [ ] (15) Stormwater Management Plan consistent with the requirements of Rule 1002.f
- [ ] (16) Interim Reclamation Plan consistent with the requirements of Rule 1003
- [ ] (17) Wildlife Plan consistent with the requirements of Rule 1201
- [ ] (18) Water Plan
- [ ] (19) Cumulative Impacts Plan
- [ ] (20) Community Outreach Plan
- [ ] (21) Geologic Hazard Plan

VARIANCE REQUESTS

Check all that apply:

- [ ] This proposed Oil and Gas Location requires the approval of a Rule 502.a variance from COGCC Rule or Commission Order number: _____

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

RULE 304.d LESSER IMPACT AREA EXEMPTION REQUESTS

Check the boxes below for all Exemptions being requested. Lesser Impact Area Exemption Request must be attached, and will include all requested exemptions.

- ☐ 304.b.(1). Local Government Siting Information
- ☐ 304.b.(2). Alternative Location Analysis
- ☐ 304.b.(3). Cultural Distances
- ☐ 304.b.(4). Location Pictures
- ☐ 304.b.(5). Site Equipment List
- ☐ 304.b.(6). Flowline Descriptions
- ☐ 304.b.(7). Drawings
- ☐ 304.b.(8). Geographic Information System (GIS) Data
- ☐ 304.b.(9). Land Use Description
- ☐ 304.b.(10). NRCS Map Unit Description
- ☐ 304.b.(11). Best Management Practices
- ☐ 304.b.(12). Surface Owner Information
- ☐ 304.b.(13). Proximate Local Government
- ☐ 304.b.(14). Wetlands
- ☐ 304.b.(15). Schools and Child Care Centers
- ☐ 304.c.(1). Emergency Spill Response Program
- ☐ 304.c.(2). Noise Mitigation Plan
- ☐ 304.c.(3). Light Mitigation Plan
- ☐ 304.c.(4). Odor Mitigation Plan
- ☐ 304.c.(5). Dust Mitigation Plan
- ☐ 304.c.(6). Transportation Plan
- ☐ 304.c.(7). Operations Safety Management Program
- ☐ 304.c.(8). Emergency Response Plan
- ☐ 304.c.(9). Flood Shut-In Plan
- ☐ 304.c.(10). Hydrogen Sulfide Drilling Operations Plan
- ☐ 304.c.(11). Waste Management Plan
- ☐ 304.c.(12). Gas Capture Plan
- ☐ 304.c.(13). Fluid Leak Detection Plan
- ☐ 304.c.(14). Topsoil Protection Plan
- ☐ 304.c.(15). Stormwater Management Plan
- ☐ 304.c.(16). Interim Reclamation Plan
- ☐ 304.c.(17). Wildlife Plan
- ☐ 304.c.(18). Water Plan
- ☐ 304.c.(19). Cumulative Impacts Plan
- ☐ 304.c.(20). Community Outreach Plan
- ☐ 304.c.(21). Geologic Hazard Plan

OPERATOR COMMENTS AND SUBMITTAL

Comments

The Town of Firestone approved a Cooperative Development Agreement for this location in April of2021. Please see the approved agreement attached as other. Upon entrance of the Cooperative Development Agreement and prior to filing this Application, Kerr-McGee presented an alternative location analysis to the Director pursuant to Rule 301.f.(4) and engaged in a Formal Consultation Process with the Director and the Town of Firestone.

Please ensure that all correspondence associated with this permit goes to the analyst and DJ Regulatory email addresses, as listed on this permit.

The alternative locations for the proposed Columbine pad are listed as #5-#9 in the ALA narrative, maps and template.

This location is not proposed within 2,000 feet of a Residential Building Unit, High Occupancy Building Unit, or School Facility located within a Disproportionately Impacted Community, a Rule 304.c.(20) Community Outreach Plan is not required. KMOG's “Community Consultation Plan” attached as Other is intended to provide supplemental information regarding efforts on community outreach and communication.

The attached ERP was submitted to the Frederick/Firestone Fire Protection District on 7/6/2021. KMOG has a meeting with the staff on 7/15/2021. An approved copy will be sent to the COGCC OGLA staff.

KMOG`s general Air Monitoring Plan has been approved by the CDPHE and is attached to the 2B. A site-specific Air Monitoring Plan for this location will be submitted to the COGCC and CDPHE for approval of air monitor locations prior to operations.

Temporary above ground polyethylene water pipelines (diameter 10" - 12" with a 60 BPM capacity) will deliver water to location operations from larger trunk lines for completions operations.

Flowlines: 7 flow lines will flow to the production facility location. During production, flow direction in the flow lines is from the wellhead to the production facility. The size of flow lines is typically 2". Flow lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the production facility.

Custody Transfer: Gas custody transfer occurs at the custody transfer meter located on the proposed production facility location. Oil custody transfer occurs at the LACT Unit located on the proposed production facility location.

Two 500 barrel skid-mounted tanks will be temporarily placed onsite for use of the pre-spud rig only. One tank will store water and the other will store water-based mud. A temporary ECD may be utilized during drilling.

Gas Lift Lines: Gas lift lines are also occasionally installed (one per well) from the well head to the production facility. During operation flow direction in the gas lift lines will be from the production facility to the well head. The size of the gas lift lines is typically 2". Gas lift lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the tank battery.

11 temporary 500 barrel skid-mounted frac tanks will be utilized during flowback and initially for produced water. It is estimated the three temporary ECDs and the temporary tanks will be on location for 9 - 12 months and will be removed as water production declines. A temporary generator may be placed on location if needed and would be in place until electric power is available. Temporary purge flares may be placed on location for up to 60 days. A temporary 250-gallon propane tank will be used on location to provide fuel gas during facility equipment startup.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: _____ Date: 07/12/2021 Email: DJRegulatory@oxy.com

Print Name: Shayelyn Marshall Title: Regulatory Analyst

Based on the information provided herein, this Oil and Gas Location Assessment complies with COGCC Rules, applicable orders, and SB 19-181 and is hereby approved.

COGCC Approved: _____ **Director of COGCC** Date: _____

Conditions Of Approval

All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.

COA Type	Description

Best Management Practices

No	BMP/COA Type	Description
1	Planning	Access Road: KMOG will utilize an existing access road from CR 18 for drilling, completions, and production operations, including maintenance equipment. The road will be properly constructed and maintained to accommodate for emergency vehicle access.
2	Community Outreach and Notification	KMOG held Surface Impact Planning (SIP) meetings for this location. These meetings are attended by KMOG internal teams. This is a multi-disciplinary team including construction, operations, facilities, EHS, stakeholder relations, regulatory, surface land and mitigation. The team reviews potential impacts to the surrounding residents, identify and plan for necessary mitigations, and identify BMPs that should be included in the pad development moving forward. The team reviews noise, odor, lights, traffic, haul routes, rig orientation and visual mitigation and any input we have receivedfrom surrounding communities either from response line calls or community meetings, relative to our operations. The purpose of the meeting is to proactively identify potential concerns, exhaust possible options and provide best in class solutions in order to have compatible operations.
3	Traffic control	KMOG currently plans to use the water-on-demand system on this location which is anetwork of over 180 miles of underground pipelines that stretches the length of the 20 -mile by 30-mile field to source and transport water to completions crews. This systemeliminates more than 2,000 truck trips per day, also reducing associated concerns oftraffic, noise, emissions and dust.
4	Traffic control	The operator will obtain access and ROW permits from Firestone and will implement traffic control plans prior to the commencement of operations.
5	General Housekeeping	Loadlines: All loadlines shall be bullplugged or capped.
6	General Housekeeping	Removal of Surface Trash: A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation. Uponcompletion of operations, the commercial trash bin will be removed from the locationand disposed of in an appropriate manner.
7	Material Handling and Spill Prevention	Pit Level Indicators: All storage tanks used for active drilling operations (used in lieu of pits) contain pit level monitors with Electronic Drilling Recorders (EDR). KMG uses EDRs with pit level monitor(s) and alarm(s) for production rigs. Basic level gauges are used on tanks utilized for the surface rig.
8	Construction	Fencing Requirements: The completed wellsites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the wellsites upon completion of the wells. Authorized representatives and/or KMOG personnel shall be on-site during drilling and completionoperations.
9	Emissions mitigation	All seven of the wells are commingled into a bulk and test design. This reduces the total number of separators on location on a per well basis which in turn allows to have a smaller facility footprint. Reducing the total number of separators per well also reduces the total noise and emissions from the separator burners.
10	Emissions mitigation	Temporary ECD(s) will be utilized to mitigate releases of emissions from temporary produced water storage tanks for the duration which the tanks are on location and being used.
11	Drilling/Completion Operations	Green Completions: Test separators and associated flow lines, sand traps and emission control systems shall be installed on-site to accommodate green completions techniques. When commercial quantities of salable quality gas are achieved at each well, the gas shall be immediately directed to a sales line or shut in and conserved. If a sales line is unavailable or other conditions prevent placing the gas into a sales line, KMG shall not produce the wells without an approved variance.
12	Drilling/Completion Operations	KMOG`s Integrated Operations Center is staffed 24-hours per day, seven days per week, 365 days per year providing real-time remote monitoring capabilities for all of KMOG`s wells. Employees in the Integrated Operations Center are able to shut in wells remotely and dispatch personnel to a location within 5-15 minutes.
13	Drilling/Completion Operations	Guy line anchors will not be used. Base Beams will be used to stabilize the rig and removed after drilling.
14	Final Reclamation	Well Site Cleared: The wellsite will be cleared of all non-essential equipment within ninety (90) days after all wells associated with the pad have been plugged and abandoned.

15	Final Reclamation	Identification of Plugged and Abandoned Wells: Once the well has been plugged and abandoned, KMOG will identify the location of the wellbore with a permanent monument that will detail the well name and date of plugging.

Total: 15 comment(s)

Attachment List

Att Doc Num	Name
402667820	FORM 2A SUBMITTED
402733359	OTHER
402738989	LOCATION PICTURES
402739007	LOCATION DRAWING
402740042	LOCATION AND WORKING PAD GIS SHP
402743028	OTHER
402798300	ACCESS ROAD MAP
402798301	ALA DATASHEET
402798304	ALA NARRATIVE SUMMARY
402798305	CULTURAL FEATURES MAP
402798306	DIRECTIONAL WELL PLAT
402798307	GEOLOGIC HAZARD MAP
402798308	HYDROLOGY MAP
402798310	LAYOUT DRAWING
402798311	NRCS MAP UNIT DESC
402798312	PRELIMINARY PROCESS FLOW DIAGRAMS
402798318	RELATED LOCATION AND FLOWLINE MAP
402798319	WILDLIFE HABITAT DRAWING
402828380	OTHER

Total Attach: 19 Files

General Comments

User Group	Comment	Comment Date
OGLA	The Director has determined this OGDP application is complete. Form pushed to IN PROCESS.	10/01/2021
OGLA	Plans, attachments, and NRCS soil units attachments updated.	10/01/2021
OGLA	The following changes were made with Operator concurrence: - added Firestone meeting attachment as OTHER	09/09/2021
OGLA	Returned to draft for: - missing access road soil units; correct air monitoring plan Submit tab comment - attachment and Plan corrections	08/11/2021

Total: 4 comment(s)

Public Comments

No public comments were received on this application during the comment period.

Section 4

Emergency Response Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

Location: Near Frontier Street (CR 15) and Grant Avenue (CR 18)
Address: 7274 Grant Avenue

EMERGENCY RESPONSE PLAN

Revised October 2021



1099 18th Street, Suite 1800

Denver, Colorado 80202

Columbine 4-29HZ Well Pad and Facility

Section 29, T2N – R67W

Firestone, Colorado

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

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LOCAL RESPONDING AGENCIES

Name	Emergency	Office Number
Frederick Firestone Fire Protection District	911	303-833-2742
Firestone Police Department	911	303-833-0811
Colorado State Patrol	911	970-506-4999

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

SIGNATURES

Kerr McGee Oil & Gas Onshore, LP			
Name	Signature	Title	Date
Brent Naherny	DocuSigned by: Brent Naherny D81BF2E6EAE74CF...	Director of Operations	10/15/2021
Frederick-Firestone Fire Protection District			
Name	Signature	Title	Date
Steve Iacino		Assistant Chief of Planning	

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

LEGAL DISCLAIMER

This plan serves as an overall guidance document and is based on the best information available at the time of its submission. Actual conditions can and will evolve and possibly change between the submission of this plan for permitting purposes and actual operations, which may not occur for several months or even years. As necessary, and in consultation with state and local agencies, this plan can and will be updated to reflect current conditions. In particular, there could be modifications to equipment, layout, and chemicals located on site to reflect current or updated practices and advances in technology. In most cases, these changes will not be material and will not impact public health, safety, welfare, the environment, or wildlife resources. KMOG understands that accurate information is necessary in any emergency situation and if any change is significant or has the potential to impact public health, safety, welfare, the environment, or wildlife resources, the plan will be updated as appropriate.

LOCATION INFORMATION

DIRECTIONS TO OIL & GAS LOCATION

From the intersection of HWY 52 and Colorado BLVD travel north approximately two miles to Grant Avenue. Turn right and travel approximately 1.28 miles. Turn right (south) on the lease access road and proceed to the well pad and production facility.

INGRESS AND EGRESS INFORMATION

Ingress and egress to and from the location will be via the lease access road.

LEGAL DESCRIPTION OF LOCATION

API NUMBER: Pending COGCC Permit Approval

LEGAL DESCRIPTION: NENW of Section 29, Township 2 North, Range 67 West, 6th P.M.

ADDRESS: 7274 Grant Avenue

GPS COORDINATES FOR WELL PAD (NAD 83): LAT: 40.114129°, LONG: -104.917454°

GPS COORDINATES FOR ACCESS ROAD (NAD 83): LAT: 40.116598°, LONG: -104.918317°

DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

EMERGENCY CONTACT NUMBERS

NAME	OFFICE PHONE		EMERGENCY
Kerr McGee Integrated Operations Center IOC	970- 515-1500		970-515-1500
KMOG EMERGENCY MANAGEMENT TEAM	MOBILE PHONE	Function	LOCATION
Moe Felman	303-585-1309	Incident Command	Denver, CO
Brent Naherny	720-284-1112	Incident Command	Denver, CO
Travis Forducey	303-709-4034	Safety Officer	Platteville, CO
Lynna Scranton	303-906-1711	Safety Officer	Denver, CO
Gregory Hamilton	970-590-6256	Environmental Unit Leader	Platteville, CO
Phil Hamlin	707-478-8029	Environmental Unit Leader	Platteville, CO
FIRE OR EXPLOSION OR WELL CONTROL LOSS	EMERGENCY	OFFICE PHONE	STAFFING
Frederick Firestone Fire Protection District	911	303-833-2742	Full Time
Wild Well Control		281-784-4700	Full Time
Carbon Valley Emergency Management Agency		303-319-1008	Full Time
SPILL RESPONSE ORGANIZATIONS	EMERGENCY	OFFICE PHONE	STAFFING
EnviroServe	720-450-1316	800-488-0910	Full Time
EHS –Environmental HAZMAT Services	303-525-3111	720-225-9252	Full Time
Wild Well Control	281-784-4700	281-784-4700	Full Time
Cudd Pressure Control	800-990-2833	303-260-6422	Full Time
REGULATORY CONTACTS	EMERGENCY	OFFICE PHONE	STAFFING
COGCC		303-894-2100	Full Time
CDPHE		877-518-5608	Full Time
Colorado Parks & Wildlife (CPW)		303-291-7227	Full Time
National Response Center		800-424-8802	Full Time
MEDICAL FACILITIES	EMERGENCY	OFFICE PHONE	STAFFING
UC Health Urgent Care Firestone		720-652-7055	Full Time
North Colorado Medical Center	911	970-810-4121	Full Time
UC Health Longs Peak Hospital	911	720-718-7000	Full Time
GOVERNMENT AGENCIES	EMERGENCY	OFFICE PHONE	STAFFING
Firestone Police Department	911	303-833-0811	Full Time
Colorado Oil and Gas Conservation Commission (COGCC)		303-894-2100	Full Time

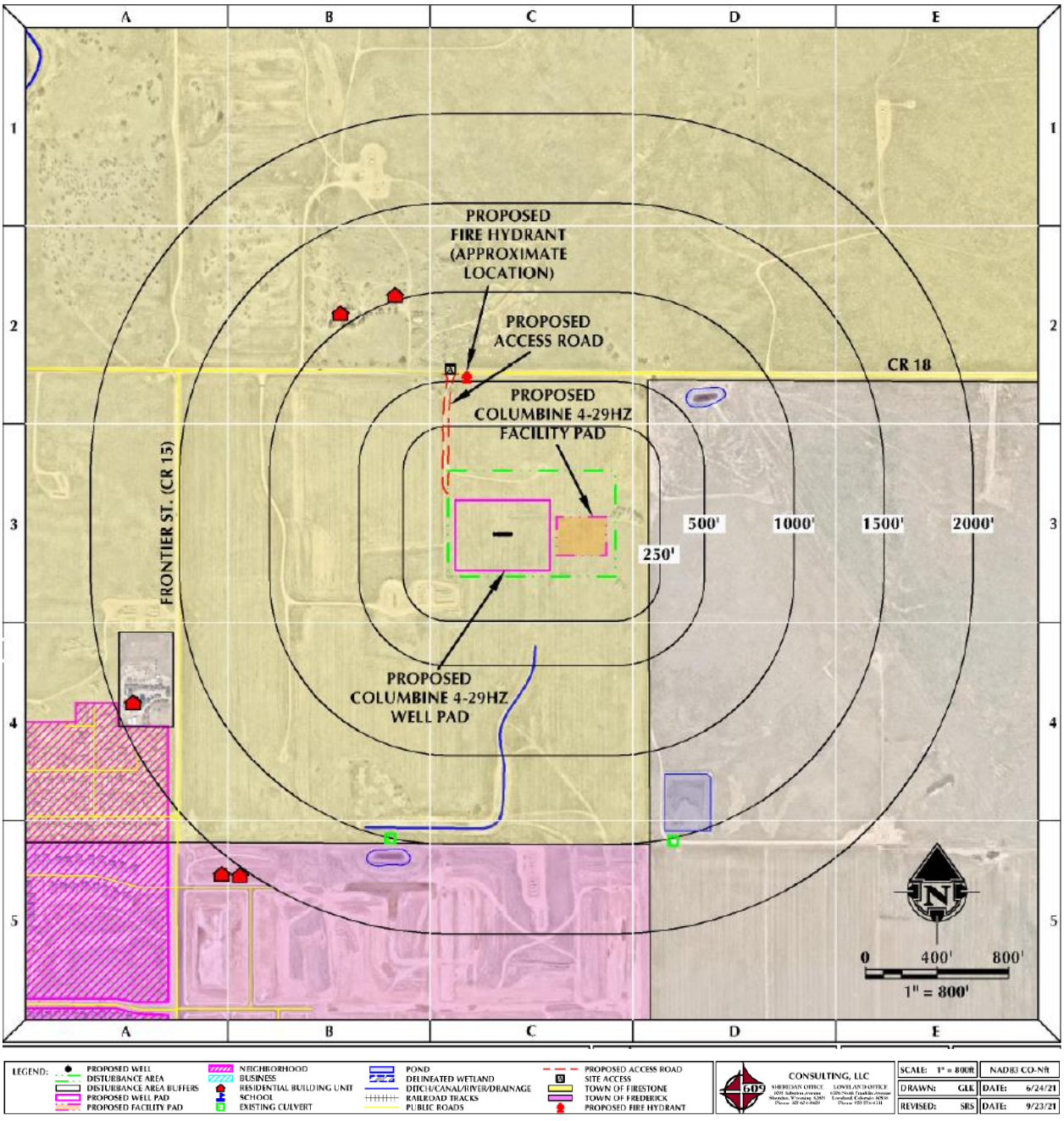
DocuSign Envelope ID: C498EB43-0361-4BAD-933F-CAB613CA7756

Colorado Dept. of Health and Environment (CDPHE)		877-518-5608	Full Time
Marty Ostholthoff - Firestone Planning Manager and Local Govt. Designee (LGD)		303-531-6275	Full Time
RAILROAD EMERGENCY RESPONSE	EMERGENCY	OFFICE PHONE	STAFFING
BNSF	800-832-5452		Full Time
Great Western Railway	800-533-9416	303-398-4500	Full Time
Union Pacific Railroad	888-877-7267		Full Time

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SITE DESCRIPTION & LAYOUT

The Columbine 4-29HZ well pad and facility are surrounded by agriculture and residential acreage. There will be 7 horizontal wells on the well pad with up to 11 temporary produced water tanks and 1 condensate tanks.



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KEY LOCATION INFORMATION

In the event of an incident it is important to understand what equipment is on location, what types of chemicals are present and where they are stored and where one can quickly access safety equipment.
Depending on the operations taking place on location, the equipment, chemicals and safety equipment on location will vary. The sections below will show the anticipated quantities and locations during each major phase of the ODGP location. Safety Data Sheets (SDSs) will be available from the Company Representative present or the contractor performing work on location. KMOG does not maintain any response equipment beyond the insipient stage. All response equipment is intended for incidental release mitigation only.

An incidental release is considered to be a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee tasked with mitigating the released product, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up.

Incidental Situations include, but are not limited to, the following examples:

- No significant safety or health hazard to workers in immediate area
- Limited in quantity, exposure potential, toxicity, etc.
- Release that can be absorbed, neutralized or otherwise controlled immediately by onsite workers

All personnel responding to an incident will satisfy the applicable Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements of 29 CFR 1910.120. Additional information may be found in Annex 1 HAZWOPER Program and Training Guidance of the Emergency Preparedness and Response Plan.

CONSTRUCTION PHASE

EQUIPMENT

During construction operations the following fuel powered equipment is anticipated to be on location.

INITIAL PAD BUILD	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Cat 815 Compactor	1	132	132
Belly dump semi	15	240	3600
Mini Excavator	1	12	12
Skid Steer	1	27	27
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	4	130	520
Total			**5217**
CONDUCTOR SETTING OPERATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Conductor Rig	1	80	80
Cement truck	1	120	120
Low Boy Semi	1	120	120
Pump	1	20	20
Skid	1	27	27
Pickup w/ 100 Gallon Transfer Tank	2	130	260
Total			**627**

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MITIGATION INSTALL AND REMOVAL	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Man-lift	1	26	26
8-10k All terrain forklift	1	26	26
Skid Steer	1	27	27
Truck mounted crane	1	120	120
Excavator/vibe hammer or conductor rig	1	80	80
Flatbed semi	2	120	240
Pickup w/ 100 Gallon Transfer Tank	1	130	130
Total			**649**
INTERIM RECLAMATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Belly dump semi	15	240	3600
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	3	130	390
Total			**4916**

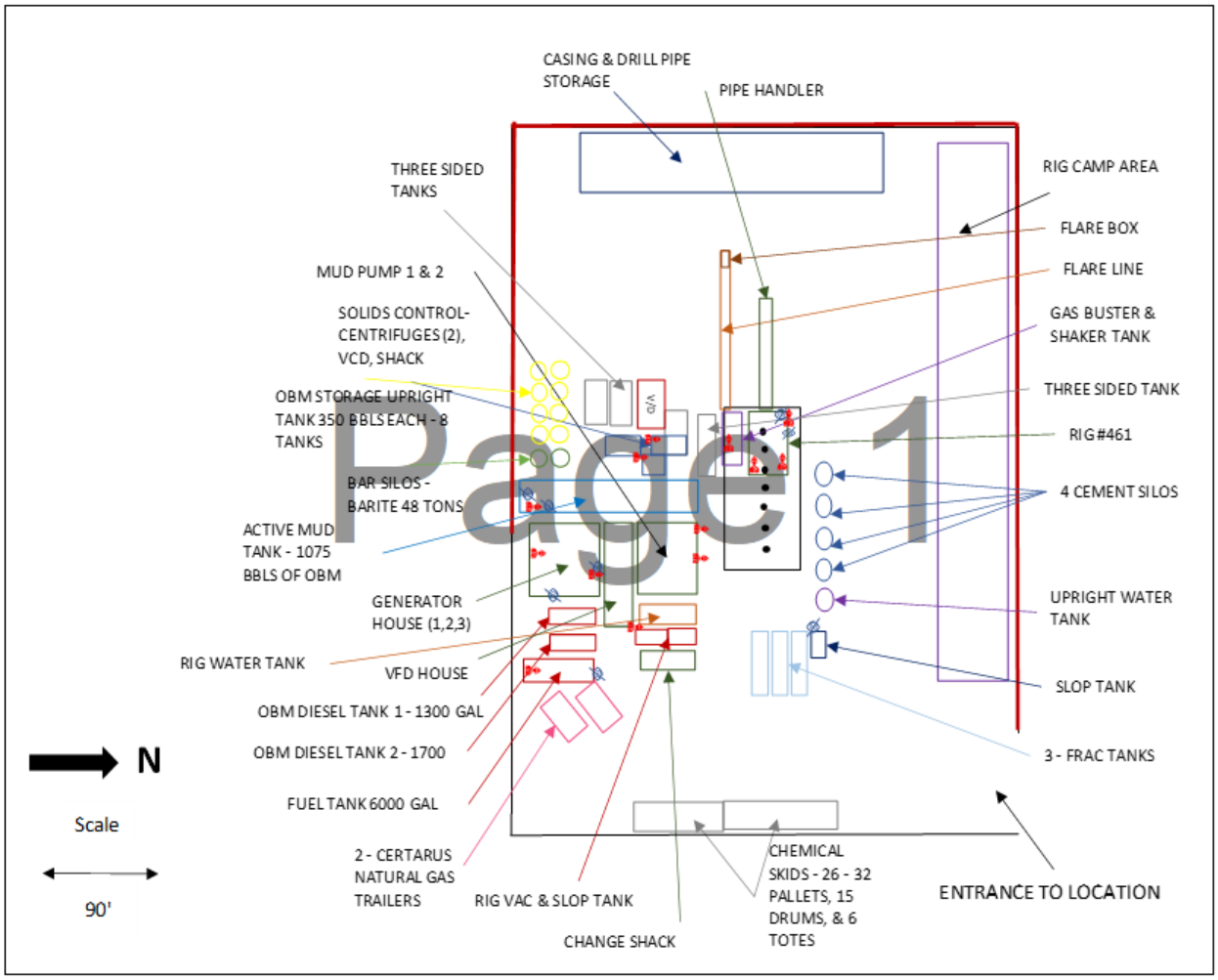
SAFETY EQUIPMENT

During construction operations each piece of construction equipment, heavy duty truck and light duty pickups are all equipped with a dedicated fire extinguisher and spill response kit. There will not be any safety equipment stored on location during these operations.

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DRILLING PHASE:

TYPICAL DRILLING LAYOUT



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EQUIPMENT LIST					
EQUIP CONTRACTOR	COLOR CODE	EQUIPMENT	DIMENSIONS	# OF UNITS	ADDITIONAL COMMENTS
PD		RIG		1	
		PIPE HANDLER		1	
		MUD PUMP #1		1	
		MUD PUMP #2		1	
		VFD HOUSE		1	
		GENERATOR HOUSE		1	
		BOILER TANK		1	
		ACTIVE MUD TANKS	12.6' x 45'	3	1075 bbls of OBM
		SHAKER TANK	12.6' x 30'	1	326 bbls of OBM
		FUEL TANK	8' x 40'	1	6000 GAL
		OBM DIESEL TANK 1	8' x 20'	1	1300 GAL
		OBM DIESEL TANK 2	8' x 25'	1	1700 GAL
CERTARUS		CERTARUS NAT GAS TRAILER	8.6' x 40'	2	380 MCF
		RIG WATER TANK	12' x 45'	1	400 bbls Fresh Water
		FRAC TANKS	12' x 45'	3	500 bbls each
		SLOP TANK	8' x 12'	1	200 bbls
		THREE SIDED TANK	10' x 36'	4	150 yards of cuttings
		UPRIGHT WATER TANK	12' x 11.5'	1	350 bbls for Cement job
		CEMENT SILOS	7.8' x 7.5'	4	450 sks per silo
		BAR SILOS	7.8' x 7.5'	2	48 tons barite
		OBM UPRIGHT STORAGE TANK	12' x 11.5'	8	350 bbls each tank
		CENTRIFUGE		2	
		VCD		1	
		SOLIDS CONTROL SHACK		1	
		CHEMICAL SKID	10' x 40'	2	26-32 pallets, 15 drums, 6 totes
		FLARE LINE		1	
		FLARE BOX		1	
		GUARD SHACK		1	
		CASING & DRILL PIPE STORAGE			
		RIG CAMP AREA			
		SOUND WALL			

EMERGENCY EQUIPMENT	
Eye Wash stations	
Fire Extinguishers	

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CHEMICALS

During drilling operations, the following chemicals are anticipated to be on location:

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CHEMICALS ON LOCATION	
NAME	UNITS
ADAPTA	25 kg bag
BA.STOPPIT	50 lb BA
BARAKLEAN	5 gal CA
BAROID 41	100 lmb bag
BAROID 41 (ST)	1 Uston bulk
BARO-SEAL CLASSIC	40 lbm bag
CAL CHLORIDE POWDER	50 lb bag
DILTREAT	55 gal drum
FORTI-MUL	55 gal drum
GRAPHITE	50 lbm bag
LIME	50 lbm bag
ODOR ARMOR	1 gal tote
RHEMOD L	55 gal drum
SALT	50 lbm bag
SAWDUST FINE	5.5 cuft bag
WALL-NUT MEDIUM	50 lbm bag

SAFETY EQUIPMENT

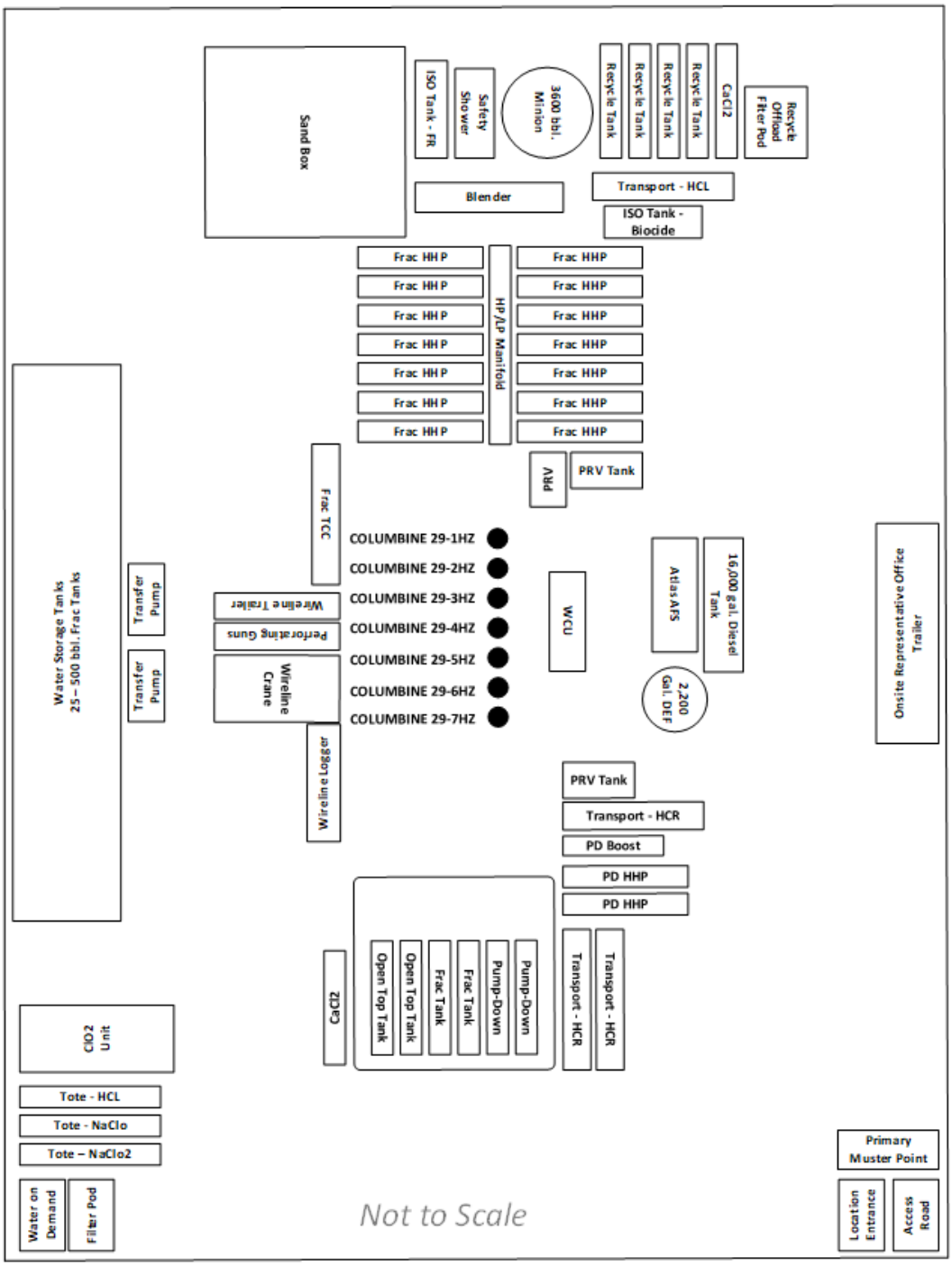
During drilling operations, the following response equipment is staged on location as depicted in the drilling layout shown above

SAFETY EQUIPMENT DETAILS	LOCATION	COMMENTS
Fire Extinguishers	Rig	3
	Shaker Tank	1
	Mud Pump 1	1
	Mud Pump 2	1
	Fuel Tank	1
	Boiler Tank	1
	Generator House	2
	Solids Control/Centrifuges	2
	Active Mud Tank	1
Eye Wash Stations	Rig	2
	Mud Pump 1	1
	Fuel Tank	1
	Generator House	2
	Active Mud Tank	2
	Slop Tank	1

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HYDRAULIC FRACTURING PHASE:

TYPICAL HYDRAULIC FRACTURING LAYOUT



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EQUIPMENT

During hydraulic fracturing the following equipment is expected to be on location:

EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
FRAC HHP	16	FIRE SUPRESSION BUILT INTO EACH UNIT
BLENDER	1	FIRE SUPRESSION BUILT INTO THE BLENDER TUB
FRAC TCC	1	
FRAC HP/LP MANIFOLD	1	
ACID TRANSPORTS	1	4000 GAL CAPACITY
HCR SYNTHETIC ACID TRANSPORT	2	4000 CAPACITY EACH
FRICTION REDUCER ISO	1	4500 GAL CAPACITY
BIOCIDE ISO	1	6000 GAL CAPACITY
WELLHEAD CONNECTION UNIT (WCU)	1	
WL PERFORATING GUN TRAILER	1	
WL CRANE (W/ OUTRIGGERS)	1	
WL TRAILER	1	
WL LOGGER	1	
FUEL TRAILER	1	16000 GAL CAPACITY DIESEL TANK
DEF TANK	1	2200 GAL DEF TANK
ONSITE REPRESENTATIVE OFFICE TRAILER	1	
MINION TANK	1	3600 BBL CAPACITY
STORAGE TANKS	25	500 BBL CAPACITY EACH
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH
SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
BIOCIDE TREATMENT TRAILER	1	REFER TO CHEMICAL TABLE FOR INFO
GREASE SKID	1	
PRV / PRV TANK	1	
SAND FORKLIFT	1	
TRANSFER PUMPS	2	
BOOST PUMPS	2	
WOD FILTER PODS	2	
FORKLIFT/MANLIFT	2	TYPICALLY 1 OF EACH ON LOCATION
FLAMELESS HEATERS	5	WINTER OPS ONLY
GLYCOL HEATERS	2	WINTER OPS ONLY
GENERATORS	4	
AIR COMPRESSORS	2	
VAC TRUCK	1	
DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
GATE GUARD SHACK	1	

CHEMICALS

During hydraulic fracturing operations the following hydrocarbons, hazardous, reactive and flammable materials are anticipated to be in on location:

CHEMICAL	# OF UNITS	VOLUME	COMMENTS
HYDROCHLORIC ACID	1	4000 GAL TRANSPORT	
HCR SYNTHETIC ACID	2	4000 GAL TRANSPORT	
SODIUM BICARBONATE		200-300 LB	ACID NEUTRALIZER
CALCIUM CHLORIDE (BRINE)	1	500 BBL CAPACITY	WINTER OPS
FRICTION REDUCER (FR)	1	4500 GAL CAPACITY ISO	
HYDROCHLORIC ACID (BIOCIDE TRAILER)	1	4000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM CHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM HYPOCHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
PREVENTATIVE BIOCIDE (TTPC)	1	4500 GAL CAPACITY ISO	
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH	PRODUCED WATER ORIGINATES AT ARF FACILITY (FACILITY ID 456644). TYPICALLY 800-1200 BBL PER DAY
DIESEL FUEL TANK	1	16000 GAL CAPACITY	
DEF TANK	1	2200 GAL CAPACITY	

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SAFETY EQUIPMENT

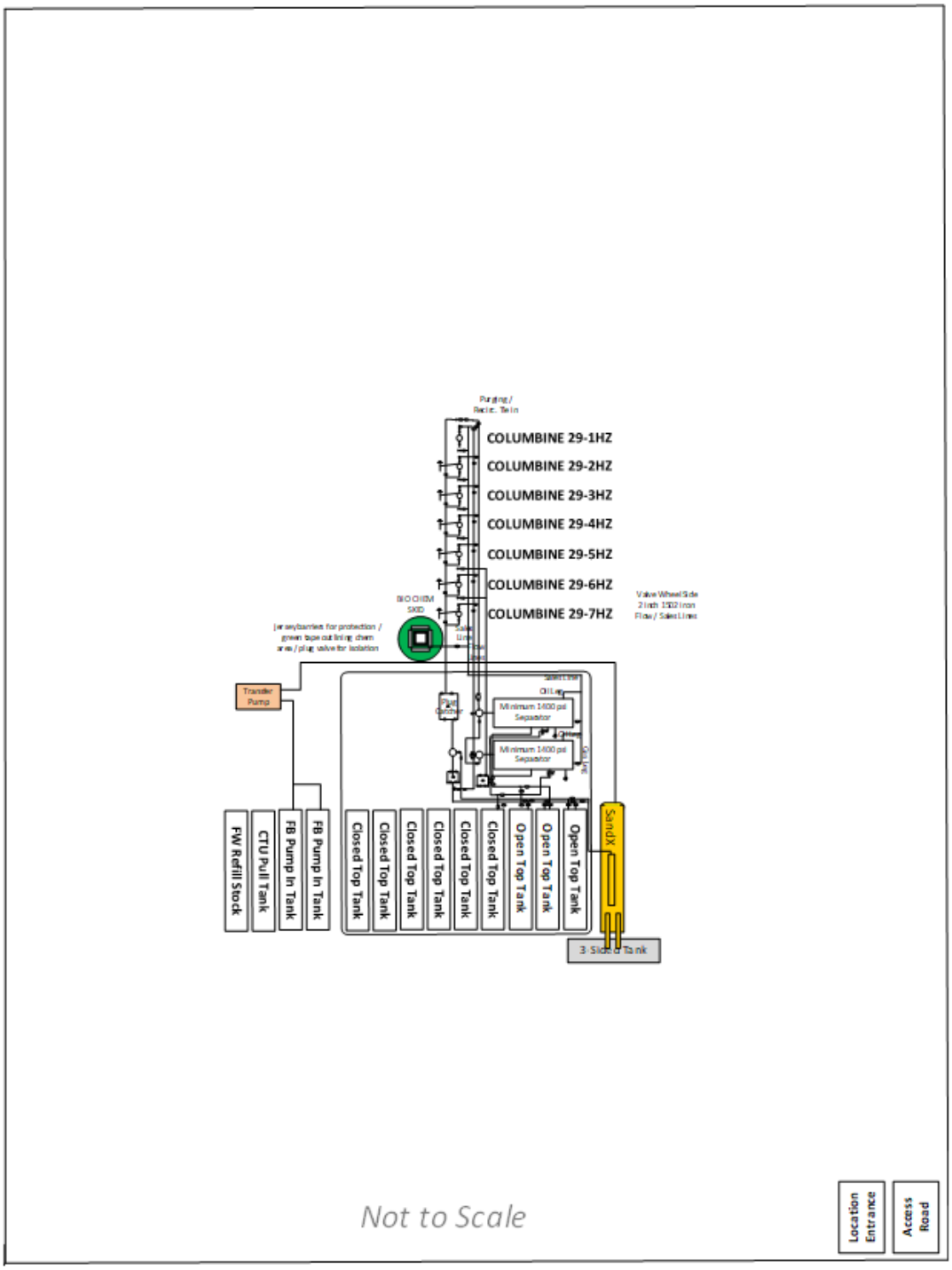
During hydraulic fracturing operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
FIRE SUPRESSION SYSTEM	BUILT INTO XLE PUMPS AND BLENDER TUB
ACID NEUTRALIZER PALLET	200-300 LB SODIUM BICARBONATE
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS AND FLOWBACK OPERATORS
RADIOS	FRAC, CONSULTANTS, WL OPERATOR, FLOWBACK OPERATOR
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

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WELL PREPARATION PHASE:

TYPICAL FLOWBACK LAYOUT



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EQUIPMENT

During preparation, coil and flowback operations the following equipment is expected to be on location:

EQUIPMENT LIST (COMPLETIONS OPERATIONS)			
COMPLETIONS ACTIVITY	EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
COIL	COILED TUBING UNIT	1	
	COIL EQUIPMENT SUPPORT TRAILER	1	
	CRANE (AND OUTRIGGER MATS)	1	
	PUMP TRUCKS	2	
	N2 PUMP	1	
	N2 TRANSPORT	1	120 BBL TRANSPORT
	1502 HARDLINE	VARIES	
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
	MIXING PLANT (CHEMICAL TRAILER)	1	REFER TO CHEMICAL LIST TABLE
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	COIL BHA	1	TYPICALLY STORED ON PALLET ON PAD
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	GENERATORS	5	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
	AIR COMPRESSORS	2	
	CENTRIFUGAL TRANSFER PUMP	1	
	VAC TRUCK	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
FLOWBACK (COIL)	3" DRILLOUT LINE	1	
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	SEPARATORS	3	4-PHASE SEPARATION
	PLUG CATCHER	1	
	SAND KNOCKOUTS	3	
	VX METER	1	NOT USED ON EVERY PAD
	MANIFOLD	1	
	CHEMICAL INJECTION CUBE	2	350 GAL CAPACITY EACH
	SAND X W/ 3-SIDED SAND BIN	1	
	SANDX CONTROL PANEL	1	
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
RIG/SNUB	WORKOVER RIG	1	
	BASE BEAM	1	
	RIG PUMP	1	
	PUMP MANIFOLD & 1502 HARDLINE	1	
	RIG TANK	1	
	PIPE WRANGLER	1	
	PIPE RACKS	1	
	SNUBBING UNIT & BASKET	1	
	SNUBBING TRAILER & CONTROL PANEL	1	
	BOP STACK	1	
	ACCUMULATORS & CONTROL PANELS	2	1 FOR BSR & 1 FOR PIPES/BLINDS
	TUBING & TUBING TRAILER	1	
	TORQUE & TEST UNIT	1	
	TORQUE UNIT	1	
	/DRAULIC LUBRICATOR & EQUALIZING HOSE/MANIFOL	1	
	BOBTAIL	1	TYPICALLY TRANSPORTS 40-60 BBL PER WELL
	WINCH TRUCK	1	
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
	GENERATORS	4	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	AIR COMPRESSORS	2	
	CHEMICAL INJECTION CUBE	2	350 BBL CAPACITY EACH
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
FLOWBACK (RIG/SNUB)	SEPARATORS	3	4-PHASE SEPARATION
	SAND KNOCKOUTS	3	1 FOR EACH SEPARATOR
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	FLOWBACK SHACK	1	

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CHEMICALS

During preparation, coil workover and flowback operations the following hydrocarbons, hazardous, reactive, and flammable materials are anticipated to be in on location:

COMPLETIONS ACTIVITY	CHEMICAL	# OF UNITS	VOLUME	COMMENTS
COIL	FRICTION REDUCER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	BIOCIDE	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	DEFOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	NANO BEADS	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	H2S SCAVENGER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FRICTION REDUCER	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	LIQUID N2	1	120 BBL TRANSPORT	COIL PROVIDER (NOT ALWAYS ON PAD)
	OIL ON PAD	N/A	20 BBL MAX ALLOWED	HAUL OFF OIL BEFORE IT REACHES 20 BBL
	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
RIG/SNUB	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	50/50 METHANOL	1	500 GAL CAPACITY	WINTER OPS ONLY
	BIO WATER	N/A	TYPICALLY 60 BBL/WELL	BROUGHT OUT IN BOBTAIL TRUCK
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)

SAFETY EQUIPMENT

During preparation, coil workover and flowback operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RADIOS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

PRODUCTION PHASE:

Once drilling and completion activities are finalized, the site will transition to its production phase and the primary chemicals stored on site will be crude oil stored in the condensate storage tank and produced water stored in the water storage tanks.

During production there is no emergency response equipment stored on location. Well operators will wear the proper PPE and will have a fire extinguisher in their vehicle.

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NEARBY SENSITIVE AREAS

There are minimal sensitive areas in the surrounding area that are likely to be impacted by a potential spill or a release. The National Hydrology Dataset (NHD) indicates that an open water feature (Lake/Pond), is located approximately 480 feet northeast of the Project Area. This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is inundated intermittently, and subject to livestock disturbance. The surrounding land use appears to be subject to ranching and agricultural practices.

The National Hydrology Dataset (NHD) indicates that an open water feature (Lake/Pond), is located approximately 1,700 feet southwest of the Project Area. This feature is also mapped on the National Wetland Inventory (NWI) dataset, as an excavated palustrine emergent wetland. Aerial imagery suggests this feature is ponded, and the surrounding land use appears to be agricultural.

MITIGATION OF POTENTIAL IMPACTS TO THE ENVIRONMENT

If a spill is found reportable, it will be mitigated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and Environment (CDPHE) requirements. Once a release has been identified, it will be immediately stopped and contained if possible and safe to do so. When containing a spill; pig blankets, snakes, absorbent materials, or earthen berms will be constructed around the release to keep material from spreading. These materials will be provided by KMOG and the contract company as applicable.

Diligent efforts will be made to minimize contact with live vegetation or open water if release is outside of secondary containment structures.

In the event of a large incident requiring outside assistance, KMOG has contracted with EHS. EHS possesses a working knowledge of oil and gas operations, emergency response and Incident Command. Once notified EHS personal can be on location with two hours.

Spills deemed as emergency will include notification to the local fire department using 911.

MITIGATION OF POTENTIAL IMPACTS TO THE NEARBY POPULATION

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail. In the event of an actual emergency, the following steps will be immediately taken:

The KMOG representative will immediately notify proper authorities, including the sheriff's office, Colorado State Patrol, and any other public officials and will enlist their assistance in warning people in the calculated radius of exposure. The KMOG representative will coordinate with local authorities to warn residents down-wind of the location and within radius of exposure from the well site. Additional evacuation zones may be necessary as the situation warrants

The KMOG representative will coordinate with appropriate emergency personnel to divert traffic in the vicinity away from the potentially dangerous area

The area included within the radius of exposure is considered to be the zone with the maximum potential hazard. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated.

In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public. KMOG will fully cooperate with these authorities and will provide careful advice to such

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authorities.

KMOG will dispatch appropriate personnel to the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as necessary.

DETERMINATION OF INCIDENT TYPE & APPROPRIATE RESPONSE

The following initial response actions and mitigation procedures shall be conducted immediately, or as soon as it is safe to do so, upon discovery of an emergency or threat of an emergency:

INITIAL RESPONSE CHECKLIST		
	Secure the source	As quickly as possible, safely shut down the operation responsible for the emergency **IF SAFE TO DO SO, PROPERLY TRAINED & HAVE PROPER PPE**
	Notify	Pull an alarm, push an evacuation button, use radio or *call 911* **EVACUATE IF NECESSARY**
	The first person on scene will assume the duties of the On-Scene Incident Commander until assistance arrives in the form of a more qualified person, if needed	
	Conduct a Hazard Assessment to determine the potential for fire, explosion, and hazardous/toxic vapors as well as to define Personal Protective Equipment (PPE) needed by responders. Identify source and volume; characterize oxygen levels, explosive character, toxicity of air on scene, splash and ingestive hazards	
	Shut off ignition sources: motors, open flames, electrical circuits	
	Identify and evacuate an exclusion zone in vicinity of the emergency site until the Hazard Assessment is completed	
	Conduct a Personnel Accountability Report (PAR) to accurately determine the location and status of personnel	
	Initiate notification of management personnel	
	Request Response Team activation or escalation as appropriate	
	Initiate notification to required government agencies as promptly as possible and within the required timeframe	
	Coordinate rescue and medical response actions	
	Use explosion proof equipment in high concentration vapor areas and monitor for flammable vapors until the response operation is completed	

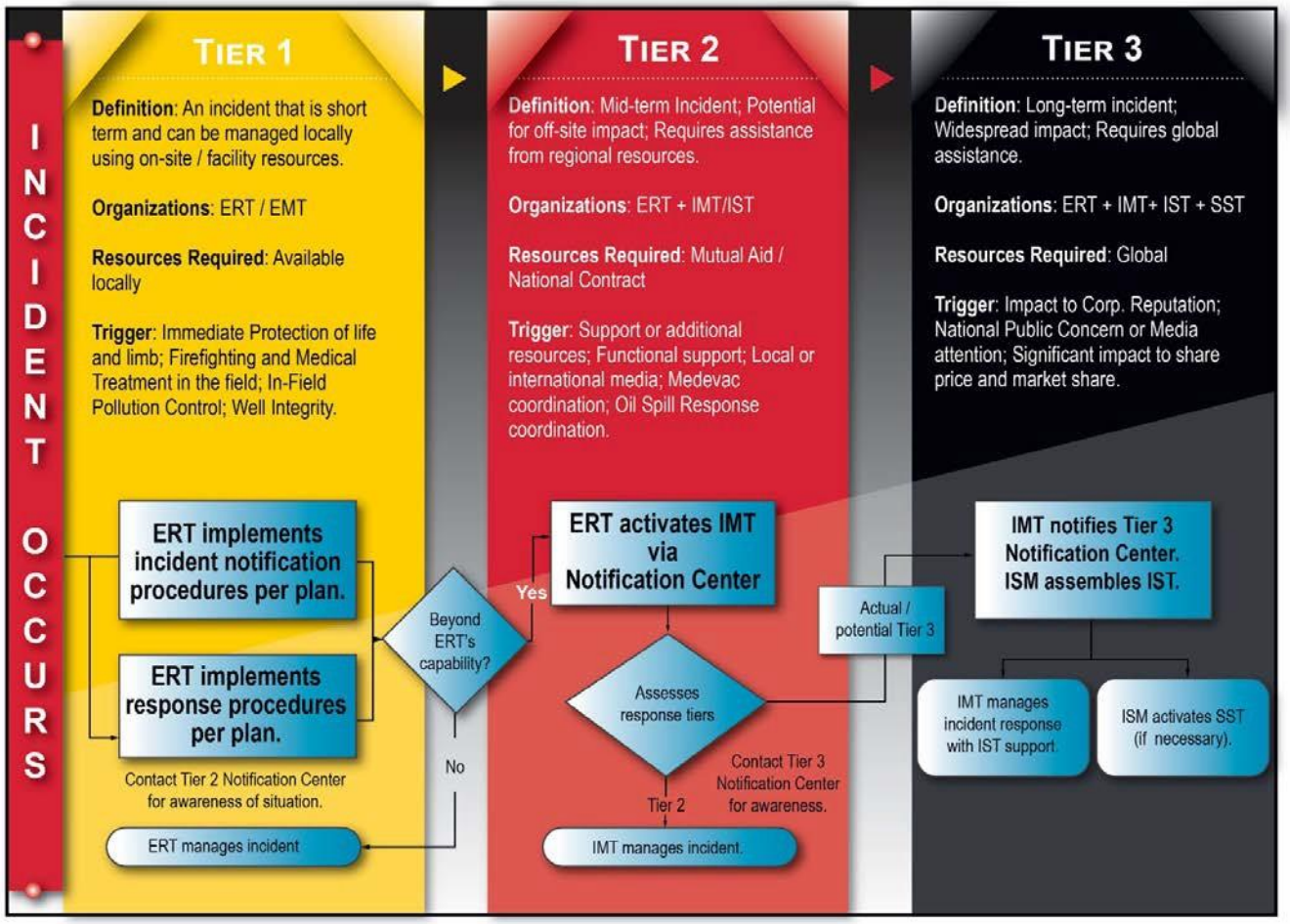
	The PEAS priorities will be utilized throughout the duration of the emergency response
	• People – ensure safety of all responders and impacted persons
	• Environment – protect the environment from further damage
	• Assets – protect non-damaged assets and minimize additional damage where possible
	• Stakeholders – reduce additional impacts and coordinate with to respond and recover effectively including:
	  ○ Effective cooperation with affected regulatory agencies
	  ○ Effective communication with Non-governmental Organizations (NGOs)
	  ○ Effective communication with other stakeholders
	  ○ Safe and effective restoration of business	

	Initiate evacuation of third parties: Contact local and state law enforcement as necessary to coordinate evacuation	
	Initiate containment if necessary and safe to do so. Contact Oil Spill Removal Organization if needed	

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INCIDENT TIER CLASSIFICATION

Incidents are classified in tiers according to their severity, either potential or realized.



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NOTIFICATION

Notifying the appropriate organizations that an incident has occurred is the first step in the initial response for all incidents

Notification efforts should include verification of the type of incident and its exact geographic location, or as close a proximity as can be readily discerned

The accountability of potentially impacted personnel is critical to determine a proper response when the health or safety of individuals are likely to occur

In no instance shall internal notifications take precedent over the safety of people or the request and mobilization of critical safety or medical resources, such as Emergency Medical, Fire, or Police assistance

Internal and external notification procedures shall be implemented immediately after discovering an incident has occurred, or as soon as it is safe to do so.

Upon discovery of or initial notification of an incident, the person in charge will attempt to identify the following information:

- The safety of the reporting party and others in the vicinity
- Name of the reporting party and contact information
- Status of any persons injured
- Accurate Personnel Accountability Report (PAR)
- Location of the incident, either address or global positioning system (GPS) location
- Time of discovery
- Incident description (source, assets involved, fire, etc.)
- Product type and estimated volume released
- Impacts to environmentally sensitive areas, population, waterways, etc.
- Immediate risks or exposures
- Current response actions
- Initial remedial actions, such as source control
- Name and contact of on-scene emergency agencies
- Weather conditions

The HSE Department will make all immediate initial incident notifications to the applicable agencies, including releases or spills, injuries, air emissions or air quality issues or permit variations. Any agency notification related to a deviation to a permit, such as drilling, will be coordinated by the various departments, such as Regulatory, HSE, and Drilling, as set forth in established procedures and are outside the scope of this process. Subsequent, follow-up, or amended notifications to external agencies, partners, joint ventures, or others outside of KMOG shall be made by the Liaison Officer function of the Incident Management Team (IMT) or similar function of the Emergency Management Team (EMT), as established.

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RESPONSE ACTIONS DEPENDING ON INCIDENT TYPE

INJURY / MEDICAL

MEDICAL EMERGENCY CHECKLIST

CONTAMINATED VICTIM

On-site emergency medical response for a contaminated patient requires the same rapid assessment of the patient as any other situation but be aware of other considerations that may affect the patient. The potential for contamination of the personnel, and equipment should be mitigated. Patient treatment should be conducted AFTER the injured party has been decontaminated.

IF	THEN
A responder requires medical attention	Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness. If the treatment needed is critical care or lifesaving treatment.
The need for full decontamination is less than the need for prompt medical treatment.	Refer to the Site Safety Plan for steps to be taken in an abbreviated decontamination for medical treatment
Medical Treatment is needed	The Incident Commander or his designee will request assistance from trained medical personnel
Transportation to a medical facility is needed	The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant.
	SDS information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.

NOTE: **Evacuation of seriously ill or injured persons should be conducted by ground or air ambulance only.** Transportation by company or private vehicle should be discouraged, unless advised to do so by medical authorities. All medical emergencies should be documented on appropriate company reports.

NON-CONTAMINATED VICTIM

Provide BASIC LIFE SUPPORT Stabilize the victim at the scene if necessary		
Maintain airway/breathing/Administer CPR	Control bleeding	Treat for shock
Activate professional medical care for the victim by: Call 911 to arrange for ground or air ambulance support.		
Provide the 911 dispatch the following information		
Your name and location and contact phone number	Type of medical emergency	
Name and location of the injured	Condition of injured	
Assess the situation and contact the Field Office or Safety Department		
Determine the level of medical attention needed - first aid or outside professional assistance.		
Administer first aid if necessary or **Transport the victim to a local hospital or physician**		

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FIRE / EXPLOSION

	FIRE / EXPLOSION CHECKLIST
	Notify the Foreman or supervisor on duty
	Shutdown/ESD facility
	Call 911 for emergency fire services
	Shutdown the Facility, evacuate personnel and move to a muster area or other safe distance to direct the fire department to the scene of the fire
	Keep other personnel and vehicles from entering the danger area
	Each person onsite should evacuate if necessary, to protect themselves from harm

HAZARDOUS SPILL

	LINE BREAK OR LEAK CHECKLIST
	Shutdown pumping and equipment
	Drain the line section, as the situation demands
	Coordinate rescue and medical response actions
	Initiate spill response and containment process
	Clean up spilled product to eliminate any possible environmental problems
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Request local authorities to establish traffic control in the area, as the situation demands
	Make all necessary repairs
	Return the line to service once repairs are completed
	STORAGE TANK LEAK
	Notify the Foreman or supervisor on duty
	Shut down all tank battery product movement operations and isolate the tank
	Initiate Confined Space Entry procedures, as applicable
	Ensure that the containment area drainage valve is closed
	If near tank bottom, consider filling the tank with water and maintain water bottom to suspend the discharge
	Block all drainage of spilled material from travelling offsite
	Request local authorities to establish traffic control in the area, as necessary
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Remove product from containment area with an explosion proof pump, oil skimmer, and/or vacuum truck with skimmer attachments
	If floating roof tank is submerged and tank must be drained, follow the facility operating procedures for landing floating roof and draining any liquids contained upon the floating roof

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VAPOR CLOUD

VAPOR CLOUD CHECKLIST	
	Sound the alarm and notify the foreman or supervisor on duty. Vacate the area.
	The only proper action in the presence of a vapor cloud is to get away from it. **Do not shut off electrical equipment.**
	All personnel should report to the muster point for roll call and further instructions.
	Contact the appropriate agencies and potentially affected neighbors.

DECONTAMINATION

Eyewash stations and safety showers provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing. Contaminated clothing should be disposed of properly. Contaminated personal protective equipment (PPE) must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

DECONTAMINATION CHECKLIST	
	Establish "Exclusion – Hot", "Decontamination – Decon", and "Support – Safe" zones to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.
	Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
	Decontamination facilities should be positioned prior to employee/contractor entrance areas where the potential for exposure to contamination exists. The appropriate Safety Data Sheets (SDS) are available to aid health professionals treating theinjured parties.
	Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
	Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

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SEVERE WEATHER

	TORNADO OR SEVERE STORMS CHECKLIST
	Upon notification by weather monitoring of impending severe weather conditions, notify the person in charge or the appropriate office of the situation Be aware of changing weather conditions: • *Tornado watch* – conditions are right for the formation of a tornado. • *Tornado warning* – a tornado has been seen in area or is imminent. Take cover immediately.
	Personnel will be instructed to shut down all nonessential activities and take shelter where available until the storm has passed.
	Immediately bring personnel off tanks, pipe racks, and other elevated work areas. Suspend product loading operations and close all tank openings.
	Take shelter in a low-level area away from glass until the storm has passed.
	Stay in the shelter until "ALL CLEAR" has been issued.

EVACUATION

The decision to evacuate should always be based upon a prudent analysis of the risks involved in any incident, and/or a response to an incident.

EVACUATION PROCEDURES

Depending upon the hazard, personnel will evacuate either via the access road and meet at muster points.

In case of emergency, the primary command center will be established at the IOC at the Platteville Office. The Denver Office may be used as an alternate command center if necessary.

If determined necessary, local response personnel (fire, police, etc.) would coordinate all community evacuation procedures utilizing existing community evacuation plans.

	EVAUATION PROCEDURES CHECKLIST
	Sound an alarm or give verbal alarm
	Call 911
	Shut down loading/unloading and pipeline operations
	Evacuate trucks from the location
	Divert incoming trucks to a safe distance away
	Evacuate all personnel to designated staging areas

TRAINING AND COORDINATION WITH LOCAL GOVERNMENT AND RESPONDERS

KMOG is a member of the CPRN (Colorado Preparedness Response Network), an industry collaboration with local responders working to enhance emergency preparedness and response. KMOG is committed to preparedness and minimizing impacts of incidents requiring emergency response should they occur. KMOG recognizes the importance of knowledge sharing within the industry and with emergency responders through drills and exercises.

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Trainings and drills will be offered and facilitated regularly through CPRN as well as KMOG will facilitate internal exercises and extend invites to emergency responders annually, at minimum, but often more frequently.

If KMOG staff or contractors are contacted by the OEM or a Fire Protection District, they will provide the necessary information to assess the hazards onsite and coordinate with first responders during all phases of development of the site.

In the event of an emergency requiring first responders, Unified Command will be established between the KMOG appointed company man on location and first responders present.

Address: 7274 Grant Avenue

KerrMcGee

COLUMBINE 4-29HZ

Weld County, Colorado
Firestone, Colorado

GPS Coordinates: NAD 83

Pad Site: LAT: 40.114092° LONG:-104.915717°

Access Road: LAT: 40.116598° LONG:-104.918317°

All Emergencies will be reported through 911

NOTIFICATIONS

1. National Response Center: 800-424-8802
2. Kerr McGee/Emergency Response Coordinator
   - Integrated Operations Center (IOC) 970-515-1500
3. COGCC: 719-343-0130, 970-573-1277
4. EPA Region VIII: 303-312-6312
5. Carbon Valley Emergency Management Agency: 303-319-1008
6. Frederick/Firestone Fire Protection District: 303-833-2742

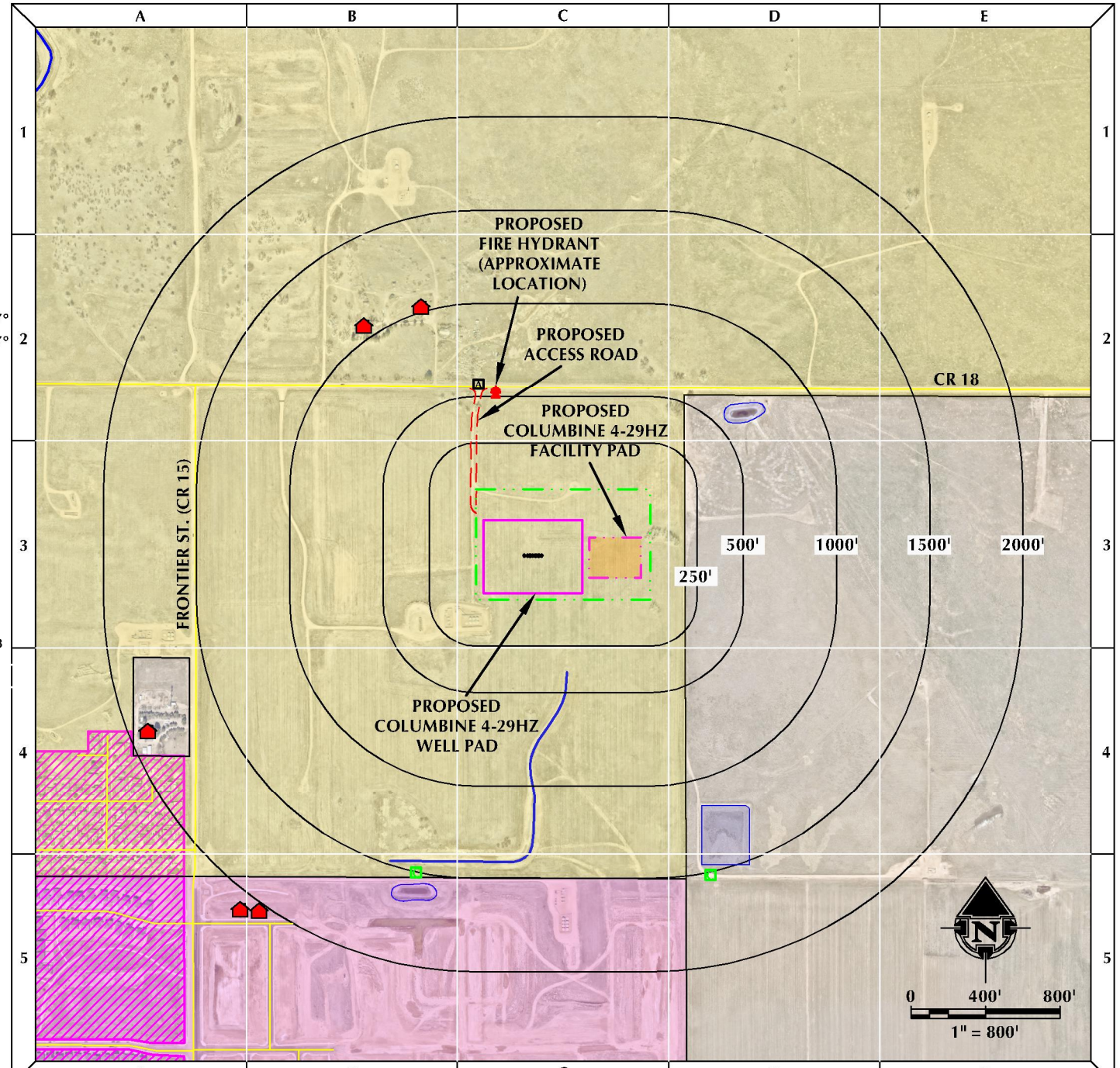
RESPONSE OBJECTIVES

Minimize the impact to the environment and local community. Contain and recover released product to the extent possible

CRITICAL RECEPTORS

1. DRAINAGE SWALE/DIVERTING OFFSITE FLOWS
2. SURROUNDING RESIDENTIAL PROPERTIES
3. N/A
4. N/A

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.



LEGEND:
- PROPOSED WELL
- DISTURBANCE AREA
- DISTURBANCE AREA BUFFERS
- PROPOSED WELL PAD
- PROPOSED FACILITY PAD
- NEIGHBORHOOD
- BUSINESS
- RESIDENTIAL BUILDING UNIT
- SCHOOL
- EXISTING CULVERT
- POND
- DELINEATED WETLAND
- DITCH/CANAL/RIVER/DRAINAGE
- RAILROAD TRACKS
- PUBLIC ROADS
- PROPOSED ACCESS ROAD
- SITE ACCESS
- TOWN OF FIRESTONE
- TOWN OF FREDERICK
- PROPOSED FIRE HYDRANT

609 CONSULTING, LLC
SHERIDAN OFFICE 1095 Saberton Avenue Sheridan, Wyoming 82801 Phone 307-674-0609
LOVELAND OFFICE 6706 North Franklin Avenue Loveland, Colorado 80538 Phone 970-776-4331

SCALE:	1" = 800ft	NAD83 CO-Nft	
DRAWN:	GLK	DATE:	6/24/21
REVISED:	SRS	DATE:	9/23/21

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TACTICAL RESPONSE CHECKLIST

After assessing the incident level and contacting the appropriate parties, the following steps will need to be taken for the tactical response:

1. Implement National Incident Management System (NIMS) Incident Command System (ICS)
2. Assess hazards to site, workers, and public
3. Safety Officer should complete form ICS 208 – Safety Message/Plan
4. Conduct Job Safety Briefing
5. Assess property and environmental impacts
6. Develop ICS 201 Incident Briefing and ICS 202 – Incident Objectives
7. Implement response actions:
   a) Confine spills to tanks/vessels
   b) Locate leading edge of spilled material
   c) Contain spills on ground and any surrounding drainage ways
   d) Recover spilled materials
   e) Dispose of recovered materials properly
8. Document site conditions and activities
9. Document impacts to natural, economic, and cultural resources
10. Document site restoration/remediation activities

See the KMG/Emergency Response Plan for the full list of NIMS ICS Forms.

PAD Name and PAD STATS

FLOW STATS – 30 DAY AVERAGE IP

GAS (MCF/D)	OIL (BBL/D)	WATER (BBL/D)
TBD	TBD	TBD

WELL PAD CONTAINTMENT STORAGE

QTY.	TYPE	SIZE (BBL)
2	Water Tanks	285 barrel
1	Condensate Tank	285 barrell

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.

RESPONSE RESOURCE CONTACT INFORMATION

Name	Main Phone
Kerr McGee Oil & Gas OnShore LP Integrated Operations Center (IOC)	970- 515-1500

STATE, FEDERAL, MUNICIPAL EMERGENCY RESPONDERS

Name	24-Hour Phone
Carbon Valley Emergency Management Agency	303-319-1008
Weld County Sheriff	970-356-4015
Firestone Police Department	303-833-0811
Frederick/Firestone Fire Protection District	303-833-2742
National Response Center	800-424-8802
Colorado Dept of Natural Resources	303-866-3311
EPA Region 8	303-312-6312
Department of Transportation	855-368-4200

RESPONSE CONTRACTORS

Contractor Name	Office #	Alternative #
Emergency Response Contractors		
EnviroServe	800-488-0910	720-450-1316
EHA-Environmental HAZMAT Services	720-225-9252	303-525-3111
Wild Well Control	281-784-4700	
Boots & Coots	281-931-8884	
Cudd Pressure Control	800-990-2833	307-382-6650 713-849-2769
Support - Incident Management Team Consultant		
CTEH	2501-801-8500	317-473-0688
The Response Group	281-880-5000	
Oil Spill Clean Up Services -Wildlife Rehabilitation		
Birds of Prey Foundation	303-460-0674	
Greenwood Wildlife Rehab Ctr.	303-823-8455	303-545-5849
Rocky Mountain Raptor Program	970-484-7756	970-222-0322
Support - Consultants		
AECOM/ENSR	970-493-8878	720-210-7924
LT Environmental	303-962-5504	
GHD First (Fast Incident Response Services Team)(24hr hotline)		866-812-9565
Tasman Geoscience		303-507-8869

RESPONSE OBJECTIVES CHECKLIST

SAFETY – PROTECT LIFE

❖Evaluate and account for all personnel
❖Isolate all potential ignition sources
❖Initiate emergency services immediately, as needed (911, Fire, LEPC)
❖Identify hazard(s) of emitted material (obtain SDS)
❖Establish site control (safe perimeter and evacuation routes)
❖Monitor air in impacted areas
❖Develop Site Safety Plan (ICS 208) and Medical Plan
❖Continually assess site hazards and risks

RESPONSE – INCIDENT STABILIZATION

❖Conduct notifications to external agencies and internal personnel
❖Identify and implement staging areas to support response operations
❖Activate response company for equipment and manpower as needed
❖Activate response tactics to contain and recover product/material
❖Establish command post and field communications
❖Establish flight traffic restriction if required
❖Provide personnel and equipment support as required
❖Implement waste handling and disposal procedures as required
❖Initiate decontamination and demobilization procedures when appropriate

ENVIRONMENTAL – PROTECT THE ENVIRONMENT

❖Identify, prioritize, and protect environmentally sensitive areas
❖Establish wildlife rescue rehabilitation operations if required
❖Verify release if waters are impacted
❖Conduct visual assessments (spill tracking and surveillance)

Revised: 6/2020

Section 5

Phase III Drainage Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Phase III Drainage Report
for
Columbine 4-29HZ

Prepared for:

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

Submitted to:

Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

October 2021
Revised December 2021

609 Consulting, LLC

Engineering, Surveying, Consulting & Design

Sheridan Office
1095 Saberton Avenue
Sheridan, Wyoming 82801
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Loveland Office
6706 North Franklin Avenue
Loveland, Colorado 80538
Ph: (970) 776-4331 Fax: (970) 776-3301

Letter of Transmittal

To: Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

cc: Mr. Matt Wiederspahn, PE, Town of Firestone
Mr. Josh Evans, PE, Town of Firestone
Ms. Shayelyn Marshall, Kerr-McGee Oil & Gas Onshore L.P.
Mr. Brian Venn, PE, 609 Consulting

From: Mr. Tyler French, PE
609 Consulting
1095 Saberton Avenue
Sheridan, Wyoming 82801

Date: December 10, 2021

Subject: Columbine 4-29HZ - Phase III Drainage Report - Revised

To the Town of Firestone:

On behalf of Kerr-McGee Oil & Gas Onshore L.P., we are pleased to submit the revised Phase III Drainage Report for Columbine 4-29HZ. The purpose of this report is to discuss and summarize the stormwater drainage analysis and design performed for Columbine 4-29HZ. The proposed project will be located in the northwest quarter of Section 29 in Township 2 North, Range 67 West in Firestone, Colorado.

The drainage analysis and design were prepared using the Town of Firestone Design Standards & Construction Specifications for Public Improvements as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual. The Town of Firestone provided comments and redlines for the Preliminary Phase III Drainage Report for Columbine 4-29HZ in September of 2021. These redlines were incorporated into the Phase III Drainage Report. The Town of Firestone provided additional comments in December of 2021. This revised Phase III Drainage Report has addressed and incorporated all of the comments and redlines provided by Firestone thus far. We believe the analysis and design satisfy all Town of Firestone drainage requirements.

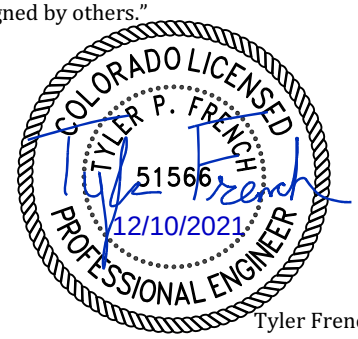
We greatly appreciate your time and consideration in reviewing this submittal. Please contact us with any questions you may have.

Respectfully,

Tyler French, PE

Certification of Engineering

"I hereby attest that this final report for the drainage design of Columbine 4-29HZ was prepared by me, or under my direct supervision, in accordance with the provisions of the Town of Firestone Storm Drainage Criteria for the responsible parties thereof. I understand that the Town of Firestone does not and shall not assume liability of drainage facilities designed by others."



Tyler French
Registered Professional Engineer
State of Colorado No. 51566

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Appendix C: FEMA Flood Insurance Rate Map FIRMette
Appendix D: NOAA Atlas 14 Point Precipitation Frequency Estimates
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Appendix F: MHFD-Detention Spreadsheet Calculations
Appendix G: Pipe Buoyancy Calculations
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Appendix I: Conveyance Calculations for Diversion Ditch Design
Appendix J: Sediment Trap Sizing Calculations

1.0 PROJECT OVERVIEW

Kerr-McGee Oil & Gas Onshore L.P. is proposing the construction and development of an oil/gas well pad and production facility, Columbine 4-29HZ, located in the northwest quarter of Section 29 in Township 2 North, Range 67 West in Firestone, Colorado. Per the requirements outlined in the Town of Firestone Municipal Code, and through a direct request from the Town of Firestone, this report was prepared to discuss the analysis and design for stormwater drainage at the proposed project site. The Drainage and Erosion Control Plan, found in Appendix A, was developed in conjunction with this report.

1.1 Project Description

The proposed project consists of the construction and operation of the Columbine 4-29HZ well pad and the Columbine 4-29HZ production facility containing infrastructure and operations for seven oil/gas wells. Combined, the well pad and facility will have a Colorado Oil & Gas Conservation Commission (COGCC) 2A disturbance boundary area of 12.66 acres during the construction phase which includes topsoil stripping and pad earthwork, well drilling and hydraulic fracturing, installation of permanent pipelines and facilities, and setup of temporary equipment. Construction phase grading and layout for the well pad and facility can be found in the Drainage and Erosion Control Plan found in Appendix A.

Once all wells have been drilled and completed, the temporary equipment area and portions of the well pad and facility will be reclaimed back to existing grade for the production phase. The remaining operational area during the production phase will be approximately 2.73 acres. Production phase grading and layout for the well pad and facility can be found in the Drainage and Erosion Control Plan found in Appendix A.

1.2 Project Location

The proposed Columbine 4-29HZ project is located on property owned by Anadarko E & P Onshore LLC (Parcel 131129200002). The project area is approximately 0.1 miles south of County Road 18 and 0.3 miles east of County Road 15 within the Town of Firestone jurisdictional boundary. A proposed access road running south from County Road 18 will provide access to the project site. Figure 1 shows the location of Columbine 4-29HZ.

Soils data for the project area were taken from NRCS Soil Data Viewer. The project area is comprised of Olney loamy sand (1 to 3 percent slopes) with a Hydrologic Soil Group (HSG) classification of Group B soils and Vona loamy sand (3 to 5 percent slopes) with a HSG classification of Group A soils. The soils report for the project area can be found in Appendix B. The proposed project will be constructed on undeveloped agricultural land. According to National Land Cover Database (NLCD 2016), the project area is classified as a combination of cultivated crops, herbaceous, and hay/pasture.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 08123C2081E, Effective Date: 1/20/2016), the proposed project is in an area of minimal flood hazard (Zone X) and is therefore determined to be outside the 500-year floodplain. The corresponding FIRMette displaying the flood zone classification at the project site can be found in Appendix C.

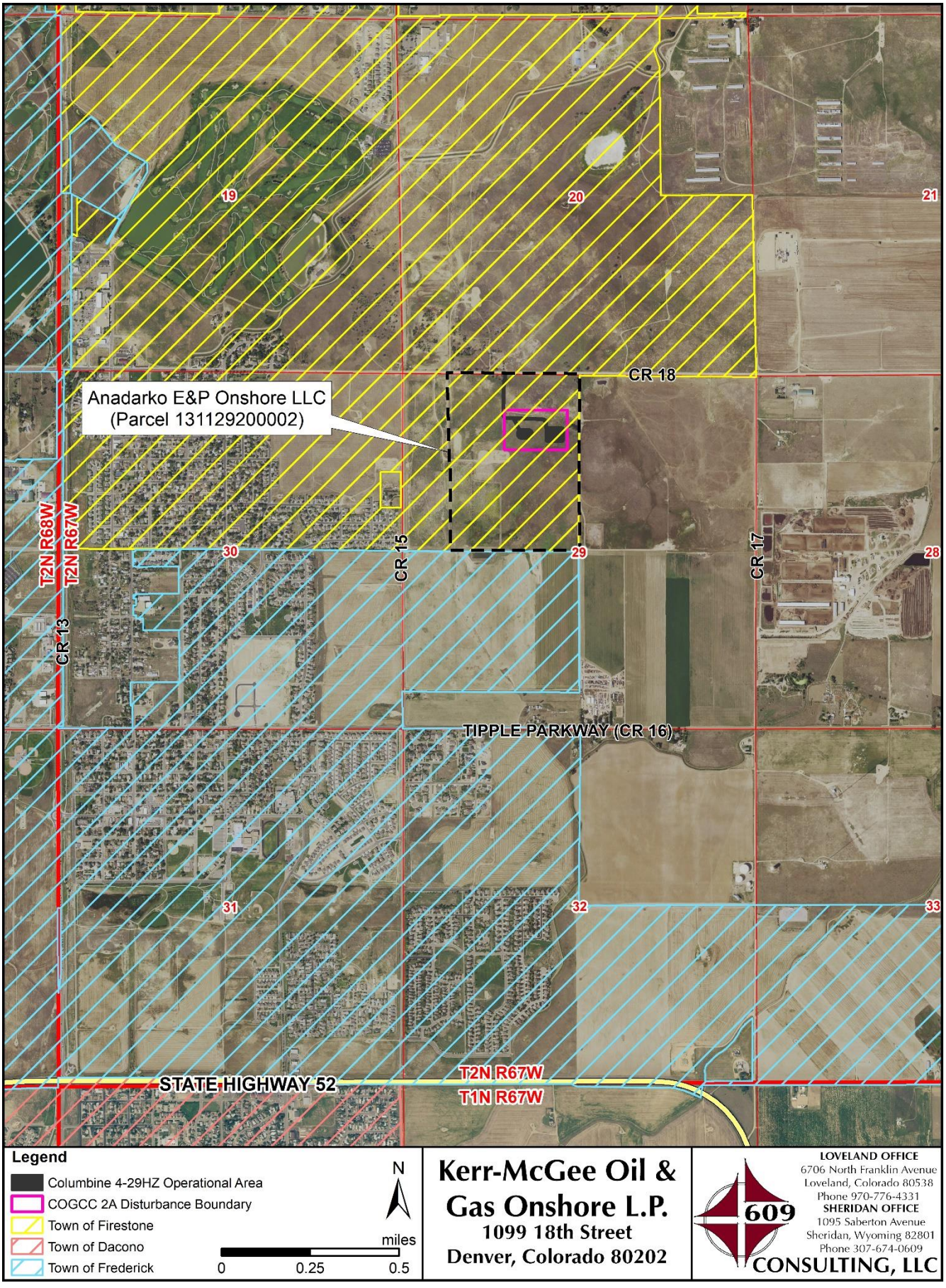


Figure 1. Project Location

1.3 Drainage Summary

The proposed Columbine 4-29HZ project lies within the Firestone Lake – Saint Vrain Creek Hydrologic Unit Code Level 12 (HUC 12): 101900050707. The HUC 12, approximately 69.5 square miles in area, consists of a mixture of agricultural lands and urban development via subdivisions, acreages, and transportation infrastructure and drains to Saint Vrain Creek.

Local drainage to and around the project site generally flows southwest to northeast. Both on-site and off-site runoff drains east under an existing private road through an existing 18-inch corrugated metal pipe (CMP) culvert. The Hidden Creek Development, just south of the project parcel in Frederick, Colorado, has recently constructed a drainage swale on the project parcel which runs south to north. The swale will drain stormwater outflows from a detention pond(s) used to capture and treat stormwater from the new development. Drainage from the swale is expected to have no negative impacts on the operations at the proposed Columbine 4-29HZ project site.

The project site lies within the study area of the *Sump Basin Master Drainage Plan*, published in May of 2010 (Colorado Civil Group, Inc.). According to the report, the Sump Basin has well-drained soil with poorly defined drainageways with most runoff conveyed via shallow overland flow or sheet flow. Historically, stormwater within the basin generally flows from south to north. Though the Sump Basin contains several existing sumps, there are no sumps located near the proposed project site.

2.0 HYDROLOGIC ANALYSIS

The following sections outline the methods used and corresponding results for the hydrologic analysis of the project site and drainage design including historic runoff, design flow, and stormwater volume.

2.1 Historic Runoff

Historic runoff, calculated assuming the site is undeveloped with a 2.0 percent imperviousness, was calculated for the proposed project site. The rational method was chosen to estimate historic peak flows. As discussed in the Mile High Flood District (MHFD) manual *Urban Storm Drainage Criteria Manual Volume I* (USDCM VI), it is acceptable to use the rational method for design storm analysis of catchments that are not complex and are 90 acres or less in size.

The MHFD spreadsheet model, *Peak Runoff Prediction by the Rational Method, V 2.00* (UD-Rational), was used to calculate peak flows. One-hour point rainfall data were obtained from NOAA Atlas 14 Point Precipitation Frequency Estimates using coordinates for the project site. One-hour point rainfall data are summarized in Table 1 and a copy of the point precipitation frequency estimates obtained from NOAA can be found in Appendix D.

Table 1. Point Rainfall Data (NOAA Atlas 14 Point Precipitation Frequency Estimates)

Storm Event Frequency	One-Hour Point Rainfall, in
2-year	0.822
5-year	1.11
10-year	1.39
25-year	1.84
50-year	2.24
100-year	2.69
500-year	3.94

The COGCC 2A disturbance boundary was used to define the drainage area. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery. HSG was derived from an area-weighted average using NRCS Soil Data Viewer. HSG and soils data for the project area can be found in Appendix B. USDCM VI was referenced for the recommended conveyance factor (K). Computed Time of Concentration (Tc) was used since historic conditions have an imperviousness of less than 20 percent. Historic peak flow estimates calculated using the rational method are summarized in Table 2 and spreadsheet model inputs and results can be found in Appendix E.

Table 2. Historic Peak Flow Estimates Using the Rational Method

Storm Event Frequency	Historic Peak Flow, cfs
2-year	0.1
5-year	0.2
10-year	1.2
25-year	5.7
50-year	9.5
100-year	15.9
500-year	32.1

2.2 Design Flow

Design flows for Columbine 4-29HZ were calculated for stormwater derived within the project disturbance area (on-site) as well as the broader drainage to and around the project area. Both the construction phase and the production phase were analyzed and used to aid in the hydraulic design.

The rational method was chosen to estimate design-specific peak flows for the proposed culvert and ditch outlets (sediment traps). Drainage area delineations for the culvert and sediment traps during the construction phase are shown in Figure 2 and drainage area delineations for the culvert and stormwater storage during the production phase are shown in Figure 3. Locations for peak flow calculations are summarized in Table 3.

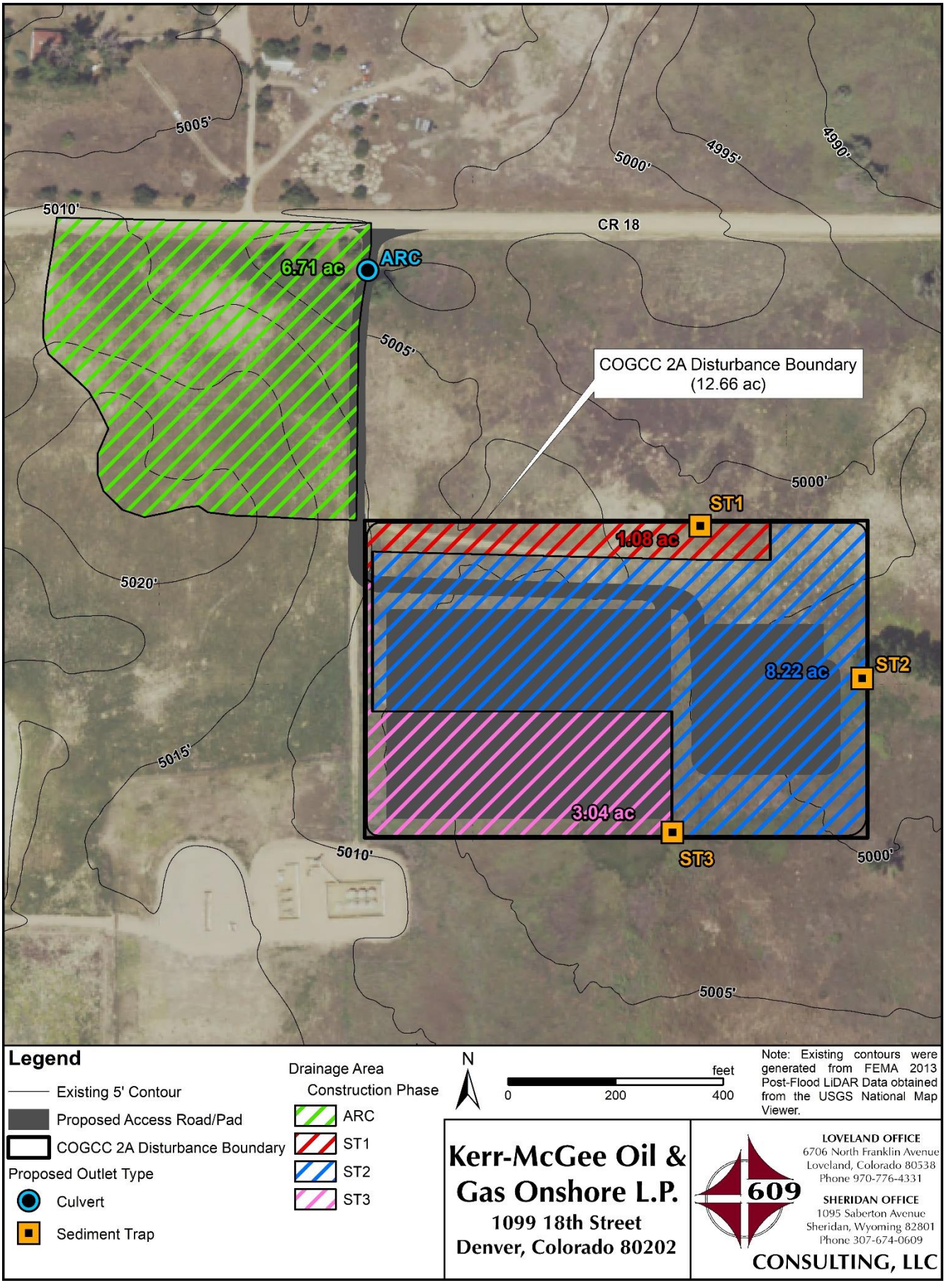


Figure 2. Drainage Area for the Construction Phase

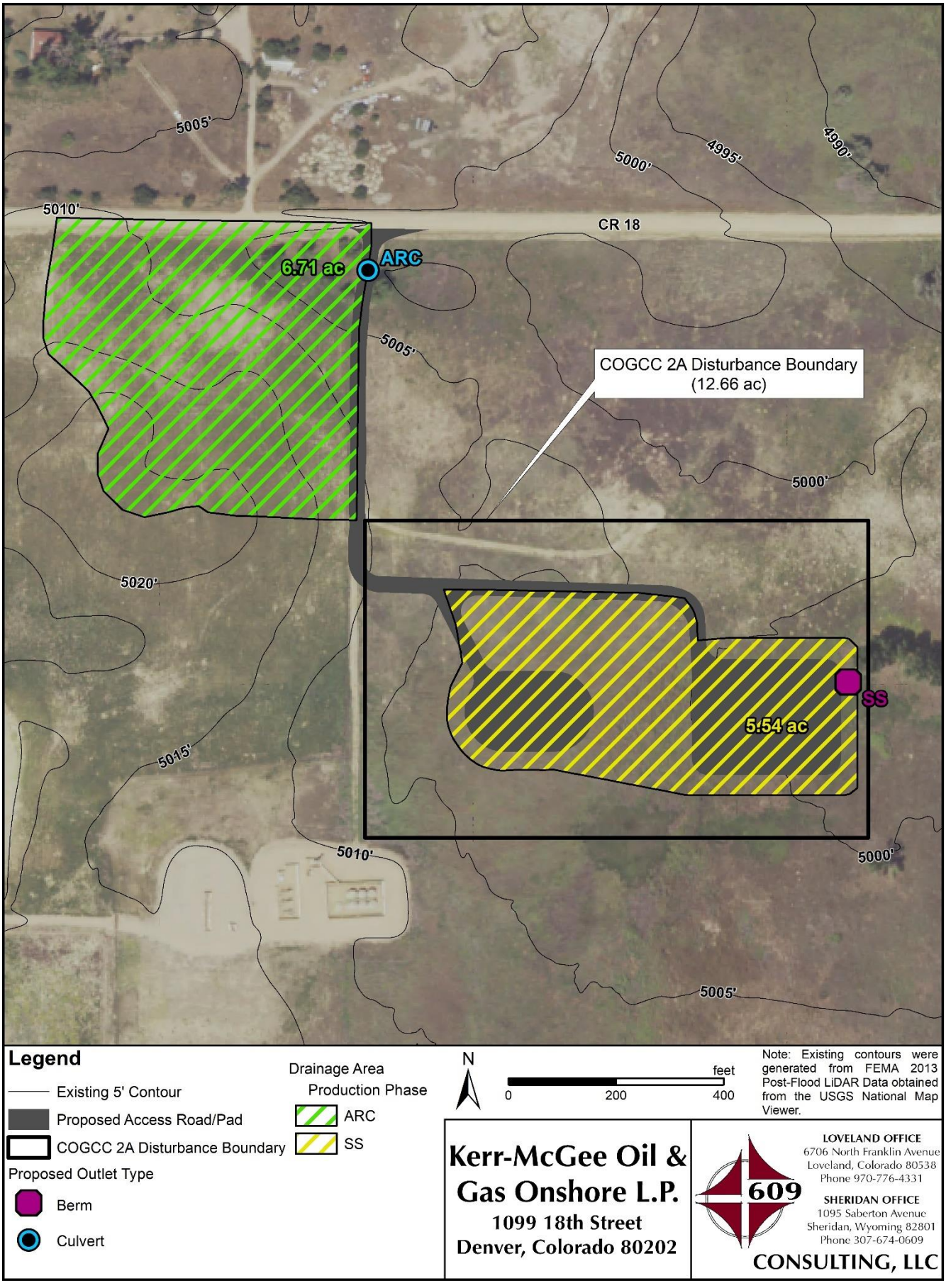


Figure 3. Drainage Area for the Production Phase

Table 3. Summary of Outlets and Drainage Areas

Outlet	Name	Description	Total Drainage Area, acre	
			Construction Phase	Production Phase
ARC	Access Road Culvert	Access road culvert conveying off-site stormwater	6.71	6.71
ST1	Sediment Trap #1	Diversion ditch conveying on-site stormwater to a sediment trap	1.08	-
ST2	Sediment Trap #2	Diversion ditch conveying on-site stormwater to a sediment trap	8.22	-
ST3	Sediment Trap #3	Diversion ditch conveying on-site stormwater to a sediment trap	3.04	-
SS	Stormwater Storage	Berm and ditch on facility used for stormwater storage	-	5.54

One-hour point rainfall data for the project area (Table 1) and the Denver Area Intensity Equation were used for inputs to UD-Rational. Field survey, LiDAR, and site design characteristics were used to delineate the drainage area for the access road culvert (ARC). Drainage areas for the sediment traps and stormwater storage were delineated using the on-site drainage design and grading found in Appendix A. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, proposed grading, LiDAR, and imagery.

HSG was derived from an area-weighted average using NRCS Soil Data Viewer. Due to the presence of both Type A and Type B soils, HSG and imperviousness were used within UD-Rational to calculate area-weighted runoff coefficients (C-values) which were used to override the default runoff coefficients. HSG and soils data for the project area can be found in Appendix B and area-weighted runoff coefficient calculations can be found in Appendix E.

USDCM VI was referenced for recommended imperviousness and conveyance factor (K). Computed T_c was used for outlets with imperviousness less than 20 percent. Drainage areas were evaluated for non-contributing area. During both the construction and production phases, facility tanks and separators are bermed to contain spills. This area is considered ineffective and non-contributing area. Calculations for area-weighted averages of percent imperviousness along with effective area are found in Table 4. Peak flow estimates calculated using the rational method are summarized in Table 5 and complete spreadsheet model inputs and results can be found in Appendix E.

Table 4. Imperviousness and Effective Area

Outlet	Phase	Total Area, acre	Ineffective Area, acre	Effective Area, acre	Open (2% Imperv), acre	Gravel (40% Imperv), acre	Weighted Imperviousness	
							acre	%
ARC	Both	6.71	0.00	6.71	6.23	0.48	0.32	4.7
ST1	Construction	1.08	0.00	1.08	1.07	0.01	0.03	2.4
ST2	Construction	8.22	0.13	8.09	3.72	4.37	1.82	22.5
ST3	Construction	3.04	0.00	3.04	0.61	2.43	0.98	32.4
SS	Production	5.54	0.13	5.41	3.18	2.23	0.96	17.7

Table 5. Peak Flow Estimates Using the Rational Method

Outlet	Phase	Peak Flow, cfs						
		2-year	5-year	10-year	25-year	50-year	100-year	500-year
ARC	Both	0.2	0.3	0.4	0.7	1.6	4.4	12.4
ST1	Construction	<0.1	<0.1	<0.1	0.1	0.2	0.7	2.1
ST2	Construction	1.4	2.0	3.2	6.2	9.3	13.6	25.1
ST3	Construction	1.0	1.5	2.3	4.3	5.8	8.0	13.2
SS	Production	0.6	0.9	1.7	3.8	5.6	8.1	14.2

2.3 Stormwater Volume

In accordance with Town of Firestone Municipal Code requirements, stormwater falling on the project area will be detained and released at reduced flow rates. The MHFD spreadsheet model *Detention Basin Design Workbook Version 4.03* (MHFD-Detention) was used to calculate storm runoff volumes. One-hour point rainfall data for the project area (Table 1) were used within MHFD-Detention. Watershed parameters including area, length, and slope as well as imperviousness and soil type were calculated based on the site design and site characteristics. Table 6 shows storm runoff volumes calculated for the stormwater storage area. MHFD-Detention inputs and results can be found in Appendix F.

Table 6. Calculated Storm Runoff Volumes

Outlet	Phase	Storm Runoff Volume, acre-ft								
		WQCV	EURV	2-year	5-year	10-year	25-year	50-year	100-year	500-year
SS	Production	0.048	0.093	0.039	0.068	0.134	0.343	0.508	0.735	1.295

3.0 HYDRAULIC ANALYSIS AND DRAINAGE DESIGN

Criteria presented in MHFD's Urban Storm Drainage Criteria Manual outline the capacity, velocity, and slope requirements involved with drainage design and stormwater conveyance. The following sections describe the design recommendations for conveyance during the construction phase and production phase. The recommended drainage design can be found in the Drainage and Erosion Control Plan found in Appendix A.

3.1 Stormwater Storage

During the production phase, the well pad and facility will drain east to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the pad. During the 10-year event, stormwater will back up out of the ditch onto the facility and will pond to a maximum depth of 0.1 feet above the ditch covering the eastern 25 feet of the facility. During the 100-year event, stormwater will pond to a maximum depth of 0.6 feet above the ditch covering the eastern 120 feet of the facility creating a stored volume of 0.339 acre-feet.

The outlet through the stormwater storage berm consists of a 10-inch diameter high-density polyethylene (HDPE) pipe with an orifice cap to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (3/4 inch orifice diameter) at the invert of the outlet pipe and a second orifice (2 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 4.0 feet, 4:1 side slopes, and a crest invert at 1.5 feet above the ditch/outlet pipe invert (0.1 feet above above the edge of the facility). It will take approximately 40 hours to drain 99 percent of the water quality capture volume (WQCV) with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 42 hours to drain 99 percent of the inflow with peak flow release of 5.3 cubic feet per second (cfs). Buoyancy calculations were performed for the outlet pipe. Using a factor safety of 1.5, it was found that a minimum cover of 0.8 feet is needed to anchor the 10-inch outlet pipe during fully saturated conditions. Buoyancy calculations can be found in Appendix G. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the stormwater storage berm, overlapping the weir. The spillway was designed with a crest length of 8.0 feet, 4:1 side slopes, and a crest invert at 2.0 feet above the ditch/outlet pipe invert (0.6 feet above the edge of the facility) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.5 feet. A berm height of 1.6 feet will provide 1.0 feet of freeboard above the spillway and 0.5 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater storage volumes, outlet sizing, and spillway design details can be found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

3.2 Culverts

One proposed culvert location will ensure proper off-site drainage. MHFD's *Culvert Hydraulics Version 4.00* (MHFD-Culvert) was used to calculate conveyance, sizing, and performance characteristics for the recommended culvert design. Peak flows used for the culvert design are found in Table 5 and MHFD-Culvert spreadsheet calculations can be found in Appendix H.

The Access Road Culvert (ARC) will convey off-site runoff from the western side of the access road under the access road and to the east during both the construction phase (Figure 2) and the production phase (Figure 3). One 15-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC are found in Table 7. The maximum design conveyance before overtopping the access road is 6.1 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow (4.4 cfs). Due to the existing site grade and the higher pipe roughness coefficient associated with CMP culverts, the 10-year peak flow velocity is below 3.0 feet per second (fps). Routine maintenance may be required to ensure sedimentation does not occur.

Table 7. Culvert Performance Characteristics for Recommended Culvert Design

Site	Culvert Size and Material	10-year Peak Flow			Full Barrel Flow			Max Conveyance		
		Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D
ARC	15-inch CMP	0.4	1.8	0.2	3.9	3.2	1.0	6.1	5.0	1.8

3.3 Ditching

Temporary diversion ditches and berms will be used to collect and direct on-site stormwater to outlets while also deflecting and redirecting off-site flows around the disturbance area during the construction phase. All temporary diversion ditches were designed with slopes between 0.5 percent and 1.5 percent as dictated by existing topography. Temporary diversion ditch slopes are identified in the Drainage and Erosion Control Plan found in Appendix A.

Manning's equation was used to calculate conveyance based on typical temporary diversion ditch design. Using a ditch slope of 0.5 percent (lowest proposed ditch slope for the project), the typical design was found to convey 5.6 cfs at a depth of 1.0 feet and 16.5 cfs at a depth of 1.5 feet (maximum capacity assuming 2:1 ditch slope is carried onto pad). The typical design at a depth of 1.0 feet will convey more than the largest 10-year peak flow (ST2, 3.2 cfs) and the typical design at a depth of 1.5 feet will convey more than the largest 100-year peak flow (ST2, 13.6 cfs). Manning's calculations for typical temporary diversion ditch conveyance can be found in Appendix I.

3.4 Sediment Traps

Sediment traps and outlets will be installed at the end of temporary diversion ditches. Sediment traps were sized according to the Kerr-McGee BMP Manual which uses modified MHFD typicals. Total ditch length draining the fill portion of the pad and ditch length along topsoil stockpiles were added together for the ditch length design parameter. The results of the sediment trap sizing are found in Table 8. In order to provide additional capture volume and treatment, sediment traps are designed to be oversized when possible. Sediment trap sizing calculations can be found in Appendix J and typical sediment trap details are included with the Drainage and Erosion Control Plan found in Appendix A.

Table 8. Sediment Trap Sizing Design

Outlet	Minimum Design Area, ft^2	Recommended Design Size
ST1	200	15 ft x 15 ft (225 ft^2)
ST2	230	20 ft x 15 ft (300 ft^2)
ST3	100	15 ft x 15 ft (225 ft^2)

4.0 SITE MAINTENANCE AND UPKEEP

Kerr-McGee's site monitoring program ensures site conditions stay in compliance. Sedimentation, culvert and access road condition, vegetation health, and several other safety and maintenance items are routinely monitored and evaluated to ensure the site is in workable and drainable order.

In addition to monitoring during regular operations, a formal monitoring plan has been developed for the project site. During the construction phase, the site will be inspected a minimum of every 14 calendar days as well as following any rain or snowmelt events that are able to cause surface erosion. After the construction phase, areas not needed for production operations within the disturbance area will be reclaimed and site inspections will occur at a minimum of every 30 calendar days until the site is fully stabilized. Once the site is stabilized and has achieved interim reclamation standards, inspections will occur annually. More frequent, informal inspections will continue to occur during routine operations.

Routine maintenance and required repairs of the culvert, access roads, ditches, berms, and the berm outlet structure will be handled by the operations team. Cleaning and removal of sediment and debris from the culvert, ditches, and the berm outlet, as well as vegetation maintenance and specific manufacturer maintenance, will also be handled by the operations team during regular operations and maintenance checks.

5.0 CONCLUSION

The information and analysis presented in this report display the adequacy and effectiveness of the design and planning associated with the Columbine 4-29HZ Drainage and Erosion Control Plan. The design protects public health, safety, and general welfare and has no adverse impacts on public rights-of-way or off-site properties. Furthermore, the report demonstrates that the design adheres to the Town of Firestone Municipal Code as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual.

6.0 REFERENCES

Culvert Hydraulics Workbook Version 4.00 (MHFD-Culvert). May 2020. Mile High Flood District. https://mhfd.org/resources/software

Detention Basin Design Workbook Version 4.03 (MHFD-Detention). May 2020. Mile High Flood District. https://mhfd.org/resources/software

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Urban Storm Drainage Criteria Manual: Volume 3 - Stormwater Quality. September 1992. Revised October 2019. Mile High Flood District. https://mhfd.org/resources/criteria-manual

Web Soil Survey. Natural Resources Conservation Service. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Weld County Property Portal. Weld County, Colorado. https://www.co.weld.co.us/maps/propertyportal

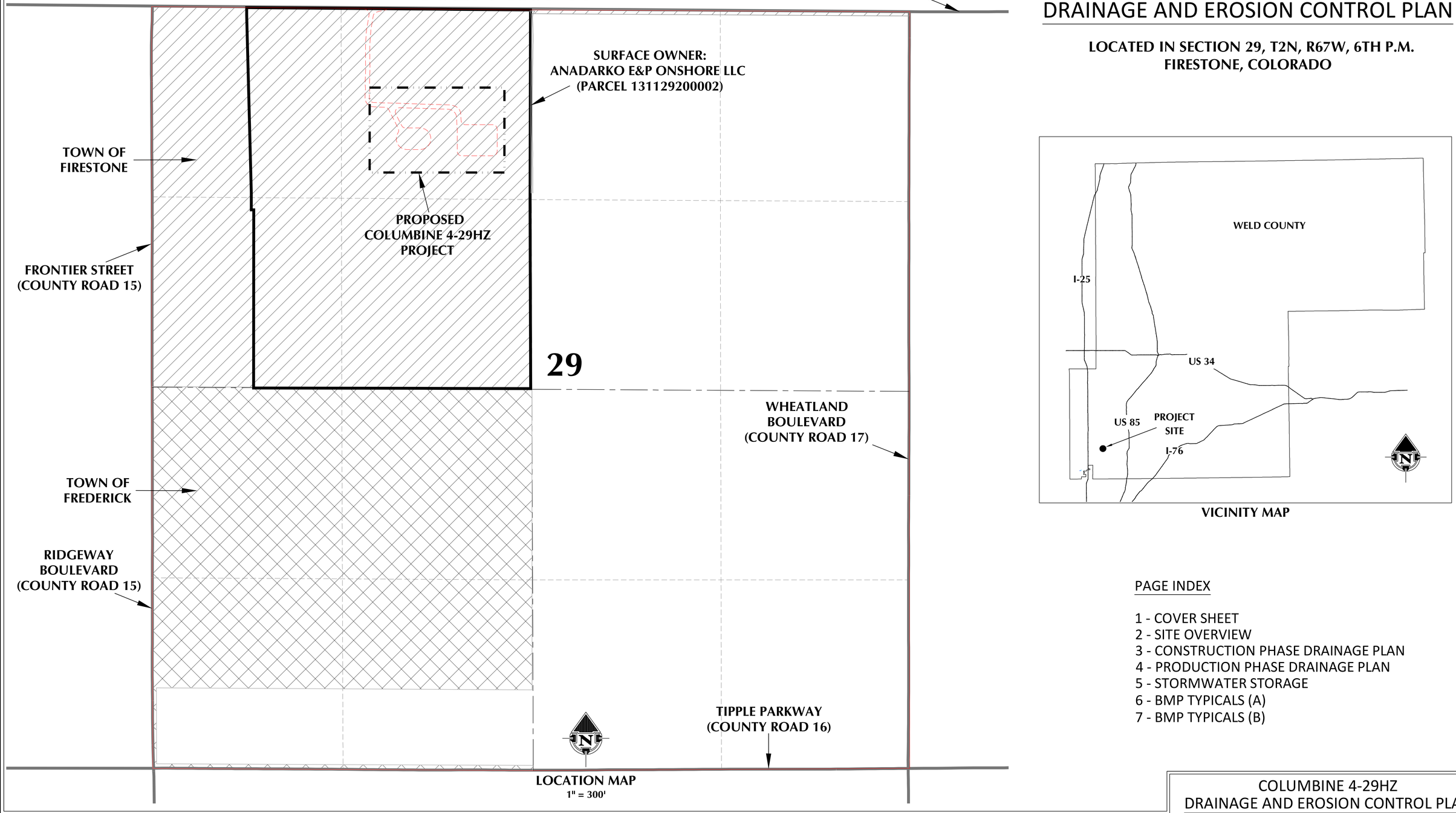
APPENDICES

Appendix A:

Drainage and Erosion Control Plan

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'

VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - STORMWATER STORAGE
6 - BMP TYPICALS (A)
7 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

609 CONSULTING, LLC

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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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ACCESS ROAD CULVERT (ARC)

COUNTY ROAD 18

PROPOSED FIRE HYDRANT

PROPOSED PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD (TO BE IMPROVED)

EXISTING PRIVATE ROAD

EXISTING CULVERT

PROPOSED COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

COUNTY ROAD 15

WELD COUNTY

FIRESTONE
WELD COUNTY

FIRESTONE
FREDERICK

5000 5010 5020 5030 4990

N

0 150' 300'

1" = 150'

5' CONTOURS

LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- EXISTING WATER LINE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

15' X 15' X 3' SEDIMENT TRAP (ST1)

EXISTING PRIVATE ROAD

EXISTING CULVERT

TOPSOIL STOCKPILE

COLUMBINE 4-29HZ WELL PAD

FLAT GRADED ELEVATION = 5002.0'

COLUMBINE 4-29HZ FACILITY

TEMPORARY EQUIPMENT AREA

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

20' X 15' X 3' SEDIMENT TRAP (ST2)

15' X 15' X 3' SEDIMENT TRAP (ST3)

PAD TRENCH

0.8% DITCH SLOPE

1.0% DITCH SLOPE

1.5% DITCH SLOPE

0.9% DITCH SLOPE

1.2% DITCH SLOPE

0.5% DITCH SLOPE

0.5% SLOPE

0.4% SLOPE

0.6% SLOPE

CUT

FILL

5000

5005

5010

5015

5020

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EPL EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- SP PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 50'	PAGE:	3 OF 7
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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD

EXISTING CULVERT

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

OFF-SITE FLOW DEFLECTION

OUTLET PIPE

COLUMBINE 4-29HZ FACILITY

COLUMBINE 4-29HZ WELL PAD

WELL ELEVATION = 5002.0'

0.2% SLOPE

0.2% SLOPE

CUT

FILL

0.4% SLOPE

0.6% SLOPE

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

WEIR & SPILLWAY

STORAGE BERM

STORAGE DITCH ALONG PAD TOE

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

5020

5015

5010

5005

5000

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

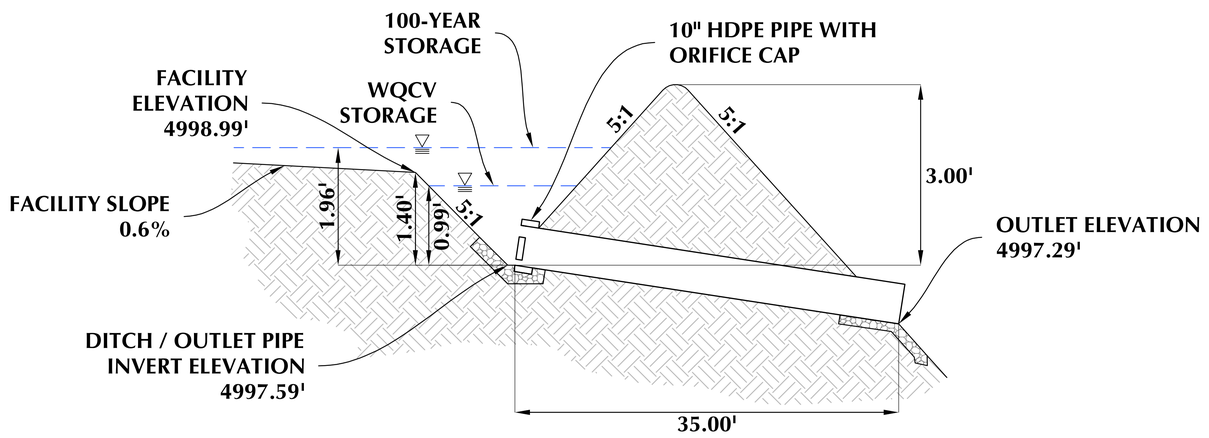
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STORAGE BERM & DITCH - PRODUCTION PHASE

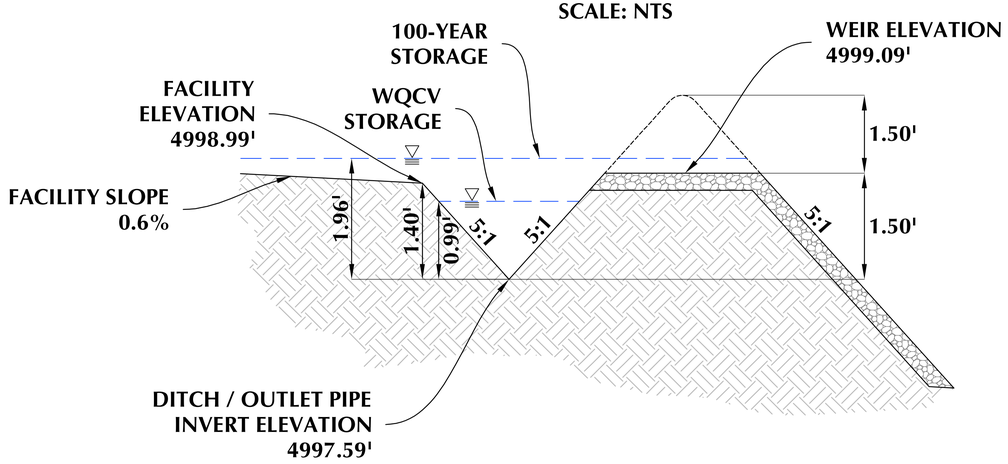
OUTLET PROFILE

SCALE: NTS



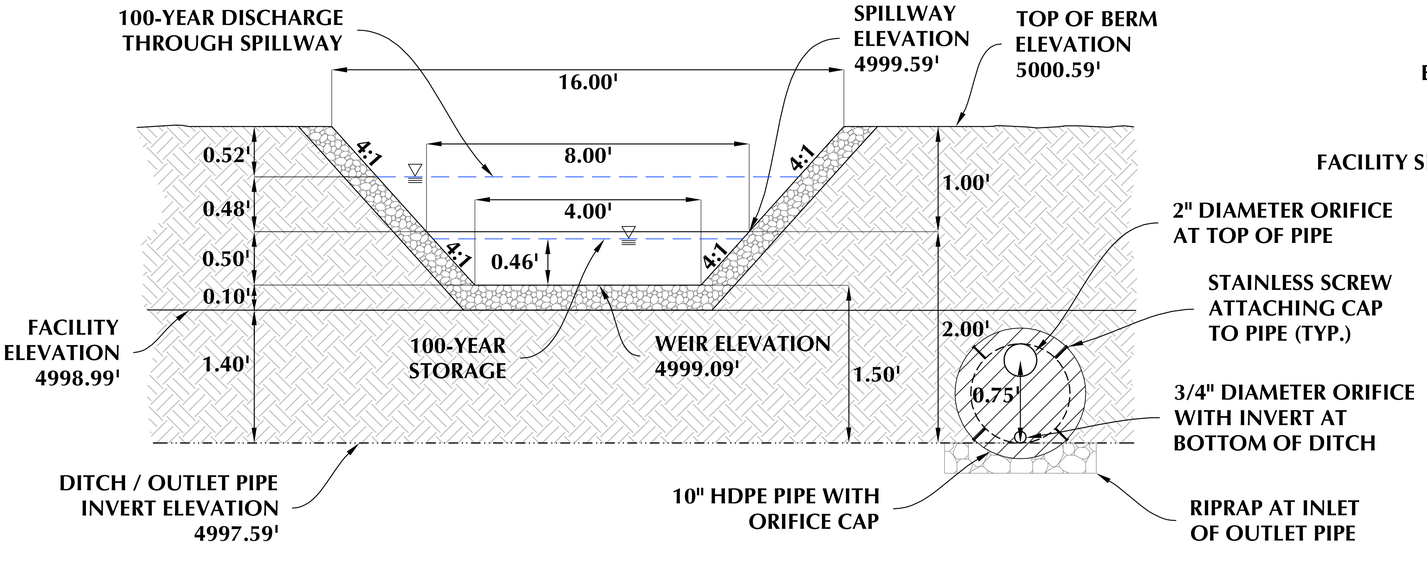
WEIR PROFILE

SCALE: NTS



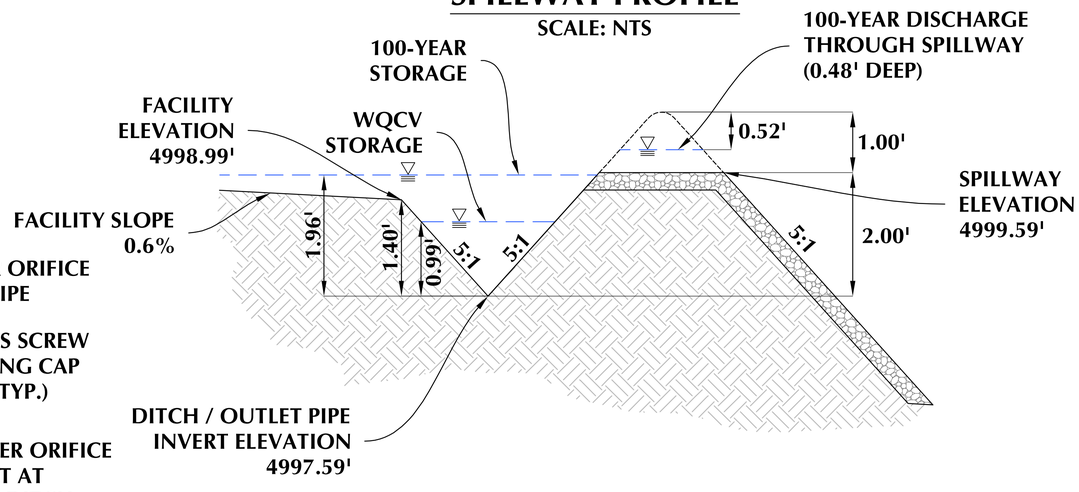
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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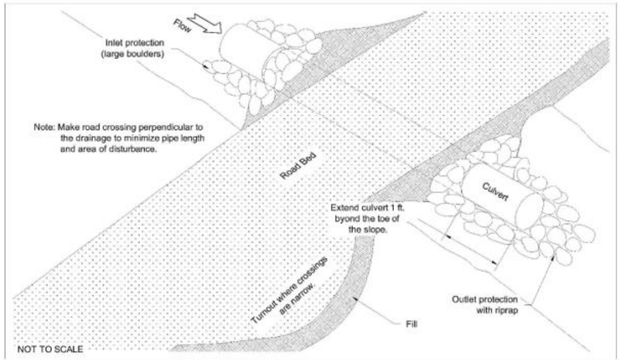
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1099 18th Street
Denver, Colorado 80202

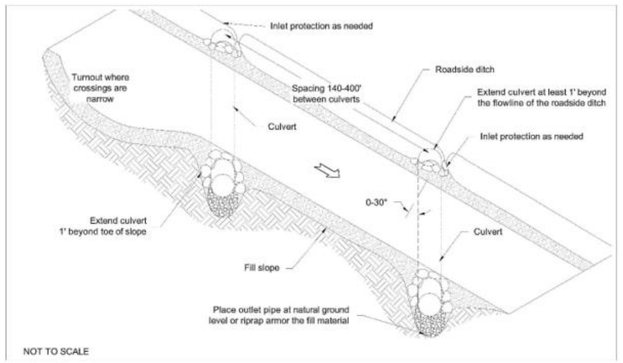
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
STORMWATER STORAGE

SCALE:	VARIES	PAGE:	5 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	

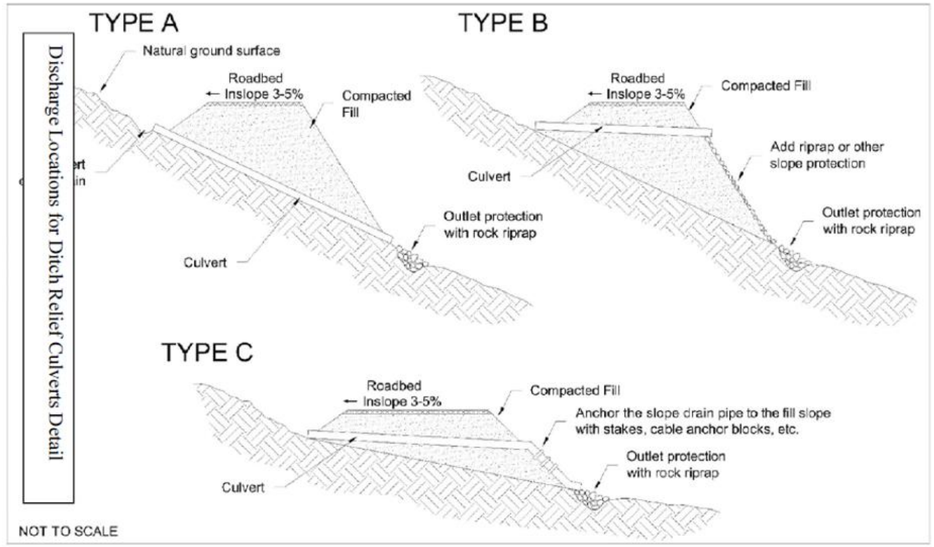
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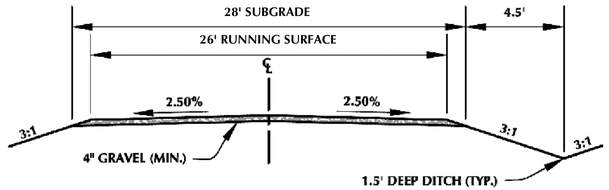
Culvert





Culvert

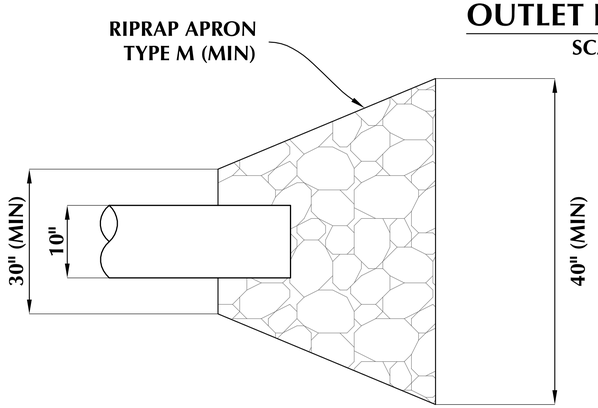


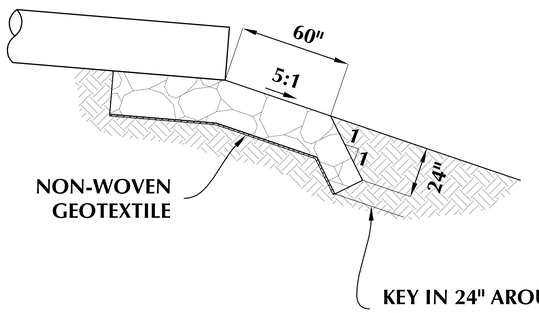


ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

SCALE: NTS

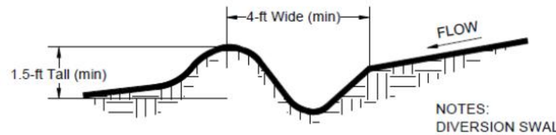




Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

SCALE:	VARIES	PAGE:	6 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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Sediment Trap

ST

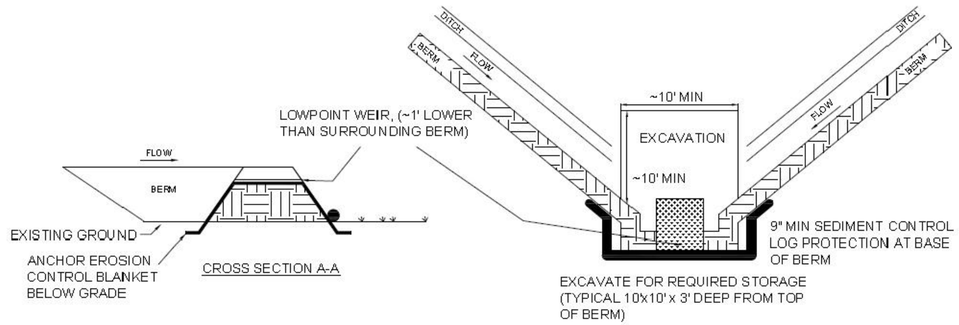
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

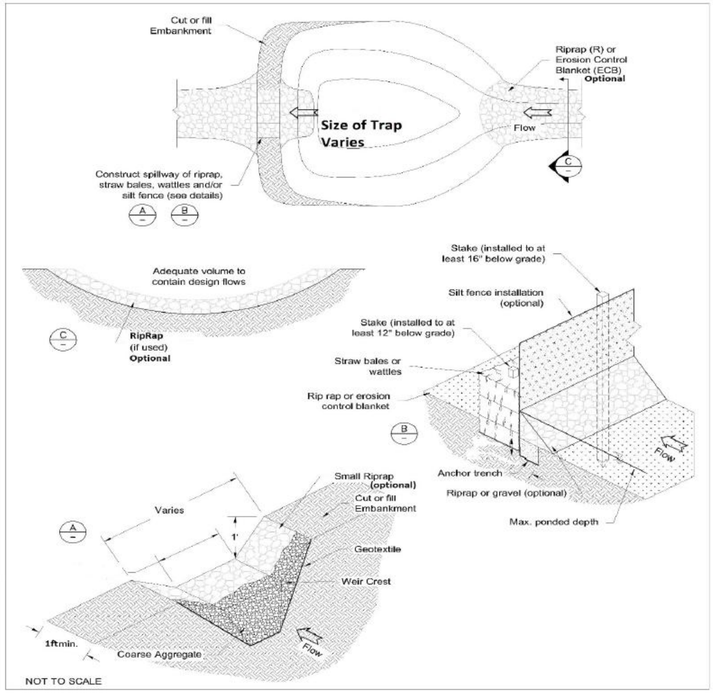
Sediment Trap

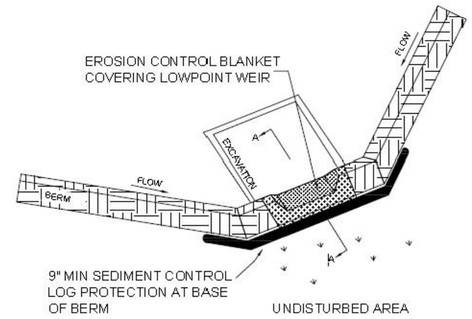
ST



Sediment Trap

ST





GENERAL NOTES:

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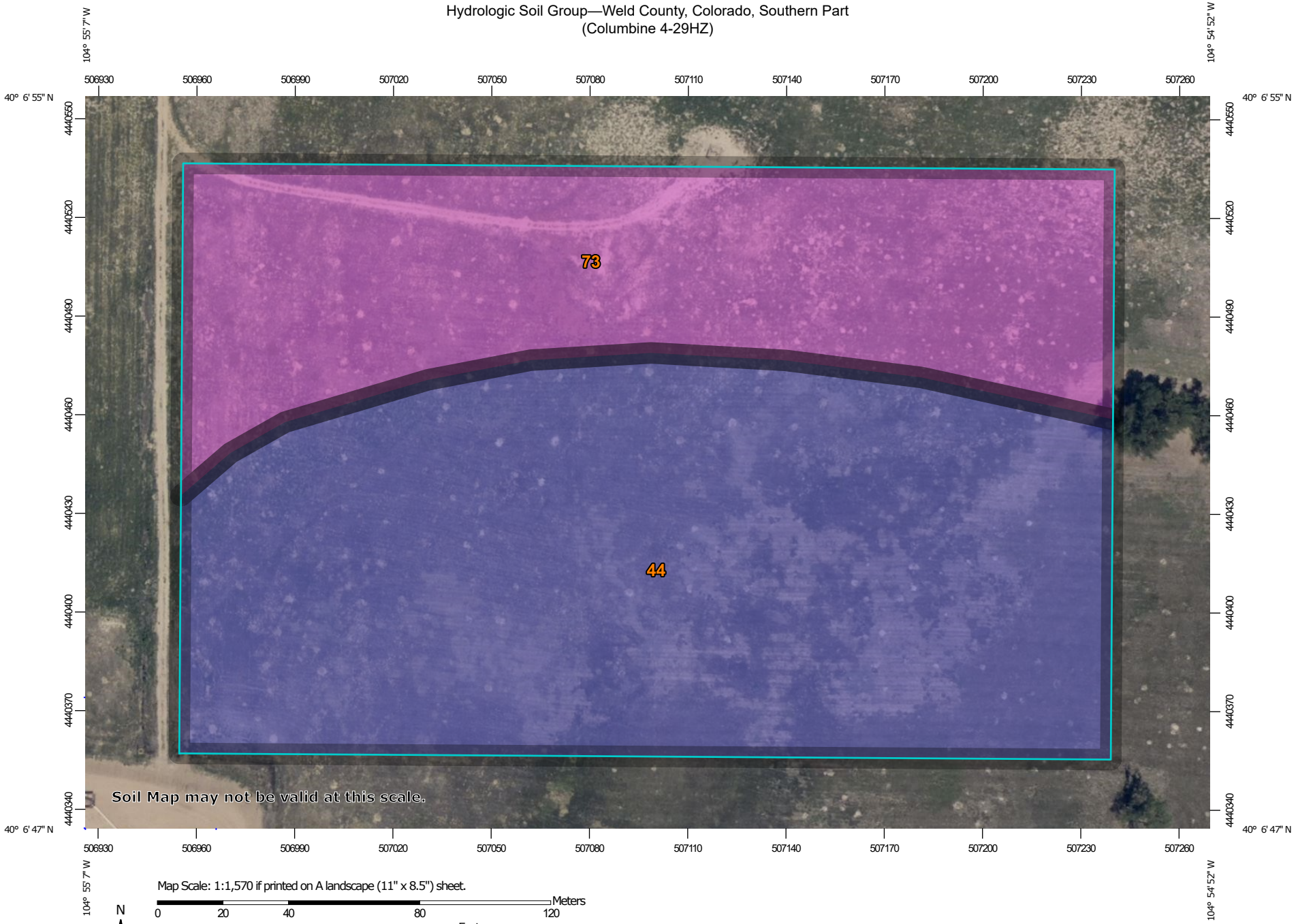
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (B)

SCALE:	VARIES	PAGE:	7 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	

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Appendix B:

NRCS Web Soil Survey – Soils Report



Map Scale: 1:1,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 18, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
44	Olney loamy sand, 1 to 3 percent slopes	B	7.9	62.7%
73	Vona loamy sand, 3 to 5 percent slopes	A	4.7	37.3%
Totals for Area of Interest			**12.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

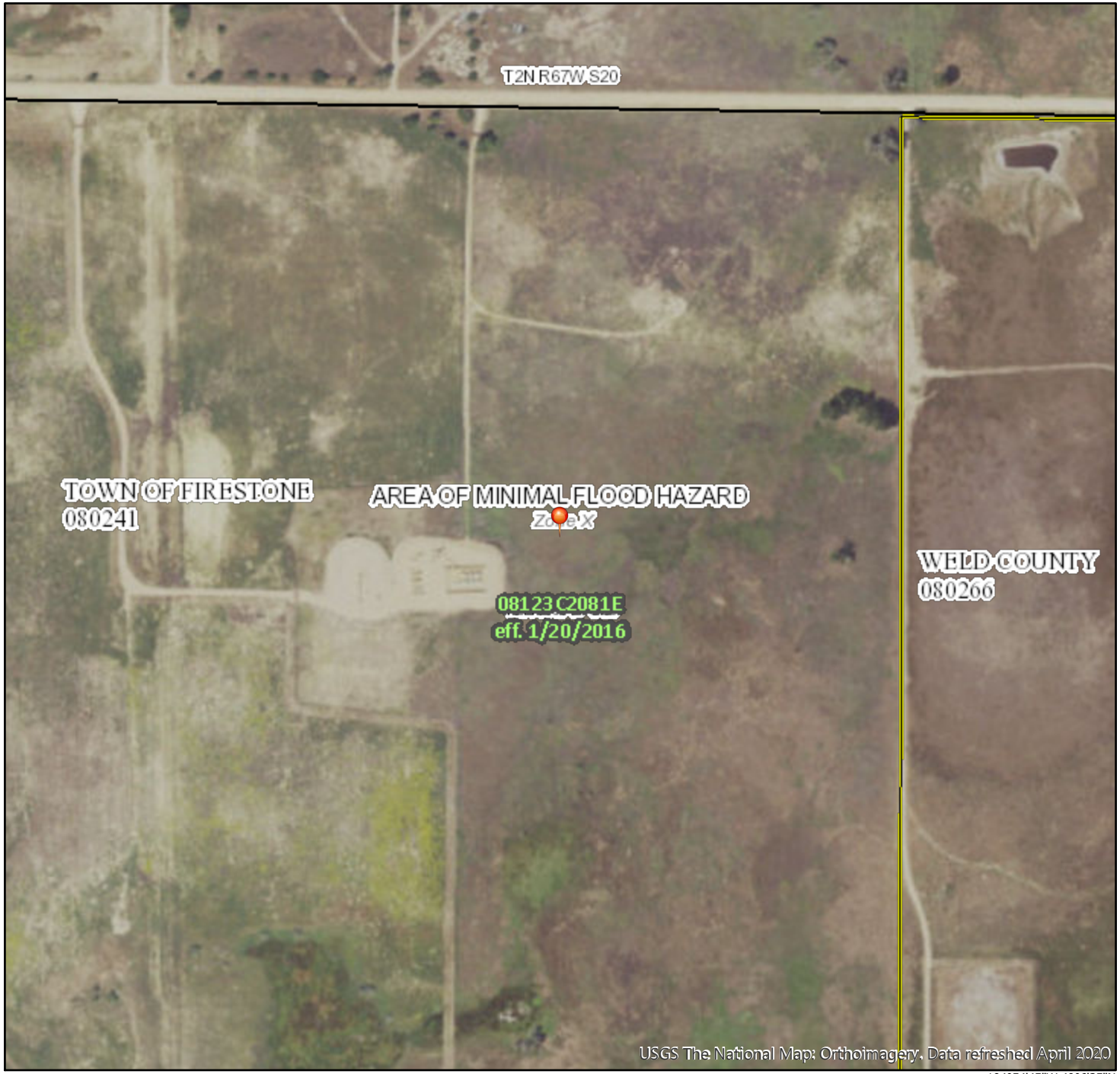
Appendix C:

FEMA Flood Insurance Rate Map FIRMette

National Flood Hazard Layer FIRMette

FEMA

104°55'22"W 40°7'2"N



104°54'45"W 40°6'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/24/2020 at 6:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D:

NOAA Atlas 14 Point Precipitation Frequency Estimates

NOAA Atlas 14, Volume 8, Version 2
Location name: Firestone, Colorado, USA*
Latitude: 40.1142°, Longitude: -104.9171°
Elevation: 5003.11 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.229** (0.176-0.297)	**0.278** (0.214-0.362)	**0.375** (0.288-0.488)	**0.470** (0.358-0.615)	**0.622** (0.470-0.874)	**0.757** (0.555-1.07)	**0.907** (0.642-1.31)	**1.08** (0.731-1.60)	**1.32** (0.864-2.02)	**1.53** (0.965-2.33)
10-min	**0.335** (0.258-0.435)	**0.408** (0.314-0.530)	**0.549** (0.421-0.715)	**0.688** (0.525-0.901)	**0.911** (0.689-1.28)	**1.11** (0.812-1.57)	**1.33** (0.941-1.92)	**1.57** (1.07-2.34)	**1.93** (1.27-2.95)	**2.23** (1.41-3.42)
15-min	**0.409** (0.315-0.531)	**0.497** (0.383-0.646)	**0.669** (0.513-0.872)	**0.839** (0.640-1.10)	**1.11** (0.840-1.56)	**1.35** (0.991-1.91)	**1.62** (1.15-2.35)	**1.92** (1.31-2.86)	**2.36** (1.54-3.60)	**2.72** (1.72-4.17)
30-min	**0.556** (0.428-0.721)	**0.673** (0.518-0.875)	**0.903** (0.693-1.18)	**1.13** (0.863-1.48)	**1.50** (1.13-2.10)	**1.82** (1.34-2.58)	**2.18** (1.55-3.16)	**2.59** (1.76-3.85)	**3.18** (2.08-4.86)	**3.68** (2.33-5.63)
60-min	**0.679** (0.523-0.881)	**0.822** (0.633-1.07)	**1.11** (0.848-1.44)	**1.39** (1.06-1.82)	**1.84** (1.39-2.59)	**2.24** (1.65-3.17)	**2.69** (1.91-3.90)	**3.20** (2.18-4.76)	**3.94** (2.58-6.02)	**4.55** (2.88-6.97)
2-hr	**0.802** (0.625-1.03)	**0.971** (0.756-1.25)	**1.31** (1.01-1.68)	**1.64** (1.27-2.12)	**2.18** (1.67-3.03)	**2.66** (1.98-3.72)	**3.20** (2.29-4.58)	**3.81** (2.62-5.59)	**4.69** (3.11-7.07)	**5.43** (3.47-8.19)
3-hr	**0.869** (0.682-1.11)	**1.05** (0.823-1.34)	**1.41** (1.10-1.80)	**1.77** (1.37-2.27)	**2.35** (1.81-3.24)	**2.87** (2.14-3.98)	**3.45** (2.49-4.89)	**4.10** (2.84-5.97)	**5.05** (3.36-7.54)	**5.84** (3.76-8.74)
6-hr	**1.03** (0.817-1.30)	**1.23** (0.976-1.55)	**1.63** (1.29-2.06)	**2.02** (1.59-2.56)	**2.66** (2.07-3.61)	**3.22** (2.43-4.40)	**3.85** (2.80-5.38)	**4.55** (3.18-6.53)	**5.58** (3.76-8.22)	**6.44** (4.19-9.49)
12-hr	**1.27** (1.01-1.57)	**1.49** (1.20-1.86)	**1.93** (1.54-2.40)	**2.35** (1.87-2.94)	**3.02** (2.37-4.03)	**3.61** (2.75-4.84)	**4.26** (3.13-5.85)	**4.98** (3.52-7.03)	**6.04** (4.10-8.73)	**6.91** (4.54-10.0)
24-hr	**1.51** (1.22-1.85)	**1.80** (1.46-2.21)	**2.32** (1.87-2.85)	**2.79** (2.24-3.45)	**3.51** (2.76-4.56)	**4.12** (3.16-5.41)	**4.77** (3.53-6.42)	**5.48** (3.90-7.57)	**6.48** (4.44-9.20)	**7.30** (4.85-10.4)
2-day	**1.72** (1.41-2.08)	**2.10** (1.72-2.54)	**2.74** (2.24-3.32)	**3.29** (2.67-4.01)	**4.07** (3.21-5.16)	**4.70** (3.62-6.03)	**5.35** (3.99-7.04)	**6.03** (4.32-8.15)	**6.96** (4.80-9.67)	**7.69** (5.17-10.8)
3-day	**1.88** (1.55-2.25)	**2.26** (1.87-2.72)	**2.91** (2.40-3.51)	**3.47** (2.84-4.20)	**4.27** (3.39-5.36)	**4.91** (3.81-6.24)	**5.56** (4.17-7.25)	**6.25** (4.51-8.37)	**7.19** (4.99-9.89)	**7.92** (5.36-11.0)
4-day	**2.01** (1.67-2.39)	**2.39** (1.98-2.85)	**3.04** (2.51-3.63)	**3.59** (2.95-4.32)	**4.39** (3.51-5.49)	**5.03** (3.92-6.37)	**5.70** (4.30-7.38)	**6.39** (4.63-8.51)	**7.34** (5.12-10.0)	**8.09** (5.50-11.2)
7-day	**2.30** (1.93-2.72)	**2.70** (2.26-3.19)	**3.37** (2.81-3.99)	**3.94** (3.27-4.69)	**4.76** (3.83-5.86)	**5.41** (4.26-6.76)	**6.08** (4.63-7.78)	**6.78** (4.96-8.91)	**7.74** (5.45-10.4)	**8.48** (5.82-11.6)
10-day	**2.56** (2.15-3.00)	**2.97** (2.50-3.49)	**3.67** (3.08-4.32)	**4.26** (3.56-5.03)	**5.10** (4.13-6.23)	**5.76** (4.56-7.13)	**6.44** (4.93-8.16)	**7.14** (5.25-9.30)	**8.09** (5.73-10.8)	**8.83** (6.09-12.0)
20-day	**3.27** (2.79-3.78)	**3.75** (3.20-4.34)	**4.54** (3.85-5.26)	**5.19** (4.39-6.05)	**6.10** (4.99-7.32)	**6.81** (5.44-8.28)	**7.52** (5.81-9.36)	**8.24** (6.12-10.5)	**9.20** (6.58-12.1)	**9.94** (6.93-13.3)
30-day	**3.84** (3.30-4.40)	**4.39** (3.76-5.03)	**5.27** (4.51-6.07)	**6.00** (5.11-6.94)	**7.00** (5.76-8.31)	**7.77** (6.25-9.34)	**8.52** (6.63-10.5)	**9.29** (6.94-11.7)	**10.3** (7.40-13.4)	**11.0** (7.75-14.6)
45-day	**4.52** (3.91-5.14)	**5.18** (4.48-5.89)	**6.23** (5.37-7.11)	**7.08** (6.07-8.11)	**8.23** (6.80-9.65)	**9.09** (7.35-10.8)	**9.93** (7.77-12.1)	**10.8** (8.09-13.5)	**11.8** (8.57-15.2)	**12.6** (8.93-16.5)
60-day	**5.08** (4.42-5.74)	**5.84** (5.08-6.61)	**7.06** (6.11-8.01)	**8.04** (6.92-9.15)	**9.33** (7.74-10.9)	**10.3** (8.36-12.2)	**11.2** (8.82-13.6)	**12.1** (9.15-15.1)	**13.3** (9.65-16.9)	**14.1** (10.0-18.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

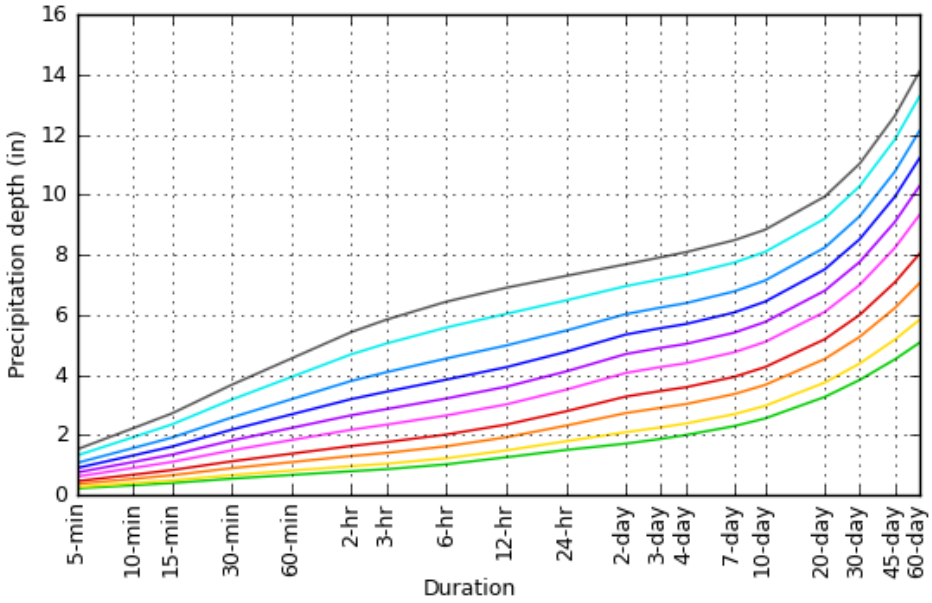
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

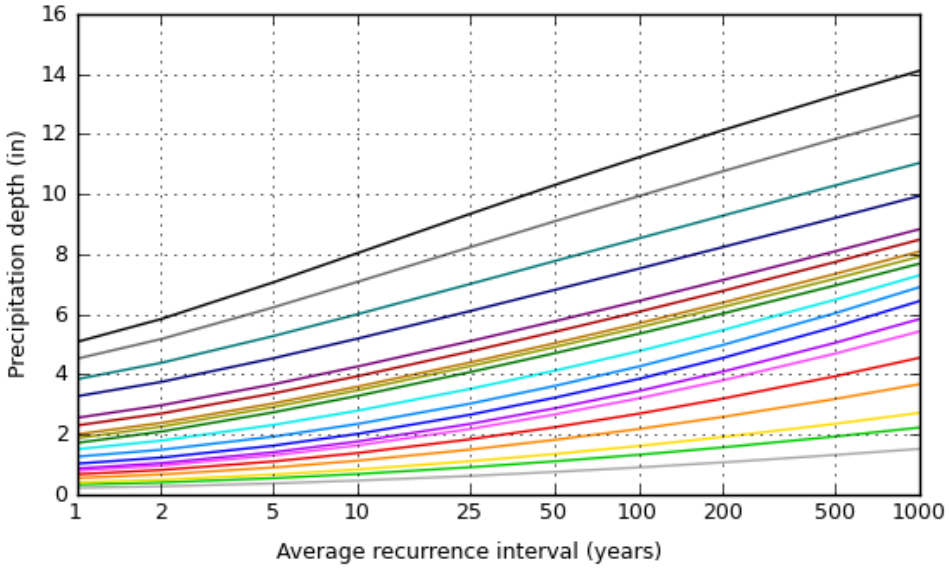
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.1142°, Longitude: -104.9171°





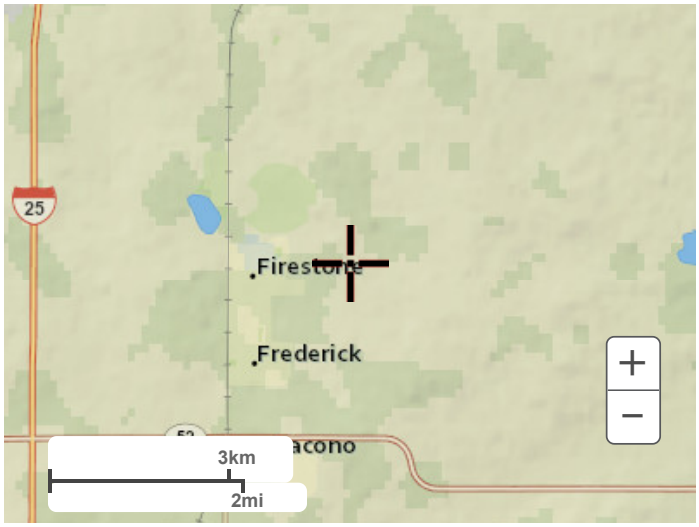
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Wed Jun 24 22:44:44 2020

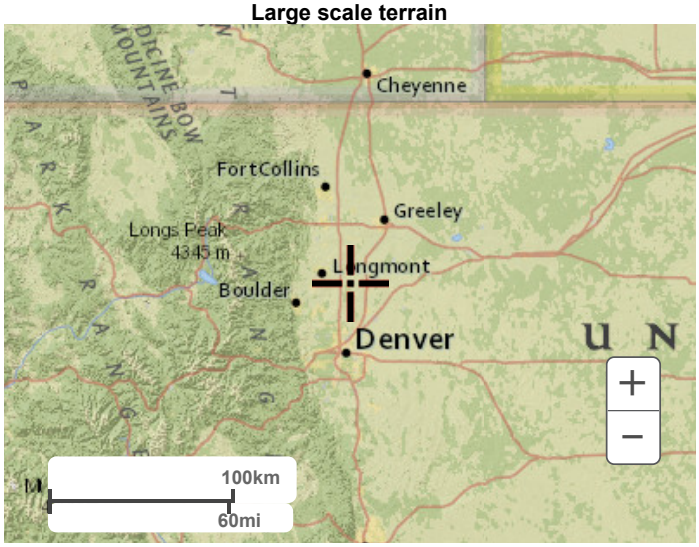
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Maps & aerials

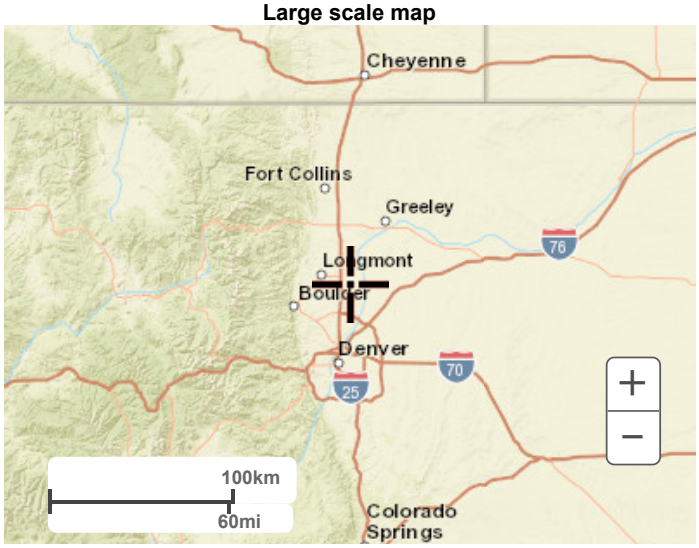
Small scale terrain



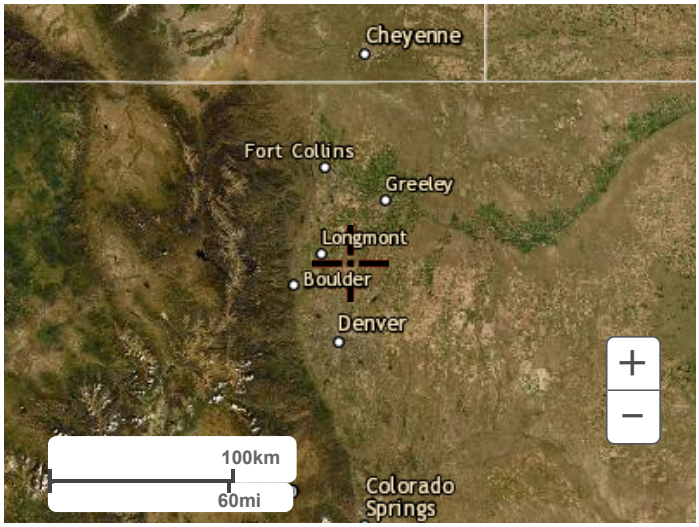
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix E:

UD-Rational Spreadsheet Inputs and Results

Calculation of Peak Runoff using Rational Method

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO

Version 2.00 released May 2017

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Cells of this color are for optional override values
Cells of this color are for calculated results based on overr

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$= 5 (urban)
$t_{minimum}$= 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.822	1.11	1.39	1.84	2.24	2.69	3.94

Rainfall Intensity Equation Coefficients =	a	b	c
	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

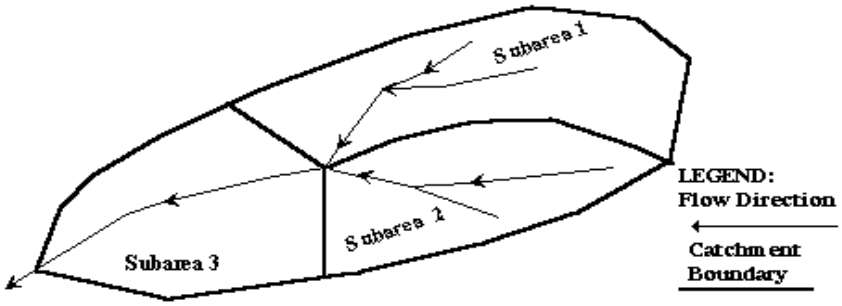
$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Disturbance Boundary - Historcial	12.66	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54	350			0.013	33.70	0			0.013	7	0.80	0.00	33.70	25.66	25.66	1.41	1.91	2.39	3.16	3.85	4.62	6.77	0.2	0.3	2.2	10.5	16.5	25.5	46.5
				0.01	0.01	0.05	0.17	0.23	0.32	0.44					33.77								33.77		33.77	1.20	1.62	2.03	2.69	3.27	3.93	5.76	0.1	0.2	1.2	5.7	9.5	15.9	32.1
ARC - Both	6.71	A	4.7	0.02	0.02	0.02	0.03	0.07	0.15	0.28	270			0.044	19.70	410			0.015	7	0.86	7.97	27.67	30.98	27.67	1.35	1.83	2.29	3.03	3.68	4.42	6.48	0.1	0.2	0.3	0.6	1.6	4.4	12.4
				0.02	0.02	0.03	0.03	0.07	0.15	0.28					19.57								27.54		27.54	1.36	1.83	2.29	3.03	3.69	4.44	6.50	0.2	0.3	0.4	0.7	1.6	4.4	12.4
ST1 - Construction	1.08	A	2.4	0.01	0.01	0.01	0.01	0.05	0.13	0.27	60			0.025	11.29	570			0.008	10	0.89	10.62	21.91	36.97	21.91	1.54	2.08	2.60	3.45	4.20	5.04	7.38	0.0	0.0	0.0	0.0	0.2	0.7	2.1
				0.01	0.01	0.01	0.01	0.05	0.13	0.27					11.28								21.91		21.91	1.54	2.08	2.61	3.45	4.20	5.04	7.38	0.0	0.0	0.0	0.1	0.2	0.7	2.1
ST2 - Construction	8.09	A	22.5	0.12	0.13	0.14	0.17	0.22	0.29	0.40	300			0.005	38.20	560			0.010	10	1.00	9.33	47.53	29.86	29.86	1.29	1.75	2.19	2.90	3.52	4.23	6.20	1.3	1.8	2.5	3.9	6.2	9.8	20.0
				0.13	0.14	0.18	0.27	0.33	0.40	0.50					37.55								46.89											1.4	2.0	3.2	6.2	9.3	13.6	25.1
ST3 - Construction	3.04	B	32.4	0.22	0.25	0.32	0.45	0.51	0.58	0.65	230			0.005	29.21	530			0.012	10	1.10	8.06	37.27	26.45	26.45	1.39	1.87	2.35	3.11	3.78	4.54	6.65	0.9	1.4	2.3	4.3	5.8	8.0	13.2
				0.23	0.26	0.32	0.45	0.51	0.58	0.65					29.08								37.14											1.0	1.5	2.3	4.3	5.8	8.0	13.2
Stormwater Storage - Production	5.41	B	17.7	0.11	0.13	0.20	0.36	0.43	0.51	0.60	500			0.008	42.14	200			0.008	7	0.63	5.32	47.47	26.24	26.24	1.39	1.88	2.36	3.12	3.80	4.56	6.68	0.8	1.3	2.5	6.1	8.8	12.5	21.7
				0.11	0.13	0.19	0.33	0.39	0.47	0.57					42.31								47.64		47.64	0.97	1.31	1.64	2.17	2.64	3.17	4.64	0.6	0.9	1.7	3.8	5.6	8.1	14.2

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

Subcatchment Name
Disturbance Boundary - Historcial

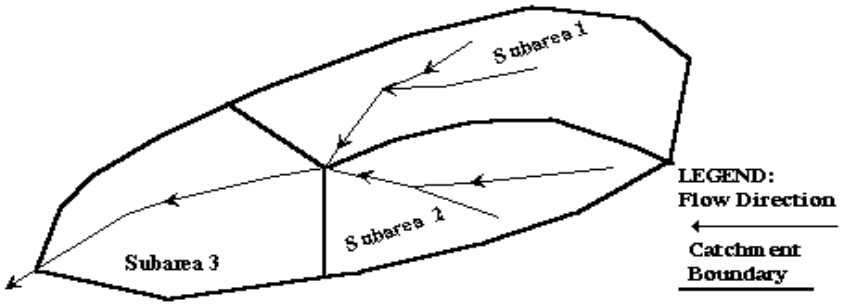
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	7.93	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
73	4.73	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**12.66**		**Area-Weighted C**	**0.01**	**0.01**	**0.05**	**0.17**	**0.23**	**0.32**	**0.44**
			Area-Weighted Override C	**0.01**	**0.01**	**0.05**	**0.17**	**0.23**	**0.32**	**0.44**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ARC - Both

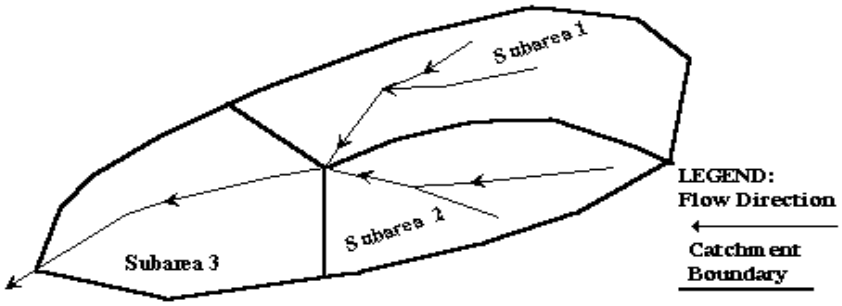
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
73	0.48	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
73	6.23	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**6.71**		**Area-Weighted C**	**0.02**	**0.02**	**0.03**	**0.03**	**0.07**	**0.15**	**0.28**
			Area-Weighted Override C	**0.02**	**0.02**	**0.03**	**0.03**	**0.07**	**0.15**	**0.28**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ST1 - Construction

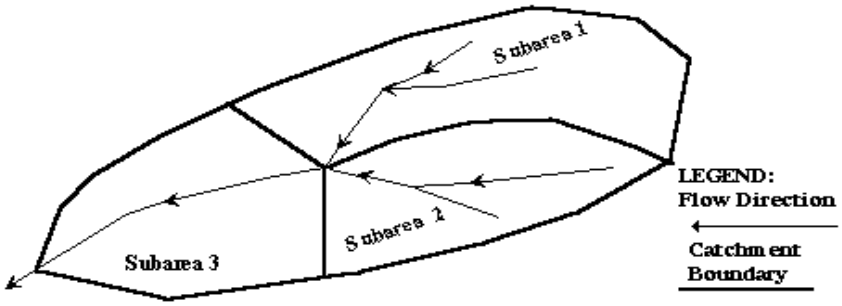
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
73	0.01	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
73	1.07	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**1.08**		**Area-Weighted C**	**0.01**	**0.01**	**0.01**	**0.01**	**0.05**	**0.13**	**0.27**
			Area-Weighted Override C	**0.01**	**0.01**	**0.01**	**0.01**	**0.05**	**0.13**	**0.27**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ST2 - Construction

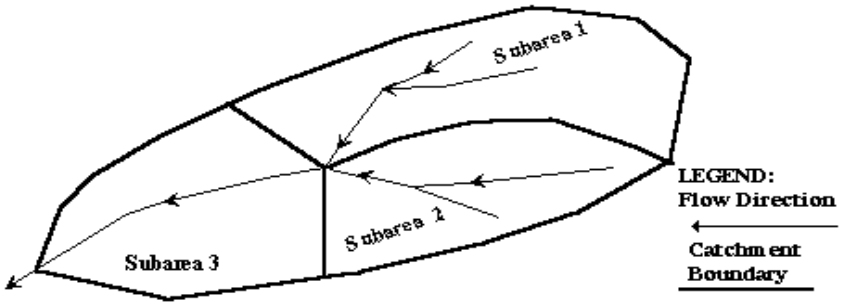
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	3.46	B	17.0	0.11	0.12	0.19	0.36	0.42	0.51	0.60
73	4.63	A	26.7	0.15	0.16	0.17	0.20	0.25	0.32	0.43
Total Area (ac)	**8.09**		**Area-Weighted C**	**0.13**	**0.14**	**0.18**	**0.27**	**0.33**	**0.40**	**0.50**
			Area-Weighted Override C	**0.13**	**0.14**	**0.18**	**0.27**	**0.33**	**0.40**	**0.50**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
ST3 - Construction

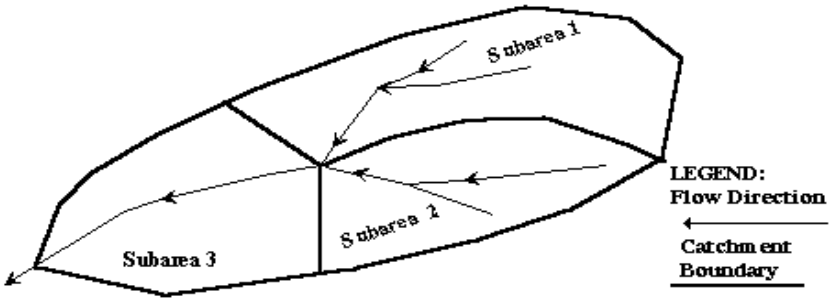
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	2.43	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
44	0.61	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	**3.04**		**Area-Weighted C**	**0.23**	**0.26**	**0.32**	**0.45**	**0.51**	**0.58**	**0.65**
			Area-Weighted Override C	**0.23**	**0.26**	**0.32**	**0.45**	**0.51**	**0.58**	**0.65**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 6/25/2021
Project: Columbine 4-29HZ
Location: S29 T2N R67W Firestone, CO



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Subcatchment Name
Stormwater Storage - Production

See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
44	4.68	B	18.5	0.12	0.14	0.21	0.37	0.43	0.51	0.60
73	0.73	A	12.4	0.06	0.06	0.07	0.08	0.13	0.21	0.33
Total Area (ac)	**5.41**		**Area-Weighted C**	**0.11**	**0.13**	**0.19**	**0.33**	**0.39**	**0.47**	**0.57**
			Area-Weighted Override C	**0.11**	**0.13**	**0.19**	**0.33**	**0.39**	**0.47**	**0.57**

Appendix F:

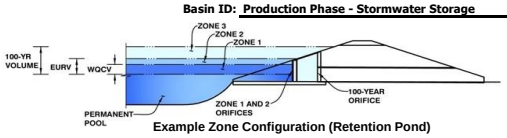
MHFD-Detention Spreadsheet Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Columbine 4-29HZ

Basin ID: Production Phase - Stormwater Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	5.41	acres
Watershed Length =	700	ft
Watershed Length to Centroid =	175	ft
Watershed Slope =	0.008	ft/ft
Watershed Imperviousness =	17.70%	percent
Percentage Hydrologic Soil Group A =	13.4%	percent
Percentage Hydrologic Soil Group B =	86.6%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.048	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.093	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.039	acre-feet	0.822	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	0.068	acre-feet	1.11	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.134	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.343	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	0.508	acre-feet	2.24	inches
100-yr Runoff Volume (P1 = 2.69 in.) =	0.735	acre-feet	2.69	inches
500-yr Runoff Volume (P1 = 3.94 in.) =	1.295	acre-feet	3.94	inches
Approximate 2-yr Detention Volume =	0.043	acre-feet		
Approximate 5-yr Detention Volume =	0.068	acre-feet		
Approximate 10-yr Detention Volume =	0.119	acre-feet		
Approximate 25-yr Detention Volume =	0.175	acre-feet		
Approximate 50-yr Detention Volume =	0.203	acre-feet		
Approximate 100-yr Detention Volume =	0.273	acre-feet		

Define Zones and Basin Geometry

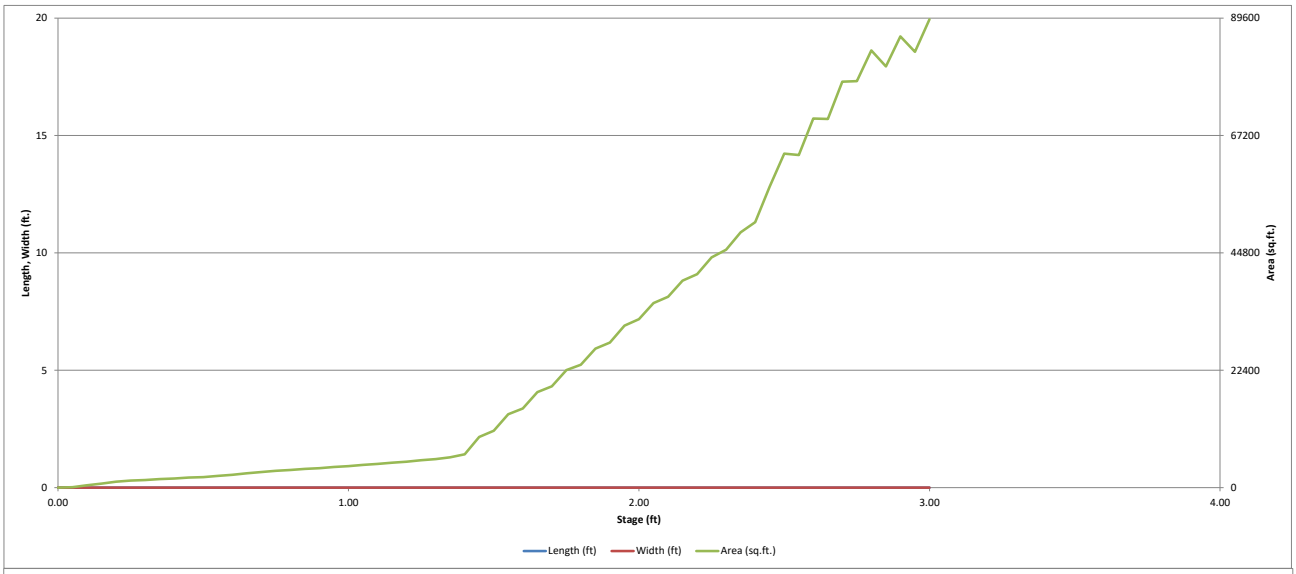
Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

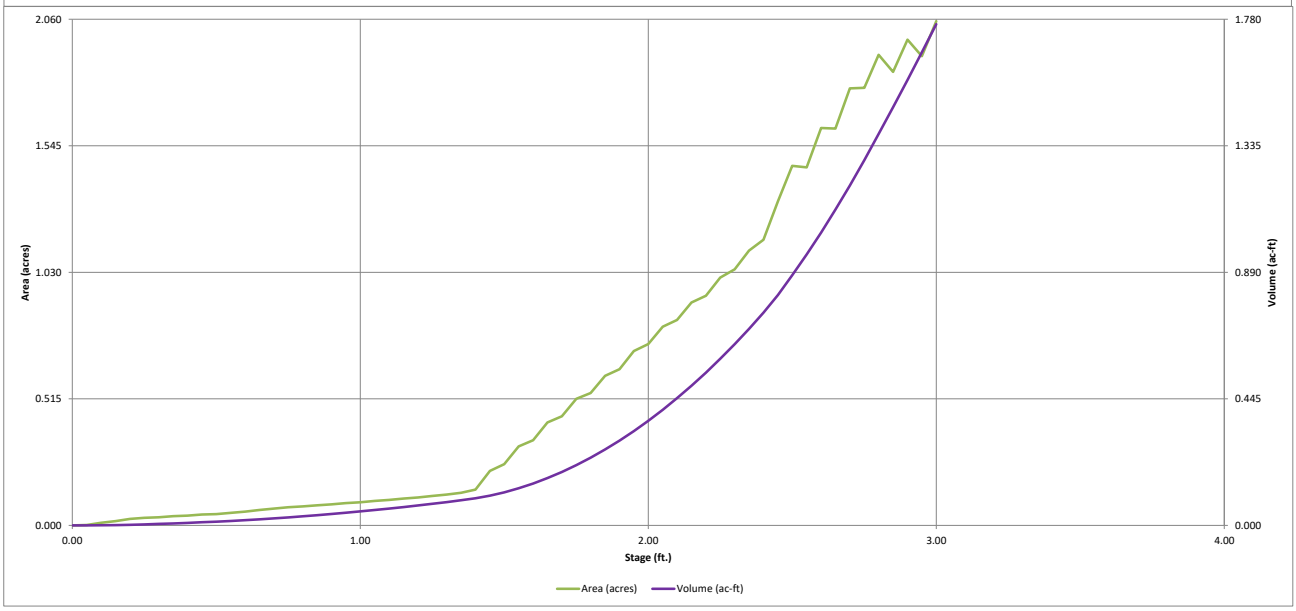
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	79	0.002	2	0.000
	--	0.10	--	--	--	464	0.011	15	0.000
	--	0.15	--	--	--	768	0.018	46	0.001
	--	0.20	--	--	--	1,143	0.026	94	0.002
	--	0.25	--	--	--	1,352	0.031	156	0.004
	--	0.30	--	--	--	1,446	0.033	226	0.005
	--	0.35	--	--	--	1,640	0.038	303	0.007
	--	0.40	--	--	--	1,743	0.040	388	0.009
	--	0.45	--	--	--	1,916	0.044	480	0.011
	--	0.50	--	--	--	1,993	0.046	577	0.013
	--	0.55	--	--	--	2,229	0.051	683	0.016
	--	0.60	--	--	--	2,446	0.056	800	0.018
	--	0.65	--	--	--	2,743	0.063	929	0.021
	--	0.70	--	--	--	2,986	0.069	1,073	0.025
	--	0.75	--	--	--	3,216	0.074	1,228	0.028
	--	0.80	--	--	--	3,358	0.077	1,392	0.032
	--	0.85	--	--	--	3,569	0.082	1,565	0.036
	--	0.90	--	--	--	3,721	0.085	1,747	0.040
	--	0.95	--	--	--	3,942	0.090	1,939	0.045
	--	1.00	--	--	--	4,104	0.094	2,140	0.049
	--	1.05	--	--	--	4,335	0.100	2,351	0.054
	--	1.10	--	--	--	4,512	0.104	2,572	0.059
	--	1.15	--	--	--	4,761	0.109	2,804	0.064
	--	1.20	--	--	--	4,957	0.114	3,047	0.070
	--	1.25	--	--	--	5,225	0.120	3,302	0.076
	--	1.30	--	--	--	5,453	0.125	3,569	0.082
	--	1.35	--	--	--	5,790	0.133	3,850	0.088
Edge of Facility	--	1.40	--	--	--	6,351	0.146	4,153	0.095
	--	1.45	--	--	--	9,663	0.222	4,553	0.105
	--	1.50	--	--	--	10,845	0.249	5,066	0.116
	--	1.55	--	--	--	14,001	0.321	5,687	0.131
	--	1.60	--	--	--	15,101	0.347	6,415	0.147
	--	1.65	--	--	--	18,245	0.419	7,248	0.166
	--	1.70	--	--	--	19,342	0.444	8,188	0.188
	--	1.75	--	--	--	22,442	0.515	9,233	0.212
	--	1.80	--	--	--	23,456	0.538	10,380	0.238
	--	1.85	--	--	--	26,521	0.609	11,629	0.267
	--	1.90	--	--	--	27,686	0.636	12,985	0.298
	--	1.95	--	--	--	30,905	0.709	14,449	0.332
	--	2.00	--	--	--	32,141	0.738	16,025	0.368
	--	2.05	--	--	--	35,221	0.809	17,709	0.407
	--	2.10	--	--	--	36,428	0.836	19,501	0.448
	--	2.15	--	--	--	39,510	0.907	21,399	0.491
	--	2.20	--	--	--	40,725	0.935	23,405	0.537
	--	2.25	--	--	--	43,942	1.009	25,522	0.586
	--	2.30	--	--	--	45,404	1.042	27,755	0.637
	--	2.35	--	--	--	48,711	1.118	30,108	0.691
	--	2.40	--	--	--	50,655	1.163	32,592	0.748
	--	2.45	--	--	--	57,447	1.319	35,295	0.810
	--	2.50	--	--	--	63,731	1.463	38,324	0.880
	--	2.55	--	--	--	63,477	1.457	41,504	0.953
	--	2.60	--	--	--	70,441	1.617	44,852	1.030
	--	2.65	--	--	--	70,357	1.615	48,372	1.110
	--	2.70	--	--	--	77,466	1.778	52,068	1.195
	--	2.75	--	--	--	77,573	1.781	55,944	1.284
	--	2.80	--	--	--	83,441	1.916	59,969	1.377
	--	2.85	--	--	--	80,401	1.846	64,065	1.471
	--	2.90	--	--	--	86,117	1.977	68,228	1.566
	--	2.95	--	--	--	83,186	1.910	72,461	1.663
	--	3.00	--	--	--	89,373	2.052	76,774	1.762

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



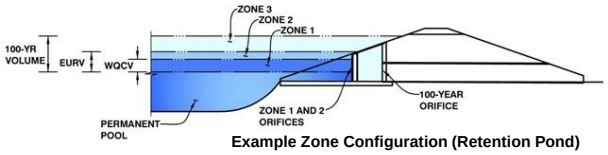


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: **Columbine 4-29HZ**

Basin ID: **Production Phase - Stormwater Storage**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1	#N/A		Orifice Plate
Zone 2			Weir (No Pipe)
Zone 3			
Total (all zones)			

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.75						
Orifice Area (sq. inches)	0.442	3.142						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.50		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	4.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	2.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	8.00	feet	Stage at Top of Freeboard =	3.00	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.05	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	1.76	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

Calculated Parameters for Spillway

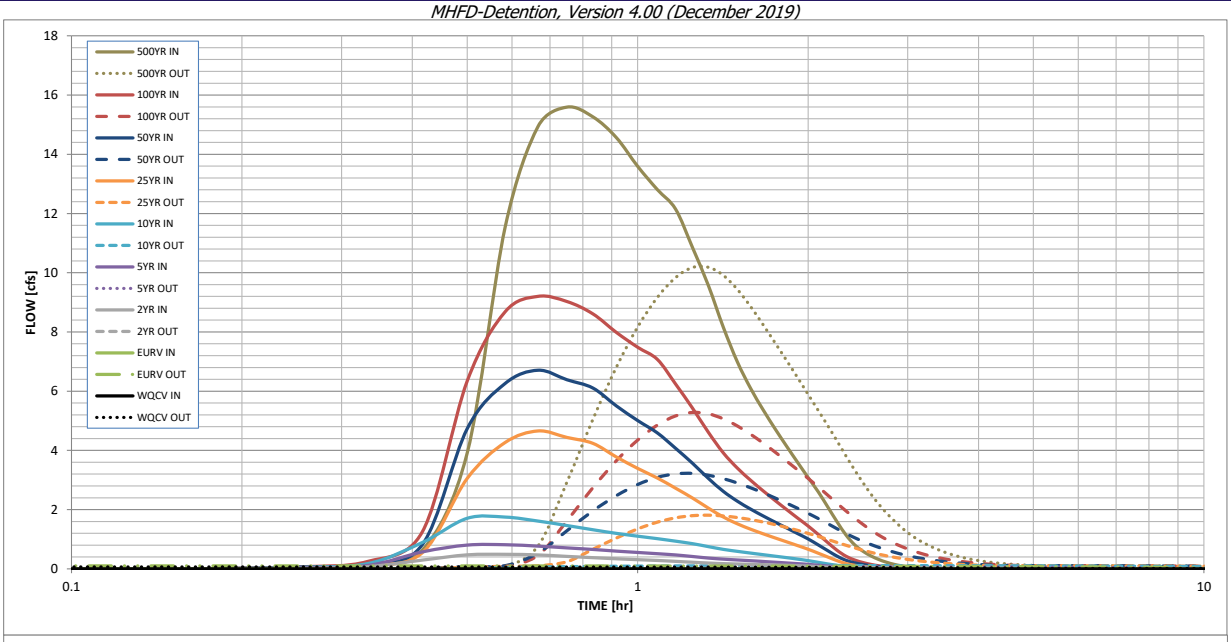
Routed Hydrograph Results

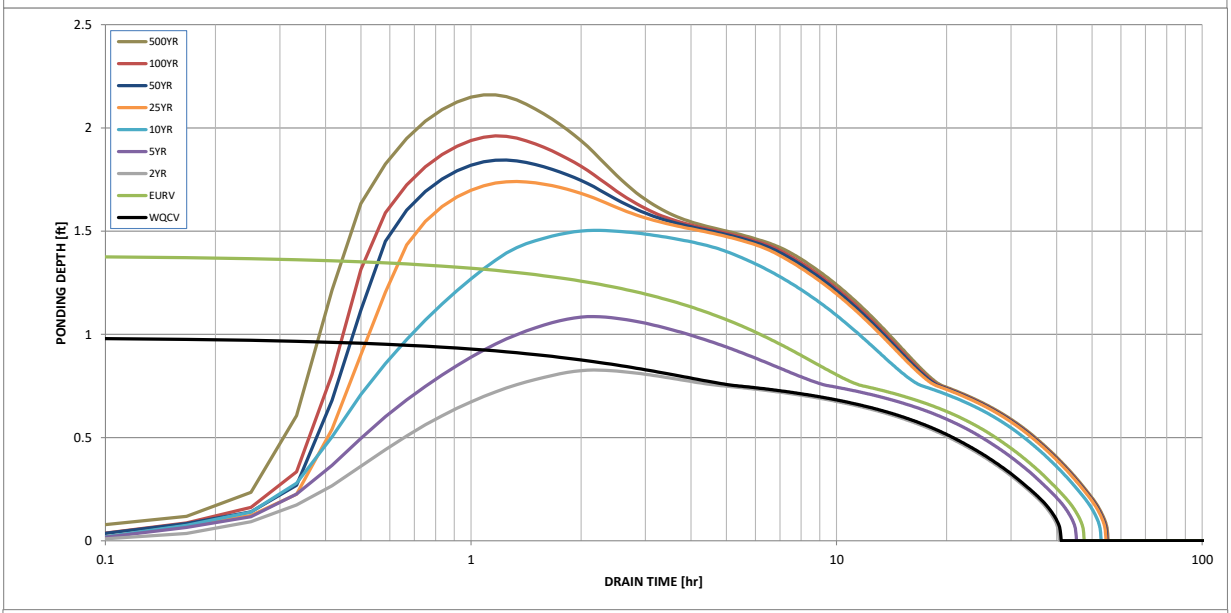
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

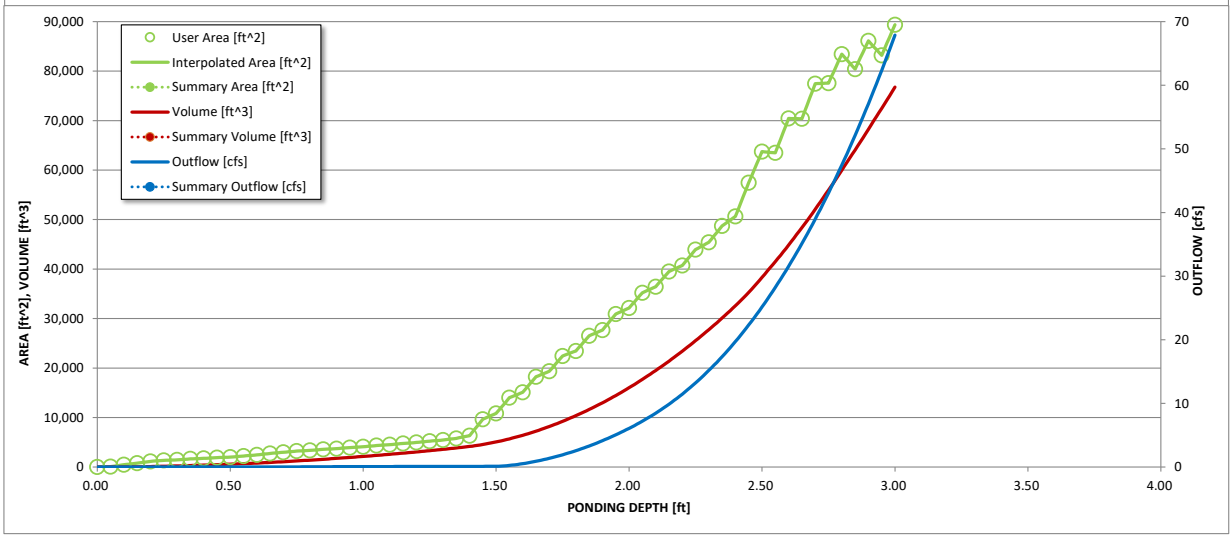
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.11	1.39	1.84	2.24	2.69	3.94
CUHP Runoff Volume (acre-ft) =	0.048	0.093	0.039	0.068	0.134	0.343	0.508	0.735	1.295
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.039	0.068	0.134	0.343	0.508	0.735	1.295
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.9	3.7	5.7	8.1	14.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.02	0.17	0.69	1.05	1.50	2.63
Peak Inflow Q (cfs) =	N/A	N/A	0.5	0.8	1.7	4.7	6.7	9.2	15.6
Peak Outflow Q (cfs) =	0.1	0.1	0.0	0.08	0.1	1.8	3.2	5.3	10.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.9	0.1	0.5	0.6	0.7	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	42	38	41	45	38	32	25	16
Time to Drain 99% of Inflow Volume (hours) =	**40**	45	40	43	50	48	45	42	35
Maximum Ponding Depth (ft) =	0.99	1.39	0.83	1.09	1.50	1.74	1.84	1.96	2.16
Area at Maximum Ponding Depth (acres) =	0.09	0.14	0.08	0.10	0.25	0.50	0.59	0.72	0.91
Maximum Volume Stored (acre-ft) =	0.048	0.094	0.034	0.057	0.116	0.207	0.261	0.339	0.500

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Appendix G:

Pipe Buoyancy Calculations

Buoyancy Calculations for Outlet Pipes
10" HDPE Pipe

$Ww = (\pi \div 4)*(Bc^2)*\gamma$

0.90 Bc = outside pipe diameter (feet)
62.42 γ = unit weight of fresh water (pounds per cubic foot)

39.71 Ww = weight of displaced water (pounds per linear foot)

$Wt = Ww - Wp$

4.73 Wp = weight of pipe (pounds per linear foot)

34.98 Wt = resultant buoyant force of the submerged pipe (pounds per linear foot)

$Hi = (FS*Wt \div Wi*Bc) - (0.1073*Bc)$

68.0 Wi = average unit weight of inundated backfill (pounds per cubic foot)
1.5 FS = factor of safety

0.76 Hi = minimum depth of inundated backfill required above top of pipe (feet)

INPUT
CALCULATED
** Assumes all backfill is inundated*
** Does not account for added weight from anti-seep collars*

Appendix H:

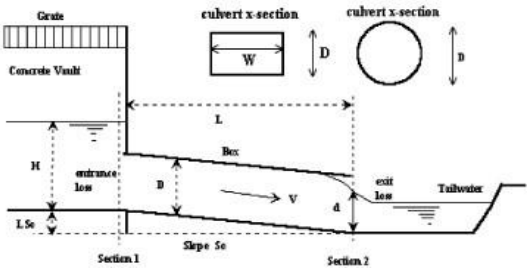
MHFD-Culvert Spreadsheet Calculations for Culvert Design

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: Columbine 4-29HZ

ID: Access Road Culvert (ARC)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	15	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	5002.7	ft
	Outlet Elevation **OR** Slope	Elev OUT =	5002.3	ft
	Culvert Length	L =	35	ft
	Manning's Roughness	n =	0.024	**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	2.76
Sum of All Loss Coefficients	K_s =	3.96
Minimum Energy Condition Coefficient	KE_{low} =	0.0400
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

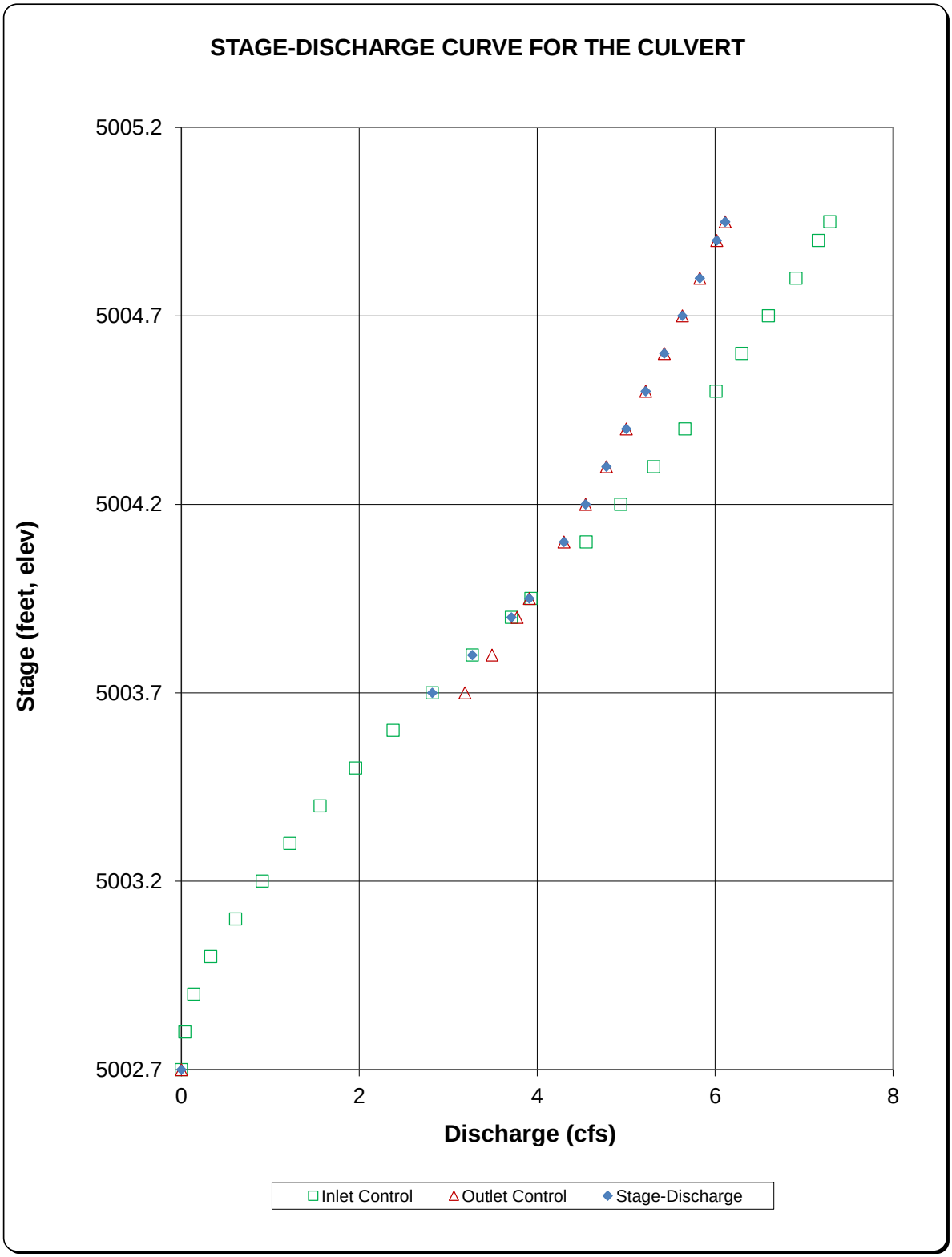
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
5002.70		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
5002.80		Min. Energy. Eqn.	0.04	#N/A	#N/A	#N/A
5002.90		Min. Energy. Eqn.	0.14	#N/A	#N/A	#N/A
5003.00		Min. Energy. Eqn.	0.33	#N/A	#N/A	#N/A
5003.10		Min. Energy. Eqn.	0.61	#N/A	#N/A	#N/A
5003.20		Min. Energy. Eqn.	0.91	#N/A	#N/A	#N/A
5003.30		Min. Energy. Eqn.	1.22	#N/A	#N/A	#N/A
5003.40		Regression Eqn.	1.56	#N/A	#N/A	#N/A
5003.50		Regression Eqn.	1.96	#N/A	#N/A	#N/A
5003.60		Regression Eqn.	2.38	#N/A	#N/A	#N/A
5003.70		Regression Eqn.	2.82	3.19	**2.82**	INLET
5003.80		Regression Eqn.	3.27	3.49	**3.27**	INLET
5003.90		Regression Eqn.	3.71	3.77	**3.71**	INLET
5003.95		Regression Eqn.	3.93	3.91	**3.91**	OUTLET
5004.10		Regression Eqn.	4.55	4.30	**4.30**	OUTLET
5004.20		Regression Eqn.	4.94	4.54	**4.54**	OUTLET
5004.30		Regression Eqn.	5.31	4.78	**4.78**	OUTLET
5004.40		Regression Eqn.	5.66	5.00	**5.00**	OUTLET
5004.50		Regression Eqn.	6.01	5.22	**5.22**	OUTLET
5004.60		Regression Eqn.	6.30	5.43	**5.43**	OUTLET
5004.70		Regression Eqn.	6.60	5.63	**5.63**	OUTLET
5004.80		Regression Eqn.	6.91	5.83	**5.83**	OUTLET
5004.90		Regression Eqn.	7.16	6.02	**6.02**	OUTLET
5004.95		Regression Eqn.	7.29	6.11	**6.11**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: **Columbine 4-29HZ**

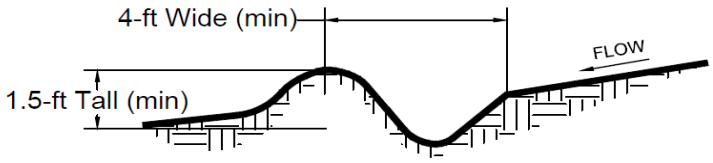
ID: **Access Road Culvert (ARC)**



Appendix I:

Conveyance Calculations for Diversion Ditch Design

Temporary Diversion Ditch Design (Typical)



INSTALLATION NOTES:

1. DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.
2. ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.
3. BERM HEIGHT SHALL BE A MINIMUM OF 18"
4. TEMPORARY DIVERSION SWALE SIDE SLOPES SHALL BE ~2:1 OR FLATTER

Estimated Capacity of Temporary Diversion Ditch Design (Typical)

Depth of 1ft*

n=	0.022	
A=	2	ft^2
P=	4.5	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 5.6 cfs

Calculated V= 2.8 fps

Depth of 1.5ft*

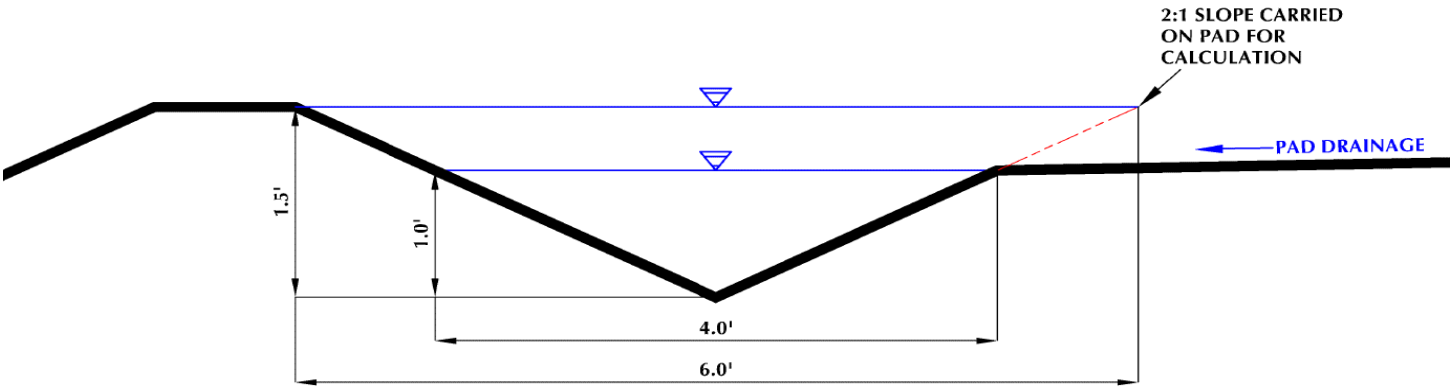
n=	0.022	
A=	4.5	ft^2
P=	6.7	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 16.5 cfs

Calculated V= 3.7 fps

* channel shape simplified to triangular geometry for conservative calculations



Appendix J:

Sediment Trap Sizing Calculations

Sediment Trap Sizing Calculations

Outlet	Ditch Length			Approximate Pad Fill Height				Minimum Design Area, ft^2	Recommended Design Size
	Total, ft	Along Fill and Soil Piles, ft	Used for Sizing, ft	Top of Pad Fill, ft NAVD 88	Sediment Trap Invert, ft NAVD 88	Calculated Pad Fill Height, ft	Used for Sizing, ft		
ST1	790	790	**800**	5006.5	5002.6	3.9	**4**	200	15'x15' (225 ft^2)
ST2	1,040	565	**600**	5001.9	4997.1	4.8	**6**	230	20'x15' (300 ft^2)
ST3	990	140	**200**	5002.0	5000.2	1.8	**2**	100	15'x15' (225 ft^2)

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Section 6

Stormwater Management Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Stormwater Management Plan

Columbine 4-29HZ Well Pad and Facility
NENW Sec 29, T2N, R67W

Firestone, Colorado

Revised October 2021

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2.0 SITE DESCRIPTION 1
3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES 2
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6.0 MATERIALS HANDLING AND SPILL PREVENTION 3
7.0 NON-STORMWATER DISCHARGES 4
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10.0 INSPECTION AND MAINTENANCE PROCEDURES 4
10.1 Inspections 4
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APPENDICES

APPENDIX A CDPS STORMWATER GENERAL PERMIT CERTIFICATION
APPENDIX B GRADING PLAN(S) AND DRAINAGE REPORT
APPENDIX C CONTROL MEASURE / BMP SPECIFICATIONS

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has prepared this site-specific Stormwater Management Plan (SWMP) for construction activities in Weld County, Colorado. The SWMP is intended to ensure construction activities adhere to good engineering, hydrologic, and pollution control practices, and to ensure erosion, sediment and stormwater control measures are selected, installed, implemented, and maintained to protect state waters, and minimize site erosion or degradation. This facility is a part of Kerr-McGee's Area 2 operations and is covered under CDPS Permit COR402541.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	Columbine 4-29HZ Well Pad and Facility
Location:	Sec 29, T2N, R67W / Firestone, Colorado
Total Area of Project:	12.66 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is seasonal winter wheat; primary land use is agriculture.
Percentage of Existing Vegetation Cover:	Vegetative cover on the subject location is 100%, with exception to seasonal planting/harvest and crop rotation. Method for determination: National Resource Conversation Service (NRCS) soil survey data, and on-site assessment at the time of pit excavation for planning and permitting purposes.
Soil Type(s):	44 - Olney loamy sand, 1-3% slopes 73 - Vona loamy sand, 3-5% slopes
Primary Receiving Water:	Unnamed freshwater emergent wetland approximately 0.11 miles northeast of location.
Operator ID:	47120
CDPS Permit:	COR402541
Stormwater Manager:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation Office: (720) 929-6317
SWMP Administrator & Inspector:	Austin Lee, HSE Advisor Occidental Petroleum Corporation Office: (605) 920-0675
Emergency Contact:	Name: Integrated Operation Center (IOC) Office: (970) 506-5980

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

☒ Delineation of Disturbance Limits	☒ Access Road Construction	☒ Perimeter /Control Measures Installation	☒ Grading, stripping, excavation, earthwork	☒ Well drilling & Completions
☒ Facility Construction	☒ Pipeline & Flowline Installation	☒ Disturbance Reduction	☒ Interim & Final Reclamation	☒ Return to Agriculture

All construction and development shall be in accordance with the Colorado Department of Public Health and Environment's CDPS General Permit for Stormwater Discharges Associated with Construction Activity, and the Colorado Oil and Gas Conservation Commission (COGCC) 304.c.15 and 1002.f rules and requirements.

4.0 POTENTIAL POLLUTANT SOURCES

Potential pollution sources shall be placed within the project construction boundary, designated staging area(s), working surface, contained by general or sized secondary containment, and stormwater perimeter controls. Anticipated pollution sources which will be managed by appropriate BMP fact sheets or operational best management standard operating procedures include, but are not limited to:

☒ Disturbed and stored soils	☒ Vehicle/equipment maintenance and fueling	☐ Non-industrial waste
☒ Vehicle tracking of sediments	☒ Dust generating processes	☒ Potential Spills
☐ Management of contaminated soils	☒ Routine maintenance activities	☐ Spill prevention and response
☒ Loading/unloading ops	☒ On-site waste management	
☒ Outdoor storage activities	☐ Concrete truck washing	

No dedicated concrete or asphalt batch plants will be at the project location. Safety Data Sheets (SDS) for materials to be used are maintained by Kerr-McGee. Pollutants shall be managed in accordance with waste regulations administered by COGCC 900 series rules.

5.0 STORMWATER, EROSION & SEDIMENT CONTROL MEASURES / BMPS

Measures for stormwater, erosion and sediment control will be accomplished through a combination of construction techniques, structural and non-structural controls, vegetation and re-vegetation, administrative controls and good housekeeping practices. Control measures will be implemented and adjusted with changing site conditions, as well as phases of construction. All control measures deployed throughout construction, shall be identified on site specific stormwater management plan as-built maps.

The following list of control measures will be implemented during all phases of construction on the Project. Installation and detail specifications can be found in Appendix C:

BMP / Control Measure	Intended Use/Purpose	Installation Timing	Removal Timing
Limits of Construction (LOC)	*To establish a perimeter for which construction activities are managed within.*	Prior to construction	Interim / Final Reclamation
Vehicle Tracking Controls (VOC)	*Provide a stabilized construction site access to reduce off-site tracking.*	Prior to construction	Interim Reclamation
Diversion Ditch (DD)	*To divert and effectively manage run-on/run-off from the project.*	Prior to Construction	Interim Reclamation
Sediment Control Log (SCL)	*Provide a sediment barrier to intercept sheet flow run-off from disturbed areas, or as a perimeter control.*	During Construction	Interim Reclamation
Check Dams (CD)	*Slow the velocity of concentrated flow, thus reducing erosion.*	During Construction	Interim Reclamation
Sediment Basin (SB)	*Collect stormwater and provide detention and settling time of stormwater run-off.*	During Construction	Interim Reclamation or As Permitted
Culverts (C)	*Divert water under a crossing, or to direct flow to a designated point.*	During Construction	Interim Reclamation
Inlet Protection (IP)	*Reduce erosion and sediment loading into a designated culvert or inlet.*	During Construction	Interim Reclamation
Outlet Protection (OP)	*Reduce velocity and erosion from a designated culvert or outlet.*	During Construction	Interim Reclamation
Seed & Mulch (SM)	*Stabilize disturbed areas no longer in use or intended for construction and development (including stockpiles)*	Construction and Interim Reclamation	N/A

6.0 MATERIALS HANDLING AND SPILL PREVENTION

Discharges of hazardous substances or oil resulting from spills or construction operations are not authorized under the Construction General Permit or this plan. Spills or leaks will be managed by Kerr-McGee personnel or their designee, and according to the Kerr-McGee *Wattenberg Field, Colorado Spill Prevention, Control and Countermeasure (SPCC)* Plan. Kerr-McGee personnel and designees are trained to prevent, mitigate, evaluate, and respond to spills and releases. In the event of a spill, notify the Stormwater Manager, after taking emergency and internal procedures for notification. Depending on the nature of the spill and material involved, the Colorado Department of Public Health and Environment 24-hour spill reporting line (877-518-5608) will be contacted and/or downstream water users notified, as necessary.

7.0 NON-STORMWATER DISCHARGES

Sources of non-stormwater discharges include emergency fire-fighting activities or a fire hydrant, uncontaminated springs which do not originate from an area of land disturbance, and construction dewatering. In the event of construction dewatering, control measures shall be implemented and Low Risk Discharge Guidance for Uncontaminated Groundwater to Land (WQP27) shall be followed.

8.0 FINAL STABILIZATION

All soil horizons segregated for the purpose of construction shall be replaced to their original relative positions and contour for reclamation and final stabilization. Following topsoil re-distribution, the reclamation area shall be cross ripped to alleviate compaction. Soil amendments will be determined and applied as necessary, and incorporated by disking, harrowing or cultiplacking during seedbed preparation.

Seed used for reclamation will be determined based on Surface Owner consultation, and consider soil type, land use, and adjacent reference area(s) vegetation. The approved seed mix, in combination with certified weed-free mulch, shall be installed when seasonal or weather conditions are most favorable to take advantage of moisture, such as early spring or late fall, and never during windy or frozen conditions.

The Colorado Department of Health and Environment (CDPHE) defines final stabilization as, “finally stabilized means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, and the vegetation cover is capable of providing erosion control equivalent to pre-existing conditions, or equivalent permanent, physical erosion reduction methods have been employed.” Stabilized unpaved surfaces, such as gravel access roads or working surfaces, necessary for the operation of the facility or nearby facilities, also qualifies as “final stabilized”.

9.0 POST-CONSTRUCTION STORMWATER

Following final stabilization, and pursuant of COGCC rule 1002.f and rule 1004, BMPs shall be maintained under Kerr-McGee’s Post-Construction Stormwater Program, and evaluated for Tier 1 / Non-Tier 1 status as applicable and per COGCC 100 series definitions, until the facility is abandoned, and final reclamation is achieved.

10.0 INSPECTION AND MAINTENANCE PROCEDURES

10.1 Inspections

Inspections will be conducted to document the status of construction activities, stormwater control measure placement, maintenance needs, and effectiveness, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Stormwater Manager and SWMP Administrator and conducted by their designated representative(s). Inspection forms will document non-compliance conditions, including any release of sediment or other contaminants, additional control measures that are needed, or repair and maintenance work orders.

During construction, inspections shall be conducted every 14 days, and after a major precipitation or melt event, which has the potential to cause surface runoff.

For sites earthwork and construction is completed, but final stabilization is not achieved due to vegetative cover, inspections shall be conducted every 30 days and exclude precipitation or melt event response. Inspections will continue until all reclaimed areas have achieved a cover of 70% the pre-construction reference vegetation (i.e. final stabilization).

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection. All inspection records are stored for a minimum of three years after the location has achieved final stabilization.

10.2 Maintenance

For maintenance items discovered at active construction locations, action and documentation towards completing repairs identified at the time of inspection, shall be made within 24 hours of discovery.

Maintenance items discovered post-construction will be documented and coordinate with production personnel.

Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for actions requiring ground disturbance / earthwork.

APPENDIX A

CDPS STORMWATER GENERAL PERMIT CERTIFICATION

COLORADO
Department of Public Health & Environment

CERTIFICATION TO DISCHARGE
UNDER
CDPS GENERAL PERMIT COR400000
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

Certification Number: **COR402541**

This Certification to Discharge specifically authorizes:

Owner Kerr McGee Oil and Gas Onshore LP
Operator Kerr McGee Oil and Gas Onshore LP

to discharge stormwater from the facility identified as

Kerr Area 2

To the waters of the State of Colorado, including, but not limited to:

to Boulder Creek to South Platte River

Facility Activity :	Oil & Gas Field Development
Disturbed Acres:	>5 acres
Facility Located at:	See Map in File Denver & Boulder & Broomfield CO 80229 Adams County Latitude 40.081 Longitude -104.717000
Specific Information (if applicable):	

Certification is issued 4/1/2019

Certification is effective 4/1/2019

Expiration date of general permit : 3/31/2024

This certification under the permit requires that specific actions be performed at designated times. The certification holder is legally obligated to comply with all terms and conditions of the permit.

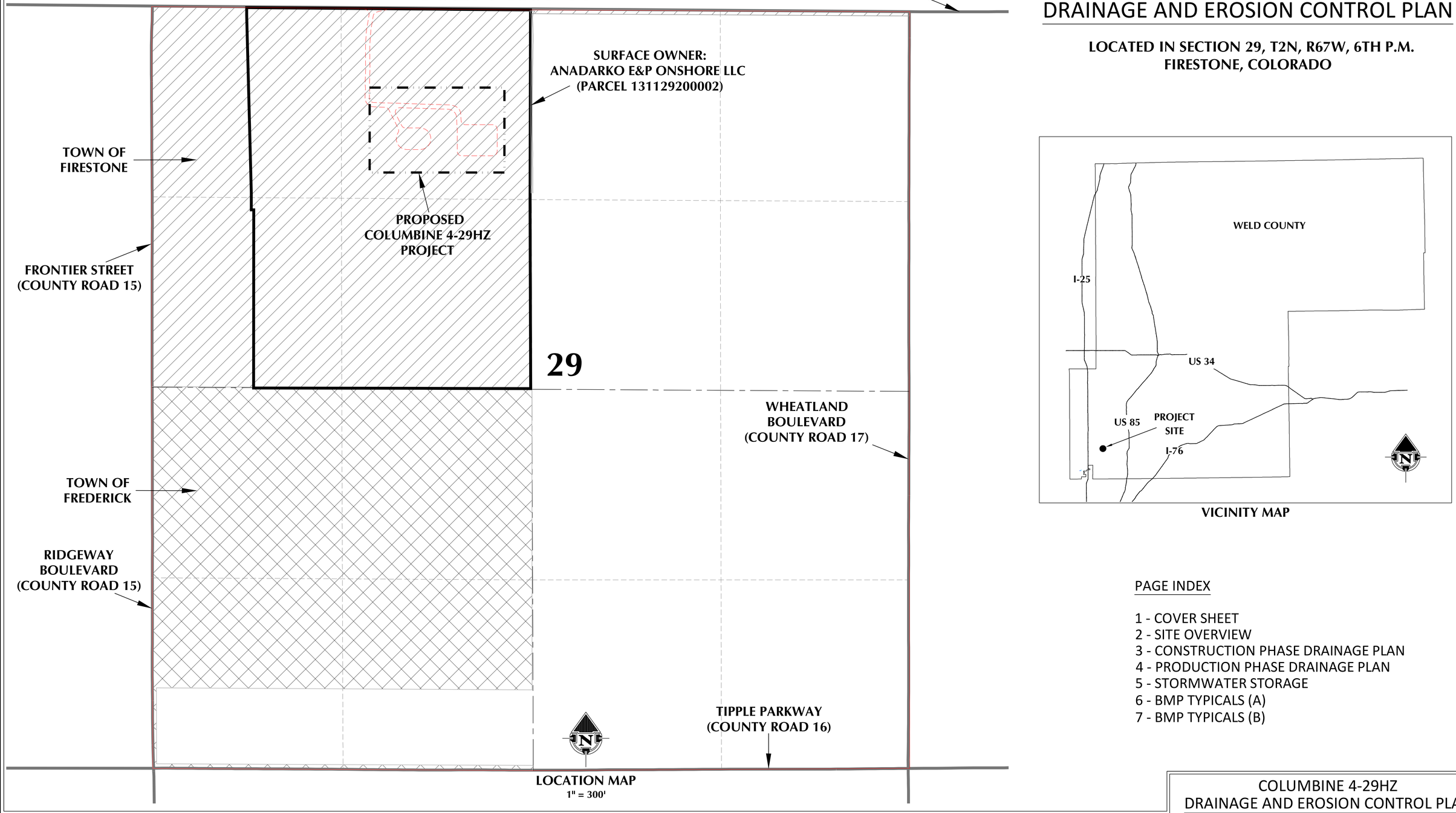
This certification was approved by:
Meg Parish, Unit Manager
Permits Section
Water Quality Control Division

APPENDIX B

GRADING PLANS AND DRAINAGE REPORT

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'

VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - STORMWATER STORAGE
6 - BMP TYPICALS (A)
7 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DRAINAGE STUDY\DWG - DRAINAGE PLAN\COLUMBINE_COMBINED.dwg, 12/10/2021 11:41:05 AM, kiev

ACCESS ROAD CULVERT (ARC)

COUNTY ROAD 18

PROPOSED FIRE HYDRANT

PROPOSED PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD (TO BE IMPROVED)

EXISTING PRIVATE ROAD

EXISTING CULVERT

PROPOSED COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

COUNTY ROAD 15

WELD COUNTY

FIRESTONE
WELD COUNTY

FIRESTONE
FREDERICK

5000 5010 5020 5030 4990

N

0 150' 300'

1" = 150'

5' CONTOURS

LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- EXISTING WATER LINE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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Denver, Colorado 80202

COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DRAINAGE STUDY\DWG - DRAINAGE PLAN\COLUMBINE_OVERVIEW.dwg, 12/10/2021 1:55:02 PM, kaby

CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

15' X 15' X 3' SEDIMENT TRAP (ST1)

EXISTING PRIVATE ROAD

EXISTING CULVERT

TOPSOIL STOCKPILE

COLUMBINE 4-29HZ WELL PAD

FLAT GRADED ELEVATION = 5002.0'

COLUMBINE 4-29HZ FACILITY

TEMPORARY EQUIPMENT AREA

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

20' X 15' X 3' SEDIMENT TRAP (ST2)

15' X 15' X 3' SEDIMENT TRAP (ST3)

PAD TRENCH

0.8% DITCH SLOPE

1.0% DITCH SLOPE

1.5% DITCH SLOPE

0.9% DITCH SLOPE

1.2% DITCH SLOPE

0.5% DITCH SLOPE

0.5% SLOPE

0.4% SLOPE

0.6% SLOPE

CUT

FILL

5000

5005

5010

5015

5020

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EPL EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- SP PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 50'	PAGE:	3 OF 7
JOB NUMBER:	16-98	DATE:	10/6/21
DRAFTED BY:	HJL	REVISED:	

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DRAINAGE STUDY\DWG - DRAINAGE PLAN\COLUMBINE_COMBINED.dwg, 10/6/2021 3:12:00 PM, katy

CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC*	15" CMP	35	5002.7	5002.3	1.1%
*SEE SITE OVERVIEW FOR CULVERT LOCATION					

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PRODUCTION PHASE OPERATIONAL AREA (2.73 ACRES)

EXISTING PRIVATE ROAD

EXISTING CULVERT

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

OFF-SITE FLOW DEFLECTION

OUTLET PIPE

COLUMBINE 4-29HZ FACILITY

COLUMBINE 4-29HZ WELL PAD

WELL ELEVATION = 5002.0'

0.2% SLOPE

0.2% SLOPE

CUT

FILL

0.4% SLOPE

0.6% SLOPE

FLAT GRADED SEPARATOR ELEVATION = 5000.0'

WEIR & SPILLWAY

STORAGE BERM

STORAGE DITCH ALONG PAD TOE

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

5020

5015

5010

5005

5000

4995

0 50' 100'

1" = 50'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

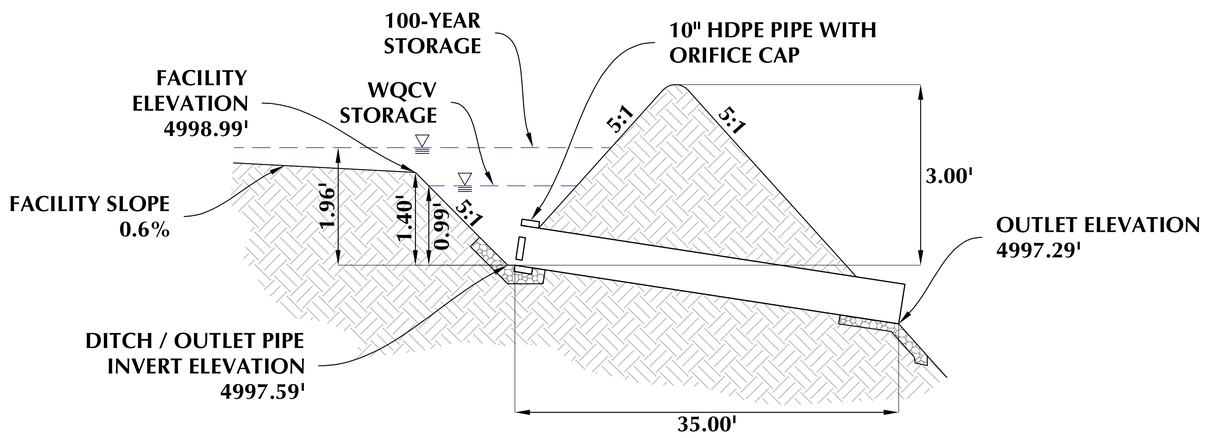
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JOB NUMBER:	16-98	DATE:	10/6/21
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STORAGE BERM & DITCH - PRODUCTION PHASE

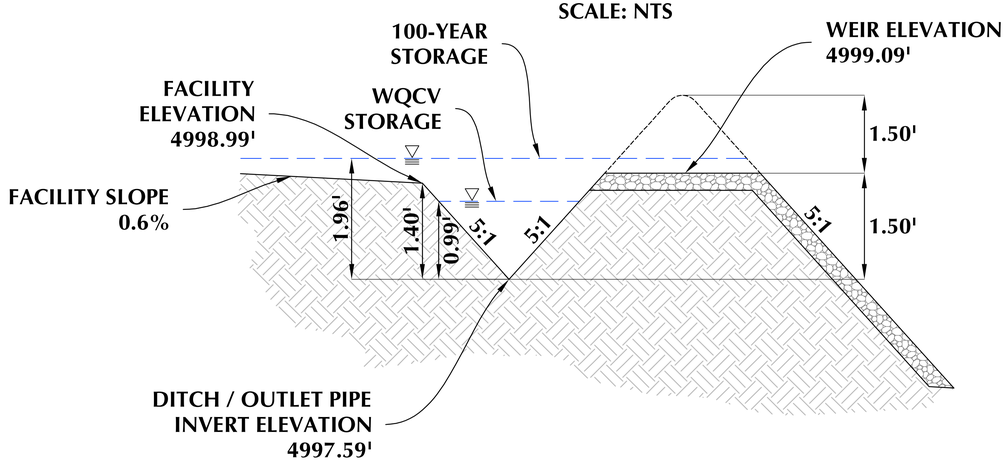
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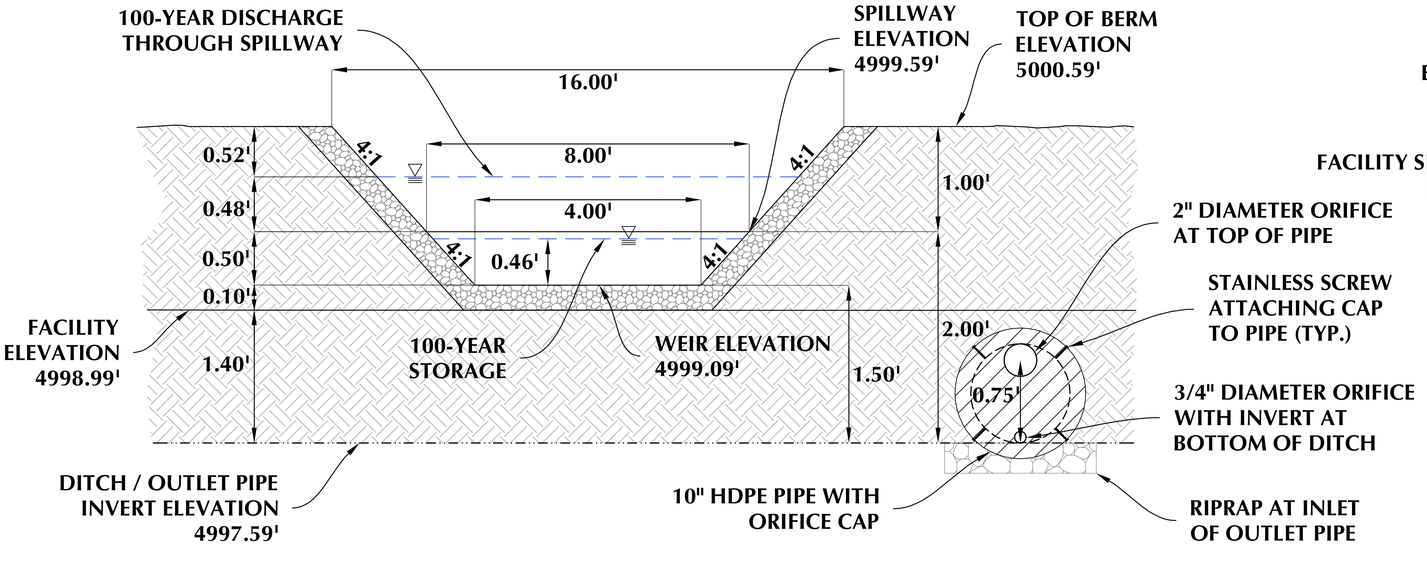
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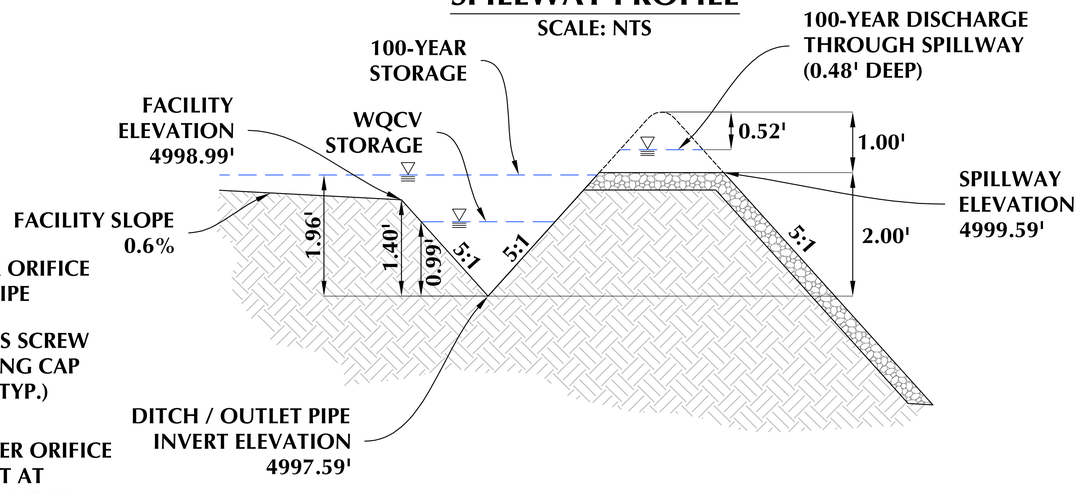
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SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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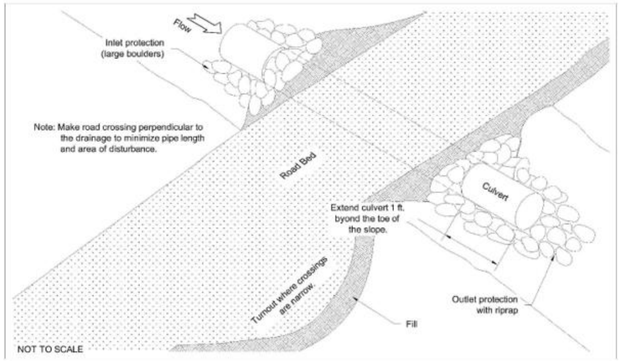
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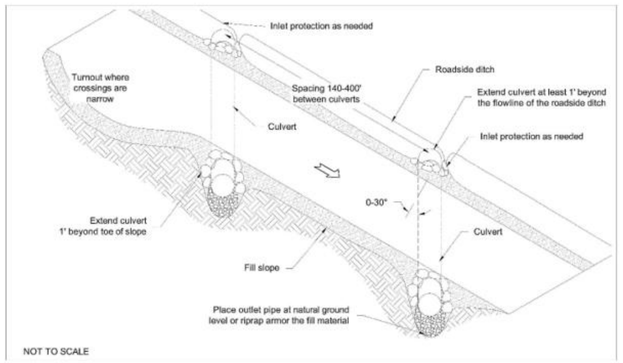
COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
STORMWATER STORAGE

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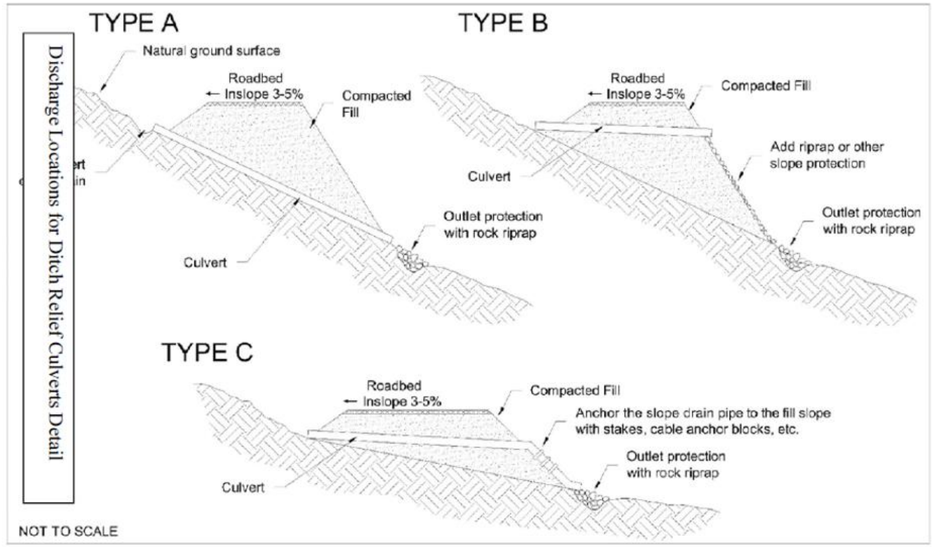
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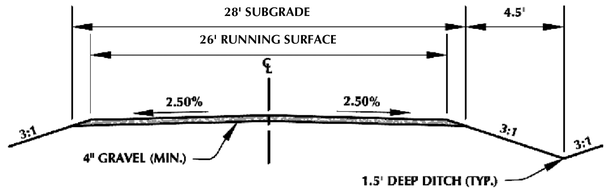
Culvert





Culvert

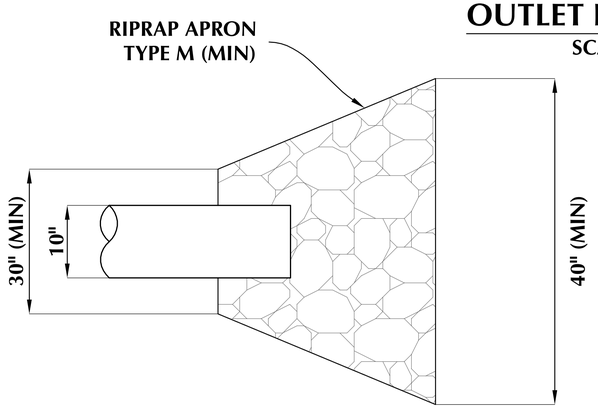


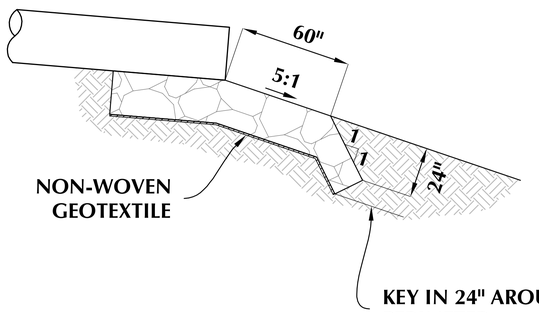


ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

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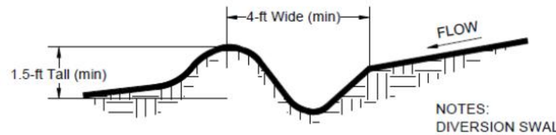




Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

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Sediment Trap

ST

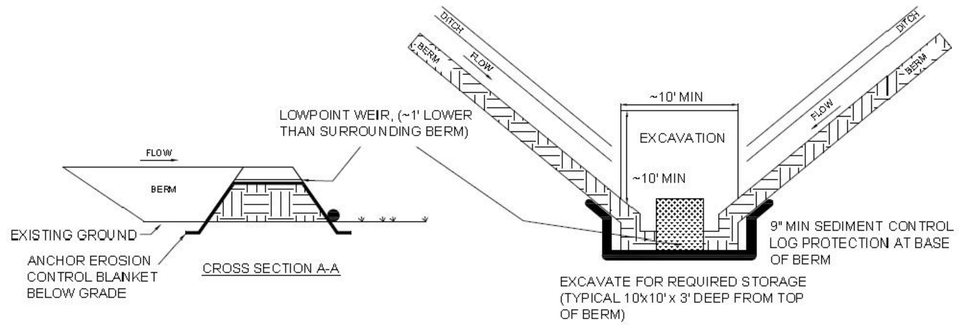
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

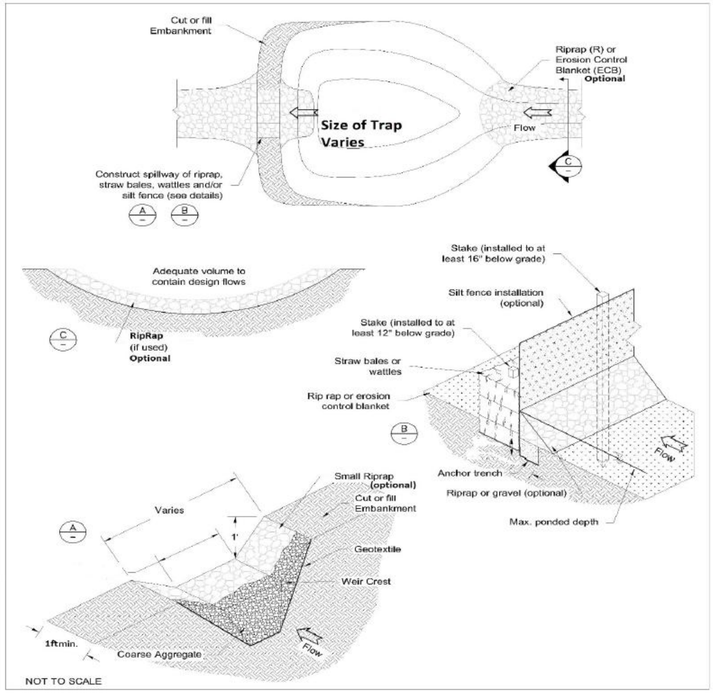
Sediment Trap

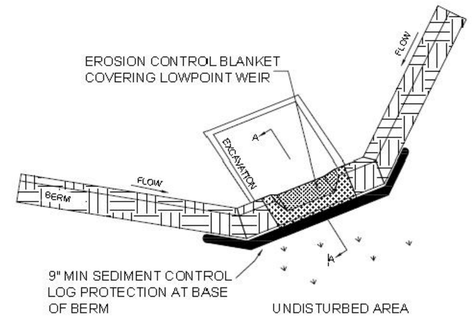
ST



Sediment Trap

ST





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COLUMBINE 4-29HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (B)

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APPENDIX C

CONTROL MEASURE / BMP SPECIFICATIONS

Construction Phasing/Sequencing (CP)

CP

Description



Source: UDFCD BMP Fact Sheet

Effective construction site management to minimize erosion and sediment transport includes attention to construction phasing, scheduling, and sequencing of land disturbing activities. On most construction projects, erosion and sediment controls will need to be adjusted as the project progresses and should be documented in the SWMP. Construction phasing refers to disturbing only part of a site at a time to limit the potential for erosion from dormant parts of a site. Grading activities and construction are completed and soils are effectively stabilized on one part of a site before grading and construction begins on another portion of the site. Construction sequencing or scheduling refers to a specified work schedule that coordinates the timing of land disturbing activities and the installation of erosion and sediment control practices.

Appropriate Uses

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance. Larger projects and linear construction projects may benefit most from construction sequencing or phasing, but even small projects can benefit from construction sequencing that minimizes the duration of disturbance. Typically, erosion and sediment controls needed at a site will change as a site progresses through the major phases of construction. Erosion and sediment control practices corresponding to each phase of construction must be documented in the SWMP.

Design and Installation

BMPs appropriate to the major phases of development should be identified on construction drawings. In some cases, it will be necessary to provide several drawings showing construction-phase BMPs placed according to stages of development (e.g., clearing and grading, utility installation, active construction, final stabilization). Some municipalities in the Denver area set maximum sizes for disturbed area associated with phases of a construction project. Additionally, requirements for phased construction drawings vary among local governments within the UDFCD boundary. Some local governments require separate erosion and sediment control drawings for initial BMPs, interim conditions (in active construction), and final stabilization.

Construction Phasing/Sequencing (CP)

CP

Construction Scheduling	
Functions	
Erosion Control	Moderate
Sediment Control	Moderate
Site/Material Management	Yes

Typical construction phasing BMPs include:

- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.

- If there is carryover of stockpiled material from one phase to the next, position carryover material in a location easily accessible for the pending phase that will not require disturbance of stabilized areas to access the stockpile. Particularly with regard to efforts to balance cut and fill at a site, careful planning for location of stockpiles is important.

Typical construction sequencing BMPs include:

- Sequence construction activities to minimize duration of soil disturbance and exposure. For example, when multiple utilities will occupy the same trench, schedule installation so that the trench does not have to be closed and opened multiple times.

- Schedule site stabilization activities (e.g., landscaping, seeding and mulching, installation of erosion control blankets) as soon as feasible following grading.

- Install initial erosion and sediment control practices before construction begins. Promptly install additional BMPs for inlet protection, stabilization, etc., as construction activities are completed. Table CP-1 provides typical sequencing of construction activities and associated BMPs.

Maintenance and Removal

When the construction schedule is altered, erosion and sediment control measures in the SWMP and construction drawings should be appropriately adjusted to reflect actual "on the ground" conditions at the construction site. Be aware that changes in construction schedules can have significant implications for site stabilization, particularly with regard to establishment of vegetative cover.

Construction Phasing/Sequencing (CP)

CP

Table CP-1. Typical Phased BMP Installation for Construction Projects

Project Phase	BMPs
Pre-disturbance, Site Access	▪ Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection). ▪ Establish vehicle tracking control at entrances to paved streets. Fence as needed. ▪ Use construction fencing to define the boundaries of the project and limit access to areas of the site that are not to be disturbed. **Note: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.**
Site Clearing and Grubbing	▪ Install perimeter controls as needed on downgradient perimeter of site (silt fence, wattles, etc). ▪ Limit disturbance to those areas planned for disturbance and protect undisturbed areas within the site (construction fence, flagging, etc). ▪ Preserve vegetative buffer at site perimeter. ▪ Create stabilized staging area. ▪ Locate portable toilets on flat surfaces away from drainage paths. Stake in areas susceptible to high winds. ▪ Construct concrete washout area and provide signage. ▪ Establish waste disposal areas. ▪ Install sediment basins. ▪ Create dirt perimeter berms and/or brush barriers during grubbing and clearing. ▪ Separate and stockpile topsoil, leave roughened and/or cover. ▪ Protect stockpiles with perimeter control BMPs. Stockpiles should be located away from drainage paths and should be accessed from the upgradient side so that perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period. ▪ Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but that will be inactive for an extended period. ▪ Water to minimize dust but not to the point that watering creates runoff.

Construction Phasing/Sequencing (CP)

CP

Project Phase	BMPs
Utility And Infrastructure Installation	**In Addition to the Above BMPs:** ▪ Close trench as soon as possible (generally at the end of the day). ▪ Use rough-cut street control or apply road base for streets that will not be promptly paved. ▪ Provide inlet protection as streets are paved and inlets are constructed. ▪ Protect and repair BMPs, as necessary. ▪ Perform street sweeping as needed.
Building Construction	**In Addition to the Above BMPs:** ▪ Implement materials management and good housekeeping practices for home building activities. ▪ Use perimeter controls for temporary stockpiles from foundation excavations. ▪ For lots adjacent to streets, lot-line perimeter controls may be necessary at the back of curb.
Final Grading	**In Addition to the Above BMPs:** ▪ Remove excess or waste materials. ▪ Remove stored materials.
Final Stabilization	**In Addition to the Above BMPs:** ▪ Seed and mulch/tackify. ▪ Seed and install blankets on steep slopes. ▪ Remove all temporary BMPs when site has reached final stabilization.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Description

Vehicle tracking controls provide a stabilized construction site access where vehicles merge onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface. There are a number of different types of vehicle tracking controls. Rock pads are the most common and effective, but other forms include cattle guards and mud mats.



Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking. Source: UDFCD BMP Fact Sheet

Applicability

Typically, vehicle tracking controls are installed at locations where construction traffic leaves or enters an existing paved road.

Limitations

- Although installing vehicle tracking control is a good way to help reduce the amount of sediment leaving a site, some soil may still be deposited from vehicle tires onto paved surfaces. To further reduce the chance of these sediments polluting stormwater runoff, sweeping of the paved area adjacent to the access is recommended.
- Heavy traffic and wet conditions will result in more frequent maintenance.
- May not be needed when access points are off unpaved roads.

Construction Specifications

Aggregate Vehicle Tracking Control (VTC)

This is a coarse-aggregate surfaced pad. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires. Typically, a geotextile should be placed between the rock and the soil surface. If the aggregate surfaced pad is not anticipated to be in use for a long duration and/or if it has limited traffic, the geotextile may be omitted.

Cattle Guard (CG)

A prefabricated rack, such as a cattle guard, may be used to reduce the amount of sediment that leaves the site on vehicle tires.

Mud Mat or TRM (MM)

This type of control may be appropriate for access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove significant sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Maintenance and Removal

Inspect the area for degradation and replace the aggregate or material used for a stabilized entrance/exit as needed. If the area becomes clogged and ponds water, remove and dispose of excess sediment or replace material with a fresh layer of aggregate as necessary.

With aggregate vehicle tracking controls, ensure rock and debris from this area do not enter the public right-of-way.

Remove sediment that is tracked onto the public right of way daily or more frequently as needed. Excess sediment in the roadway indicates that the stabilized construction entrance requires maintenance.

Ensure that drainage ditches at the entrance/exit area remain clear.

A stabilized entrance should be removed only when the potential for off-site vehicle tracking no longer exists. This is typically after the site has been stabilized.

When wheel wash equipment is used, be sure that the wash water is discharged to a sediment trap prior to discharge. Also inspect channels conveying the water from the wash area to the sediment trap, and stabilize areas that may be eroding or have the potential to erode.

When a construction entrance/exit is removed, excess sediment from the aggregate should be removed and disposed of appropriately. The entrance should be promptly stabilized with a permanent surface following removal, typically by paving.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

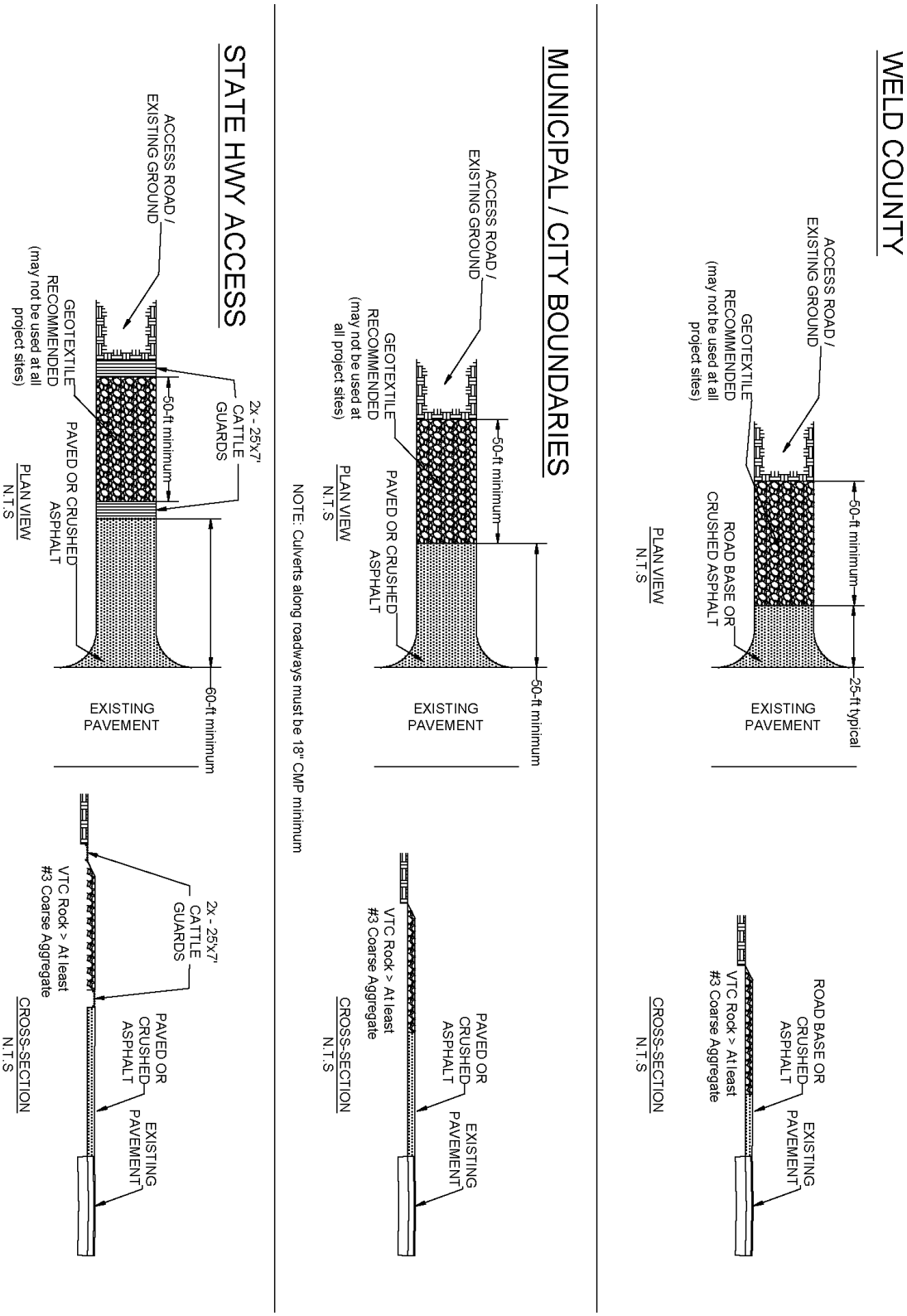
Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

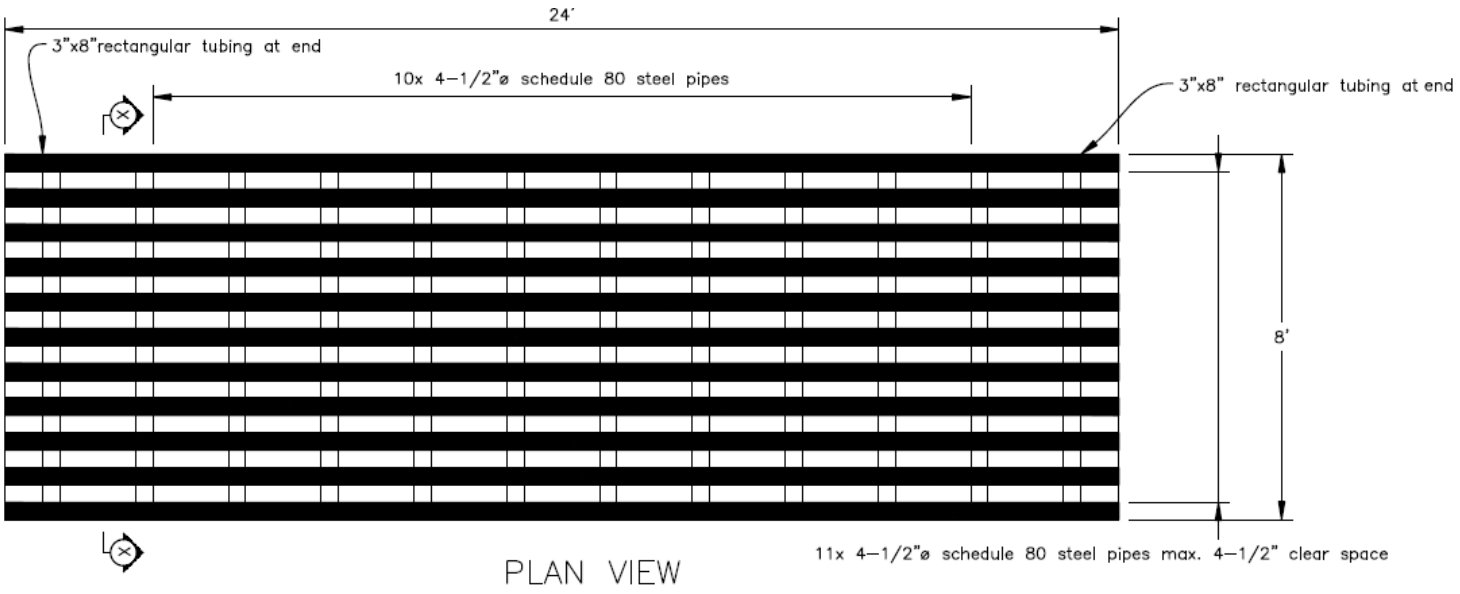
VTC/CG/MM

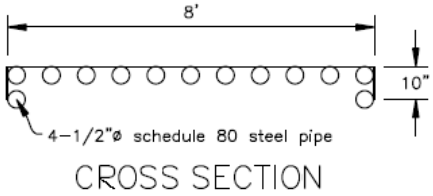


AGGREGATE VEHICLE TRACKING CONTROL DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM





These are typical dimensions for cattle guards; however, variations can be made per landowner agreements.

Typically 4- or 4½-inch pipe is used on the top but can be less if requested by landowner.

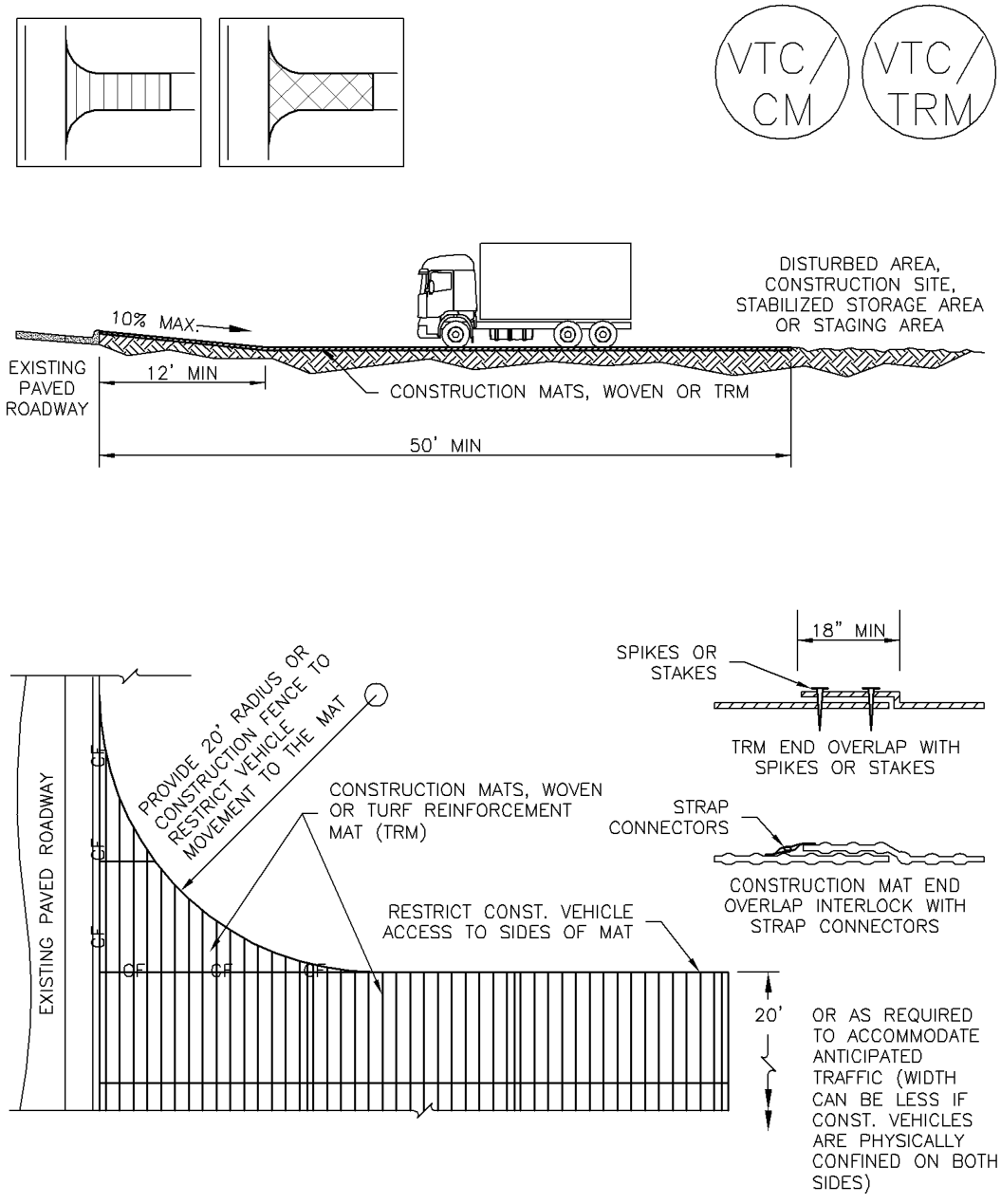




CATTLE GUARD DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM



VTC–3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM)

MUD MAT OR TRM DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S).
   –TYPE OF CONSTRUCTION ENTRANCE(S)/EXITS(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).

2. CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.

3. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT–OF–WAYS.

4. STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

5. A NON–WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.

6. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.

5. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

Diversion Ditch and Berm

DD

Definition



A ditch and berm is a drainage swale with a parabolic or trapezoidal cross-section and a supporting ridge on the lower side that is constructed across the slope. The purpose of a ditch and berm diversion is to prevent off-site stormwater runoff from entering a disturbed area, to prevent sediment laden storm runoff from leaving the construction site or disturbed area, and to direct sediment laden runoff to a sediment control feature.

Applicability

Ditch and berms may be designed for temporary or permanent use. The maximum drainage area for a temporary ditch and berm is ten acres. For undisturbed drainage areas larger than ten acres, a permanent earthen dike / berm may be designed or used for larger flows. Ditch and berms may be used for:

- The upslope of cut or fill slopes to convey or divert flows away from disturbed areas;
- The downslope of cut or fill slopes to divert on-site runoff to a stabilized outlet or sediment control feature;
- The outer edge of a well pad to ensure that runoff remains on the pad and is diverted to a sediment pond or trap, if available;
- Where runoff from higher areas has the potential for causing erosion, or for interfering with and/or preventing the establishment of vegetation on lower areas;
- Where the length of slopes need to be reduced so soil loss will be kept to a minimum; and
- The perimeter of a site or disturbed area.

Limitations

- The area around the ditch and berm that is disturbed during its construction shall be stabilized (typically by maintaining existing vegetation).
- To effectively manage erosion, ditch and berms must be directed into a stabilized outlet, well-vegetated area, or to alternative sediment control measures.
- Temporary ditch and berms should be designed to avoid crossing vehicle pathways.
- Ditch and berms should be used with caution on soils subject to slippage.

Design Criteria

For a temporary ditch and berm (drainage less than 10 acres), no formal design is necessary.

Location

Ditch and berms are usually located above or below cut or fill slopes. Exact ditch and berm location(s) shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, and the development layout. Whenever possible, preserve existing vegetation between the edge of the cut or fill slope and the ditch and berm.

Diversion Ditch and Berm

DD

Capacity

For a permanent design, constructed ditch and berm features shall have the capacity to carry, at a minimum, the peak discharge from a 10-year frequency rainfall event with freeboard of no less than 0.3 feet.

Cross section See Figure DD-1 for details.

The ditch and berm shall be parabolic or trapezoidal in shape, if possible. The ditch and berm shall have compacted, stable, side slopes. The side slopes shall be flat enough to ensure ease of maintenance of the ditch and berm.

Velocity and grade

The permissible velocity for the specific soil type will determine the maximum grade. The maximum permissible velocity for sand and silt channels is 3 feet per second, and 5 feet per second for clay vegetated channels. Ditch and berms are usually not applicable below high sediment producing areas unless structural measures, designed to prevent accumulations of sediment within the channel, are installed within the ditch and berm.

Construction Specifications

General

- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the ditch and berm.
- All ditch and berms shall have uninterrupted positive grade to an outlet.
- Diverted runoff from a disturbed area shall be conveyed to a sediment control measure.
- Diverted runoff from an undisturbed area shall outlet to a sediment control measure or into an undisturbed stabilized area at non-erosive velocities.

Temporary diversion ditch and berm (typically at edge of disturbance) See figure DD-1

- The ditch and berm shall be excavated or shaped to line, grade, and cross section as required to meet the site-specific criteria. **The ditch and berm must be compacted.**
- This is accomplished by excavation of a U-shaped or trapezoidal trench or ditch, and compaction of the fill on the downslope side of the cut.
- Stabilization with vegetation is not required, so long as adequate sediment traps or other sediment control devices are provided at outlets.
- Inspect the ditch for adequate capacity, erosion, or damage. If there is reoccurring erosion, consider installing check dams or lining the channel.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Channels should be cleared of sediment and repairs made when necessary. Maintain ditch and berm capacity, ridge height, especially if high-sediment yielding areas are in the

drainage area above the ditch and berm. Redistribute the sediment as necessary to maintain the capacity of the ditch and berm.

Removal

Temporary ditch and berms shall remain in place only until the disturbed areas are re-graded and prepared for permanent stabilization. Permanent ditch and berms shall remain in place.

References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February, 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

United States Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), *Field Office Technical Guide.* 2002. http://www.nrcs.usda.gov/technical/efotg/

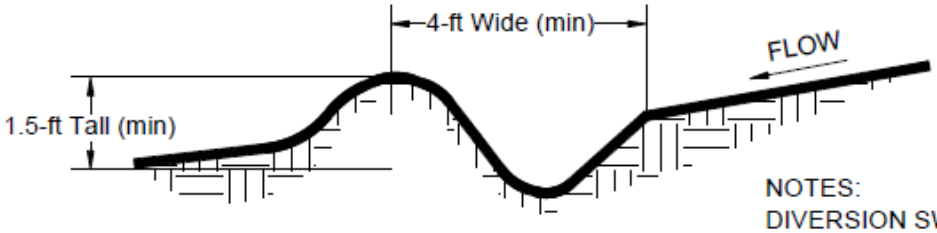
Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011. http://www.mde.state.md.us/PROGRAMS/WATER/STORMWATERMANAGEMENTPROGRAM/SOILEROSIONANDSEDIMENTCONTROL

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control.* 2012. https://www.codot.gov/business/designsupport/standard-plans/2012-m-standards-plans/2012-m-standards-pdfs/10-temproary-erosion-control/m-208-1-temp-erosion-control

Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

References: Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011.

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control*. 2012.

Sediment Control Log (SCL)

SCL

Description

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.





Photographs SCL-1 and SCL-2. Sediment control logs used as 1) a perimeter control around a soil stockpile; and, 2) as a "J-hook" perimeter control at the corner of a construction site.
Source: UDFCD BMP Fact Sheet

Appropriate Uses

Sediment control logs can be used in the following applications to trap sediment:

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

Design and Installation

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

Sediment Control Log	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	No

Sediment Control Log (SCL)

SCL

Although sediment control logs initially allow runoff to flow through the BMP, they can quickly become a barrier and should be installed is if they are impermeable.

Design details and notes for sediment control logs are provided in Detail SCL-1. Sediment logs must be properly trenched and staked into the ground to prevent undercutting, bypassing and displacement. When installed on slopes, sediment control logs should be installed along the contours (i.e., perpendicular to flow).

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

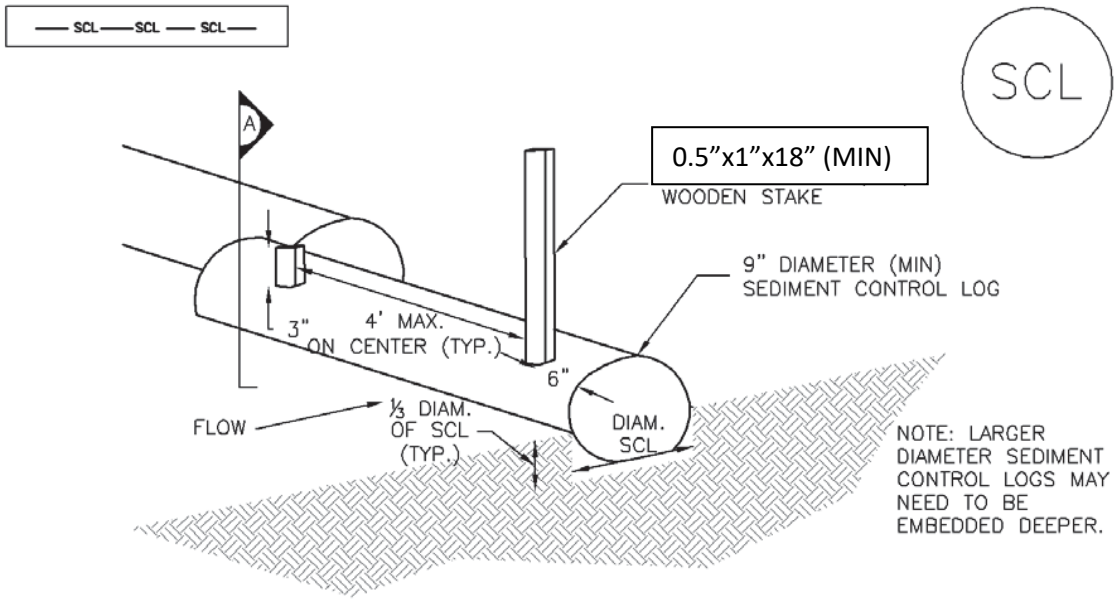
Maintenance and Removal

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

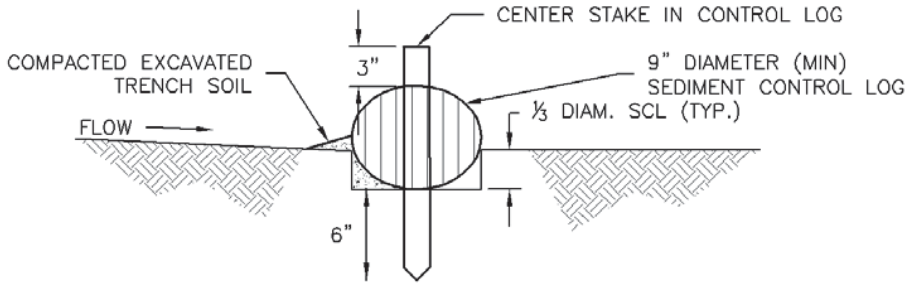
Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

Sediment Control Log (SCL)

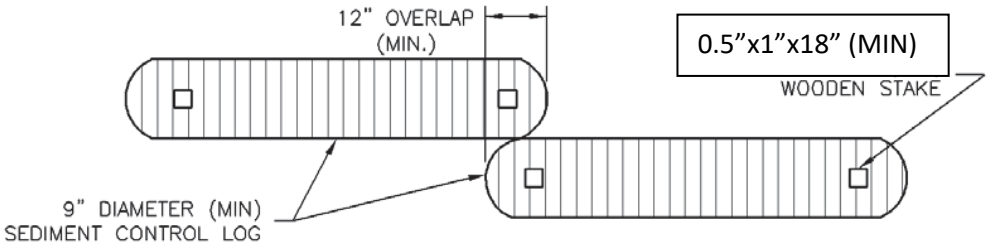
SCL



SEDIMENT CONTROL LOG



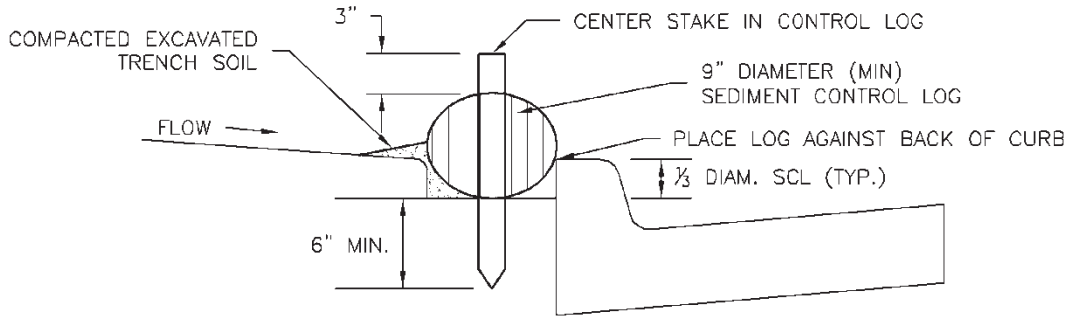
SECTION A



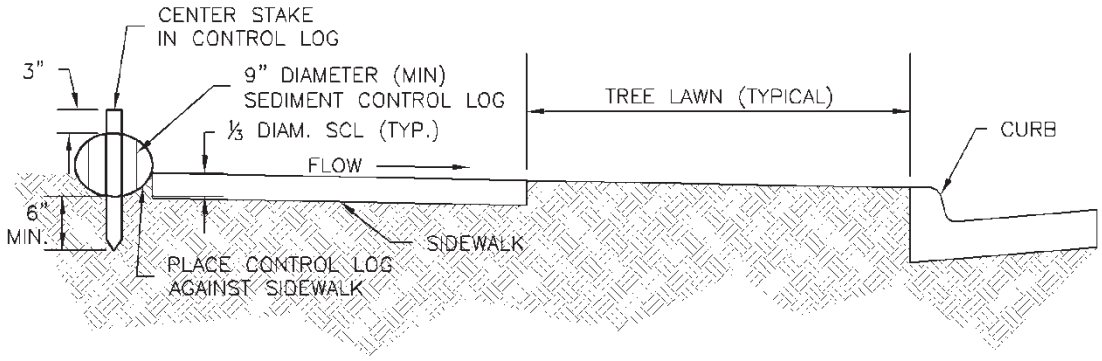
SEDIMENT CONTROL LOG JOINTS

SCL–1. SEDIMENT CONTROL LOG

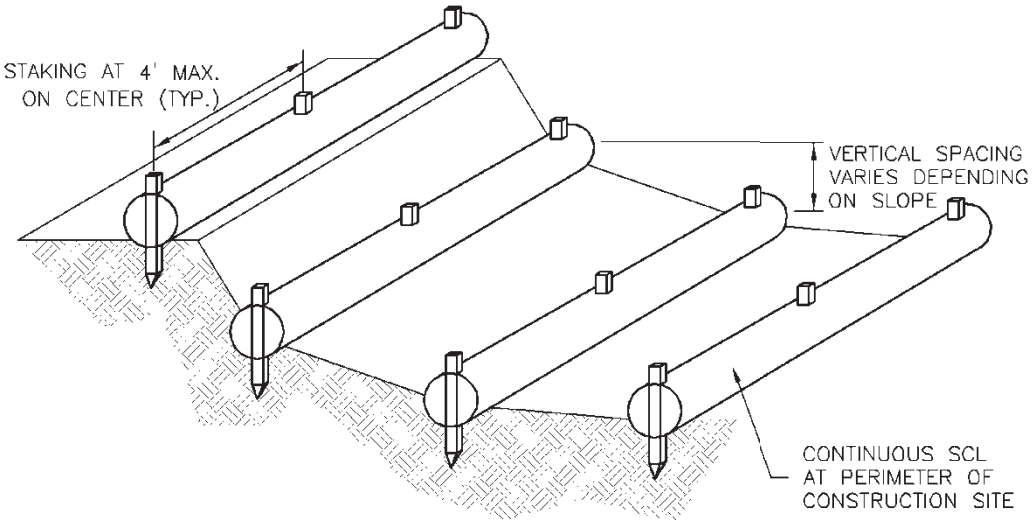
Sediment Control Log (SCL)



SCL–2. SEDIMENT CONTROL LOG AT BACK OF CURB



SCL–3. SEDIMENT CONTROL LOG AT SIDEWALK WITH TREE LAWN



SCL–4. SEDIMENT CONTROL LOGS TO CONTROL SLOPE LENGTH

Sediment Control Log (SCL)

SCL

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.

2. SEDIMENT CONTROL LOGS *THAT ACT* AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR *TO* ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.

3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.

4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES. HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE WAYS.

5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND *TO* A DEPTH OF APPROXIMATELY .l3 OF THE DIAMETER OF THE LOG. IF TRENCHING *TO* THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT *TO* DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST STAKING

6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.

7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4' CENTERS AND EMBEDDED A MINIMUM OF 6" INTO THE GROUND. 3" OF THE STAKE SHALL PROTRUDE FROM THE TOP OF THE LOG. STAKES THAT ARE BROKEN PRIOR *TO* INSTALLATION SHALL BE REPLACED.

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY *TO* MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED *TO* MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY)2 OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.

5. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO. JEFFERSON COUNTY, COLORADO, DOUGLAS COUNTY, COLORADO, AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Check Dam (CD)

CD

Description



Check dams are small, temporary dams constructed across a swale or roadside ditch. Check dams can be constructed using rock, sandbags, gravel bags, earth with erosion control blanketing, sediment control logs, or synthetic materials to slow the velocity of concentrated flow in a channel and thus reduce erosion. As a secondary function, check dams can also be used to catch sediment from the channel itself or from the contributing drainage area as stormwater runoff flows through or over the structure.

Applicability

Check dams are most often used in small, open channels with contributing drainage area of less than 10 acres and side slopes of 2:1 or less. Check dams may be used in the following applications.

- In swales or roadside ditches where it is not practical to line the channel or implement other flow control and sediment control practices;
- In swales or roadside ditches where temporary seeding has been recently implemented but has not had time to take root and fully develop;
- As a series of check dams, spaced at appropriate intervals, used in one of the above two applications.

Rock ditch checks should be **perpendicular** to the flowline of the ditch and must be designed so that water can flow over them, not around them. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the low point on the crest of the check. Where multiple check dams are used, the top of the lower dam should be at the same elevation as the toe of the upper dam.

The following table provides check spacing for a given ditch grade:

Ditch Grade (Percent)	Check Spacing (feet)	Check Spacing (meters)
5	59	18
6	49	15
7	43	13
8	36	11
9	33	10
10	30	9

Limitations

- Check dams should not be used in live, continuously flowing streams unless approved by an appropriate regulatory agency.
- Check dams may require frequent removal of accumulated sediments. Dams should therefore be located in areas accessible to maintenance vehicles.
- Leaves have been shown to be a significant problem by clogging check dams in the fall. Therefore, increased inspection and maintenance may be required in the fall.
- Sediment control log check dams decompose over time, and may be consumed by livestock.

Construction Specifications

- Install straw bale check dams, rock check dams, and other check dams according to design criteria outline at the end of the BMP Fact Sheet.
- Check dams should be located in areas accessible to maintenance vehicles for the periodic removal of accumulated sediments.
- Check dams should be installed with careful placement of the construction material. Do not dump rocks into the drainage channel carefully place material to construct the check dams.
- Check dams can be constructed from a number of different materials. Most commonly, they are made of sediment control log or rock. When using rock, the material diameter should be four to eight inches depending on the expected velocity and quantity of runoff within the channel. Sand/gravel bags may also be used. Silt fence is not an appropriate material for check dams.
- When reinforced check dams are used, install erosion control fabric around the dam to prevent erosion on the upstream and downstream sides. Each section of the check dam should be keyed in with good contact with the ground surface and extend to the top of the swale/ditch.
- When installing more than one check dam in a channel, outlet erosion stabilization measures should be installed below the final dam in the series because this area is likely to be vulnerable to further erosion. Riprap, erosion control blanket lining, or some other stabilization measure can be used for this outlet/energy dissipation.

Maintenance and Removal

Replace missing rocks causing voids in the check dam. If gravel bags or sandbags are used, replace or repair torn or displaced bags.

Remove accumulated sediment, as needed to maintain BMP effectiveness, typically before the sediment depth upstream of the check dam is within ½ of the crest height. Remove accumulated sediment prior to mulching, seeding, or chemical soil stabilization. Removed sediment can be incorporated into the earthwork with approval from the Project Manager, or disposed of at an alternate location in accordance with the standard specifications.

Check dams constructed in permanent swales should be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment should be removed, and the area seeded and mulched, or otherwise stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm
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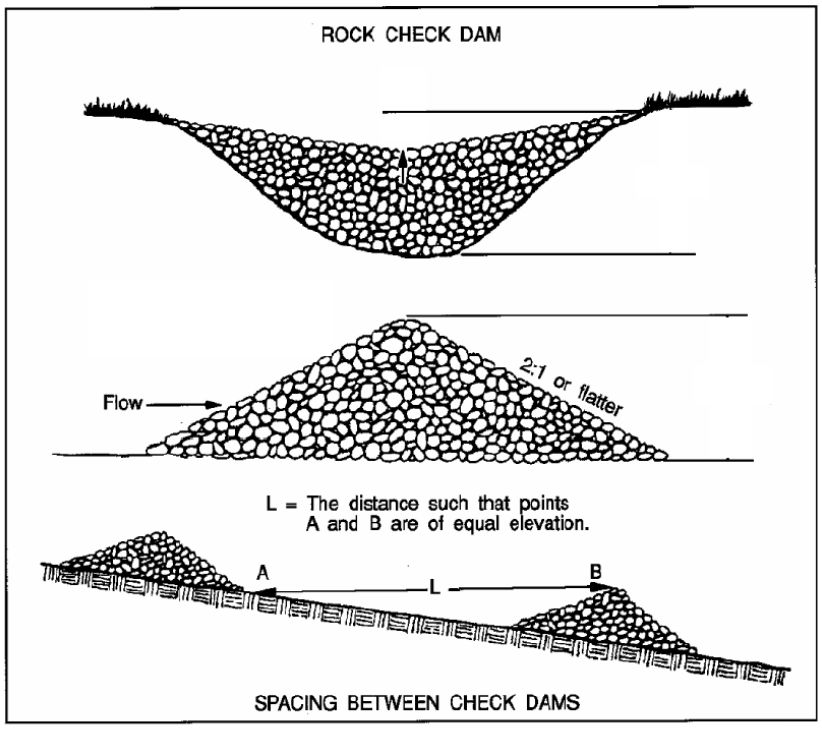
North Dakota Department of Health Division of Water Quality, *A Guide to Temporary Erosion-Control Measures for Contractors, Designers and Inspectors, June 2001.*

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

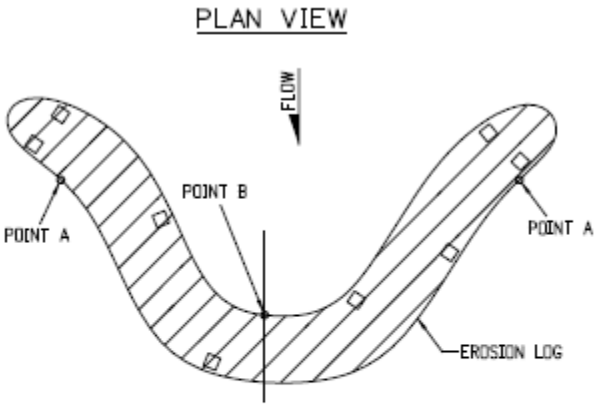
Check Dam (CD)

CD

Design Criteria

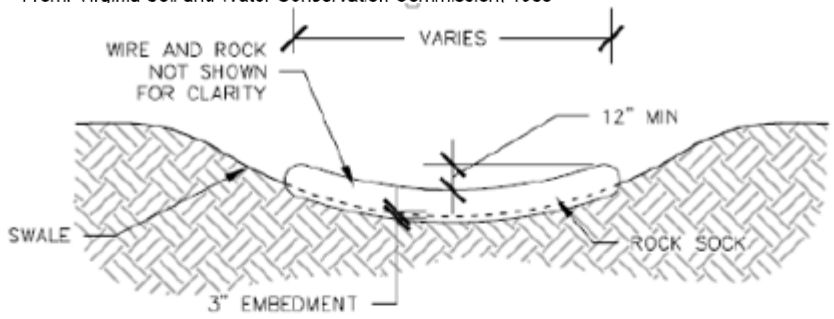


From: Virginia Soil and Water Conservation Commission, 1985

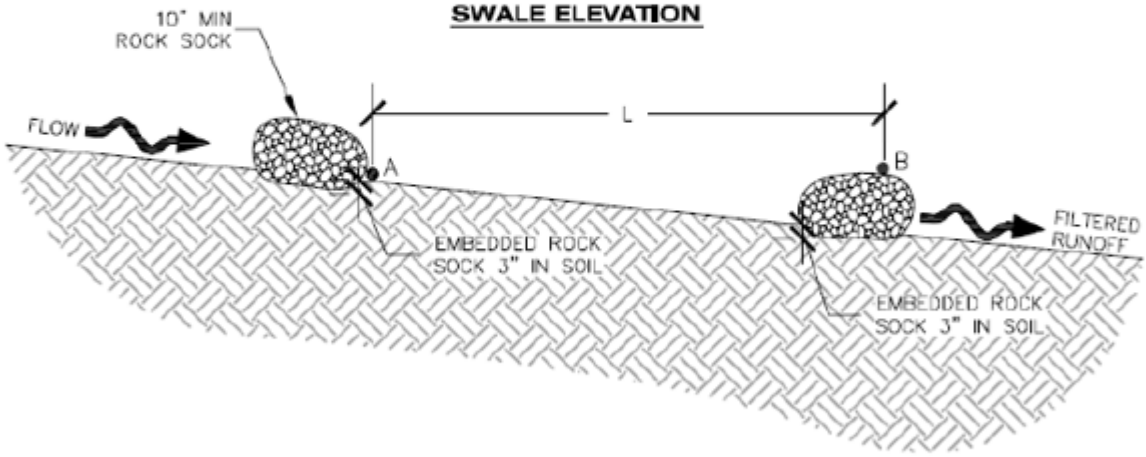


NOTES

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. STAKES SHALL BE EMBEDDED TO A MINIMUM DEPTH OF 12 INCHES.
3. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.



SWALE ELEVATION



L = THE DISTANCE SUCH THAT POINT A AND B ARE OF EQUAL ELEVATION.

SWALE SPACING

ROCK SOCK IN SWALE

CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF CHECK DAMS.
   - –CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - –LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).

2. CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.

3. RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").

4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.

5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.

5. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

6. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Basin (SB)

SB

Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.



Photograph SB-1. Sediment basin at the toe of a slope. Photo courtesy of WWE. Source: UDFCD BMP Fact Sheet

Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume**: Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent "clean" runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft^3/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft^3/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.

- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.

- **Dam Embankment**: It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- **Inflow Structure**: For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins

Imperviousness (%)	Additional Storage Volume (ft^3) Per Acre of Tributary Area
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works**: The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:

  - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.

  - **Orifice Plate or Riser Pipe**: Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.

  - **Floating Skimmer**: If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.

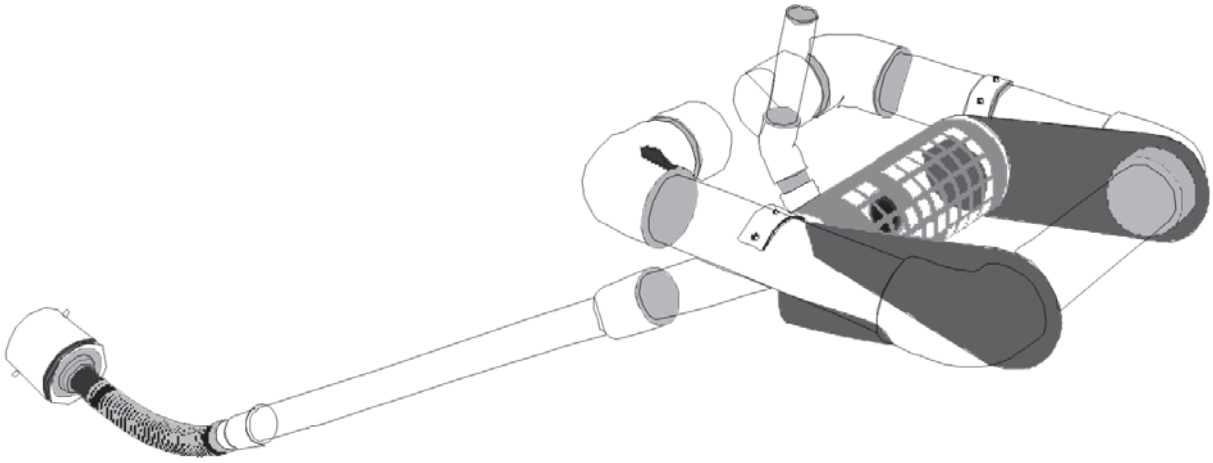


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

Maintenance and Removal

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

Sediment Basin (SB)

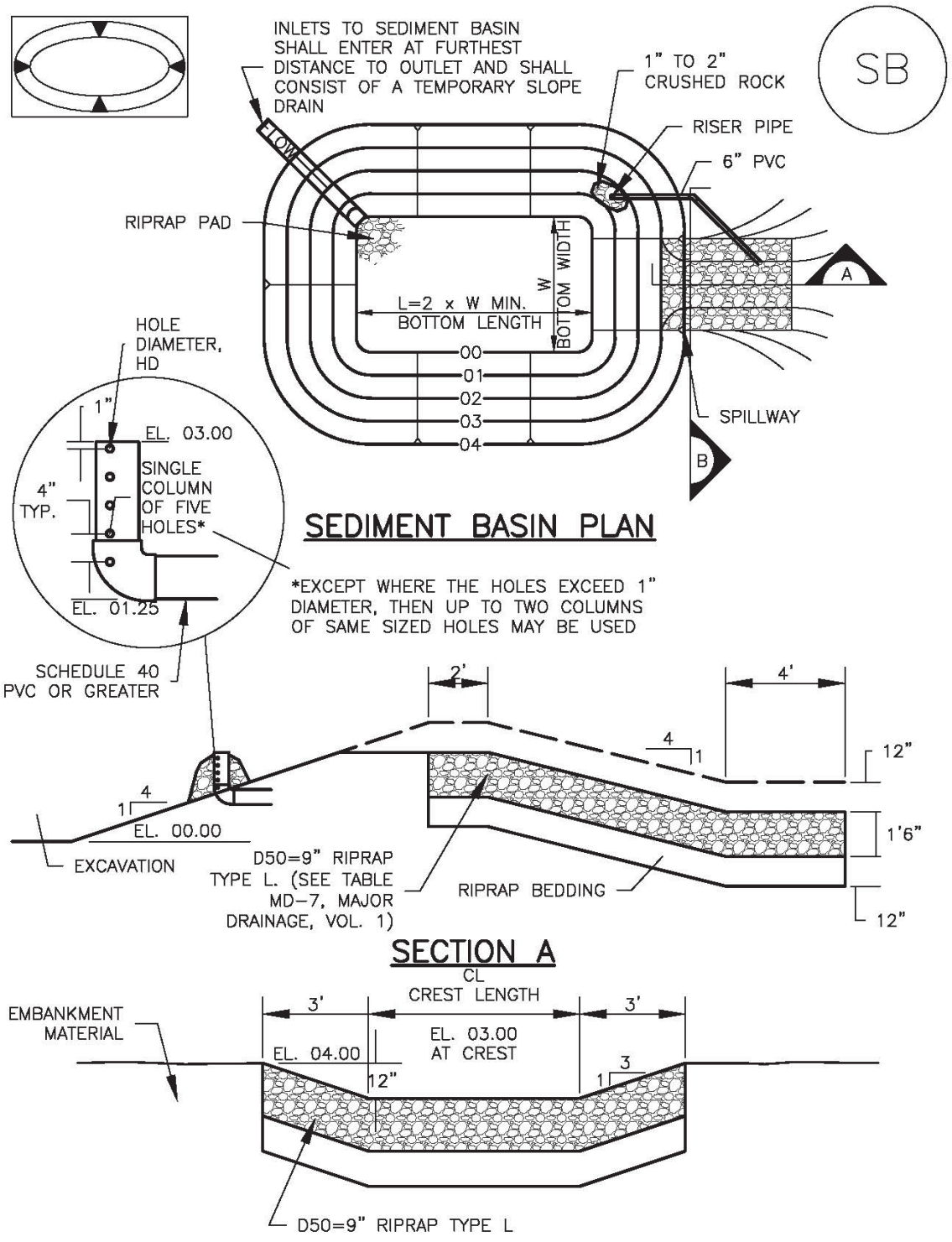


TABLE SB–1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 ½	2	9/32
2	21	3	13/16
3	28	5	½
4	33 ½	6	9/16
5	38 ½	8	21/32
6	43	9	21/32
7	47 ¼	11	25/32
8	51	12	27/32
9	55	13	⅞
10	58 ¼	15	15/16
11	61	16	31/32
12	64	18	1
13	67 ½	19	1 1/16
14	70 ½	21	1 ⅛
15	73 ¼	22	1 3/16

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF SEDIMENT BASIN.
   - –TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
   - –FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
   - –FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.

2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.

3. SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.

4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.

5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.

6. PIPE SCH 40 OR GREATER SHALL BE USED.

7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).

5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.

6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Trap

ST



Description

Sediment traps are small collection areas that allow sediment to settle out of stormwater runoff. They are usually installed in a drainage way or other point of discharge from a disturbed area. Sediment traps are formed by excavating below grade and/or by constructing an earthen embankment.

Applicability

Sediment traps are generally temporary control measures used at the outlets of stormwater diversion structures, channels, slope drains, construction site entrance wash racks, or any other runoff conveyance that discharges waters containing erosion sediment and debris. Sediment traps should be used for drainage areas less than five acres. The effective life span of these temporary structures is usually limited to 24 months. Traps may be located in a series to allow for backup control in case one trap fails.

Limitations

- Regular maintenance is needed to remove sediment. Traps should be located near roads or where accessible to remove sediment.
- Although sediment traps allow eroded soils to settle, due to the short detention periods for stormwater, traps typically do not remove fine particles such as silts and clays.
- Water may remain in sediment traps for extended periods causing mosquitoes and other insects to gather. Locate the trap in a sunny spot if possible.
- Never construct a sediment trap on a live flow stream or in wetlands.

Design Criteria

Location

Traps should be located at points of discharge from disturbed areas. The location will be determined by the natural terrain, drainage pattern of the runoff, and the accessibility for maintenance. Sediment traps should not be located in areas where their failure due to stormwater runoff excess can lead to further erosive damage of the landscape. Alternative diversion pathways should be designed to accommodate these potential overflows. Sediment trap locations should also allow for easy maintenance access for the periodic removal of accumulated sediment.

Storage capacity

A sediment trap should be designed to maximize surface area for infiltration and sediment settling. This will increase the effectiveness of the trap and decrease the likelihood of backup during and after periods of high runoff intensity. The designed capacity of the sediment trap shall be determined based on site-specific conditions. The orientation of the sediment trap will be limited by the amount of space on a site especially at boundaries.

Construction Specifications

See Figure ST-1 for installation details.

- If possible, sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.
- Traps should be located above the floodplain, where possible. If there are space constraints, several small sediment traps may be constructed in series.
- Area under embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared.
- The fill material for the embankment shall be free of roots and other woody vegetation as well as over-sized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Seeding of the embankment should be performed as soon as possible after construction of the sediment trap. Erosion control blanketing may also be used to cover the embankment in combination with seeding or during time periods when seeding is ineffective.
- The spillway may consist of a stone section in the embankment formed by a combination coarse aggregate/riprap to provide for filtering/detention capability. Riprap shall be 4-inch to 8-inch rock, while the coarse aggregate shall be ½ to ¾ inches. A Geotextile may be placed at the stone-soil interface to act as a separator.
- Another option for the spillway is to use straw bales or wattles at the overflow point in the trap and line the rest of the spillway with an erosion control blanket (see EROSION CONTROL BLANKET [ECB]).

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). The primary maintenance consideration for temporary sediment traps is the removal of accumulated sediment from the basin to ensure the continued effectiveness of the sediment trap. Sediments should be removed when the basin reaches approximately 50% sediment capacity. Inspectors should also ensure that the trap is draining properly and check the structure for damage from erosion. The depth of the spillway should be checked and maintained at a minimum of 1.5 feet below the low point of the trap embankment.

Sediment Trap

ST

Removal

The structure shall be removed and the area stabilized when the drainage area has been properly stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide.* 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004

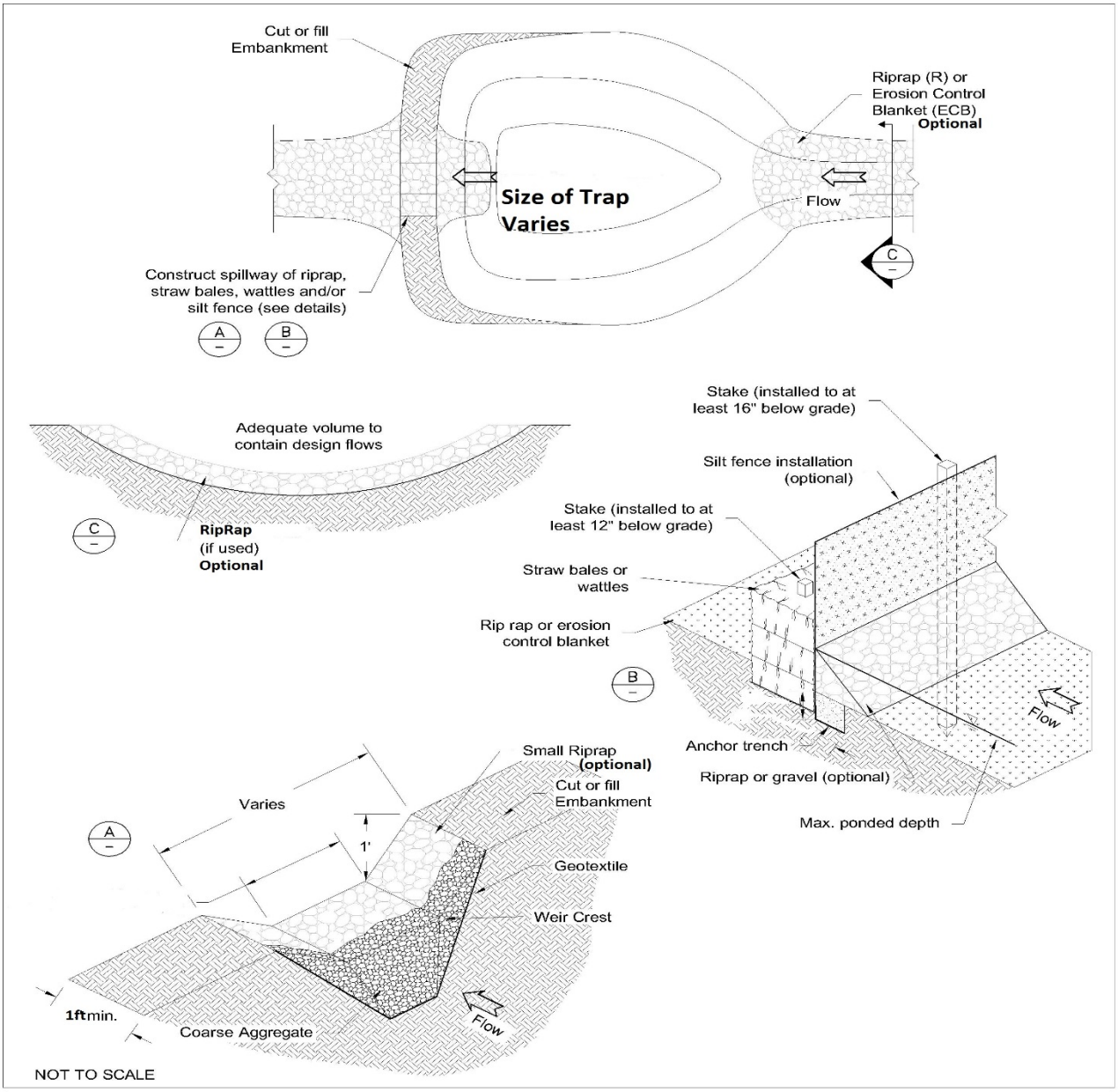

Cut or fill
Embankment
Riprap (R) or
Erosion Control
Blanket (ECB)
Optional
Size of Trap
Varies
Flow
C
Construct spillway of riprap,
straw bales, wattles and/or
silt fence (see details)
A
B
Adequate volume to
contain design flows
C
RipRap
(if used)
Optional
Stake (installed to at
least 16" below grade)
Silt fence installation
(optional)
Stake (installed to at
least 12" below grade)
Straw bales or
wattles
Rip rap or erosion
control blanket
B
Flow
Anchor trench
Riprap or gravel (optional)
Max. ponded depth
Small Riprap
(optional)
Cut or fill
Embankment
Varies
A
1'
Geotextile
Weir Crest
1ftmin.
Coarse Aggregate
Flow
NOT TO SCALE

Figure ST-1.

Sediment Trap

ST

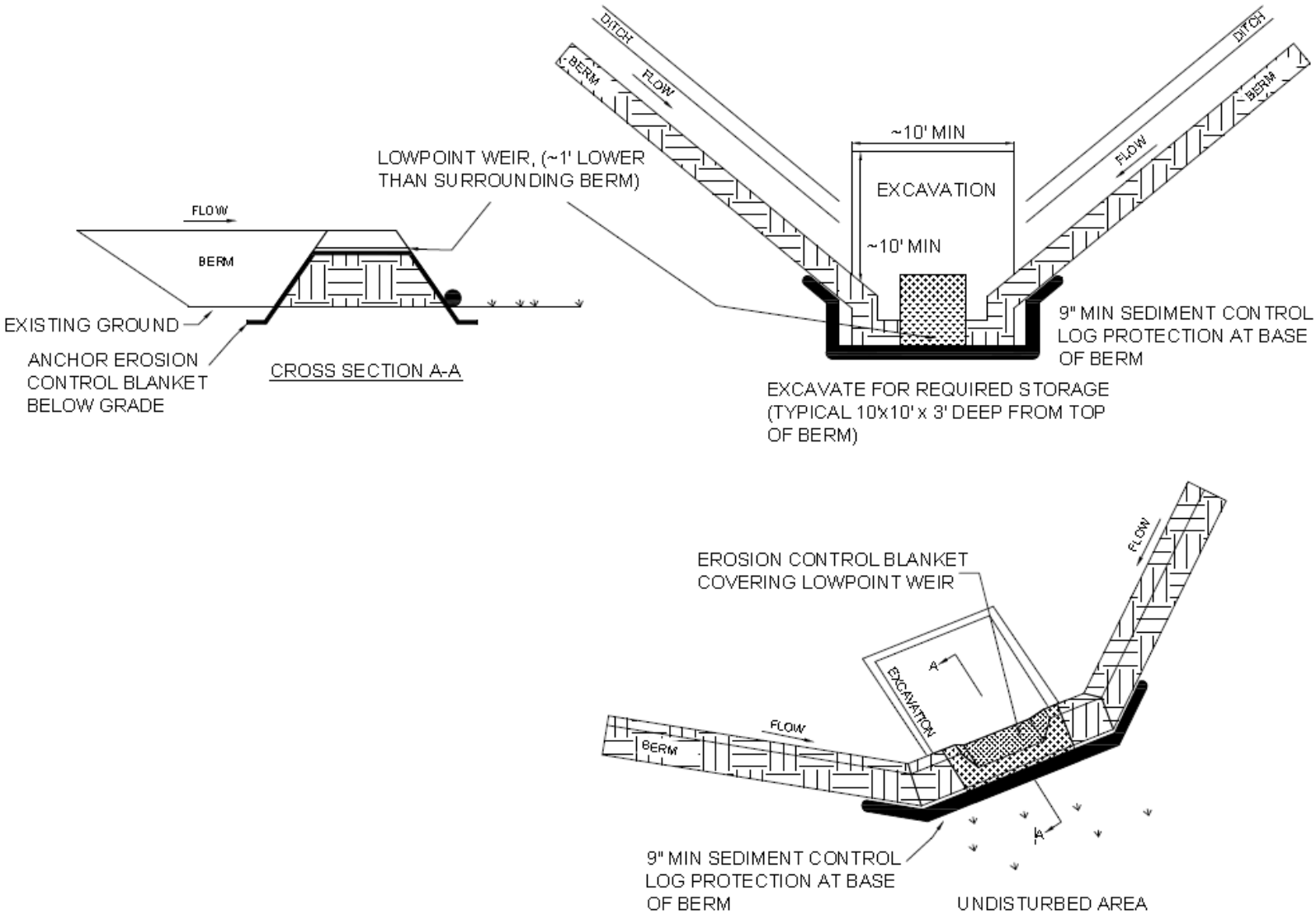


Figure ST-2.

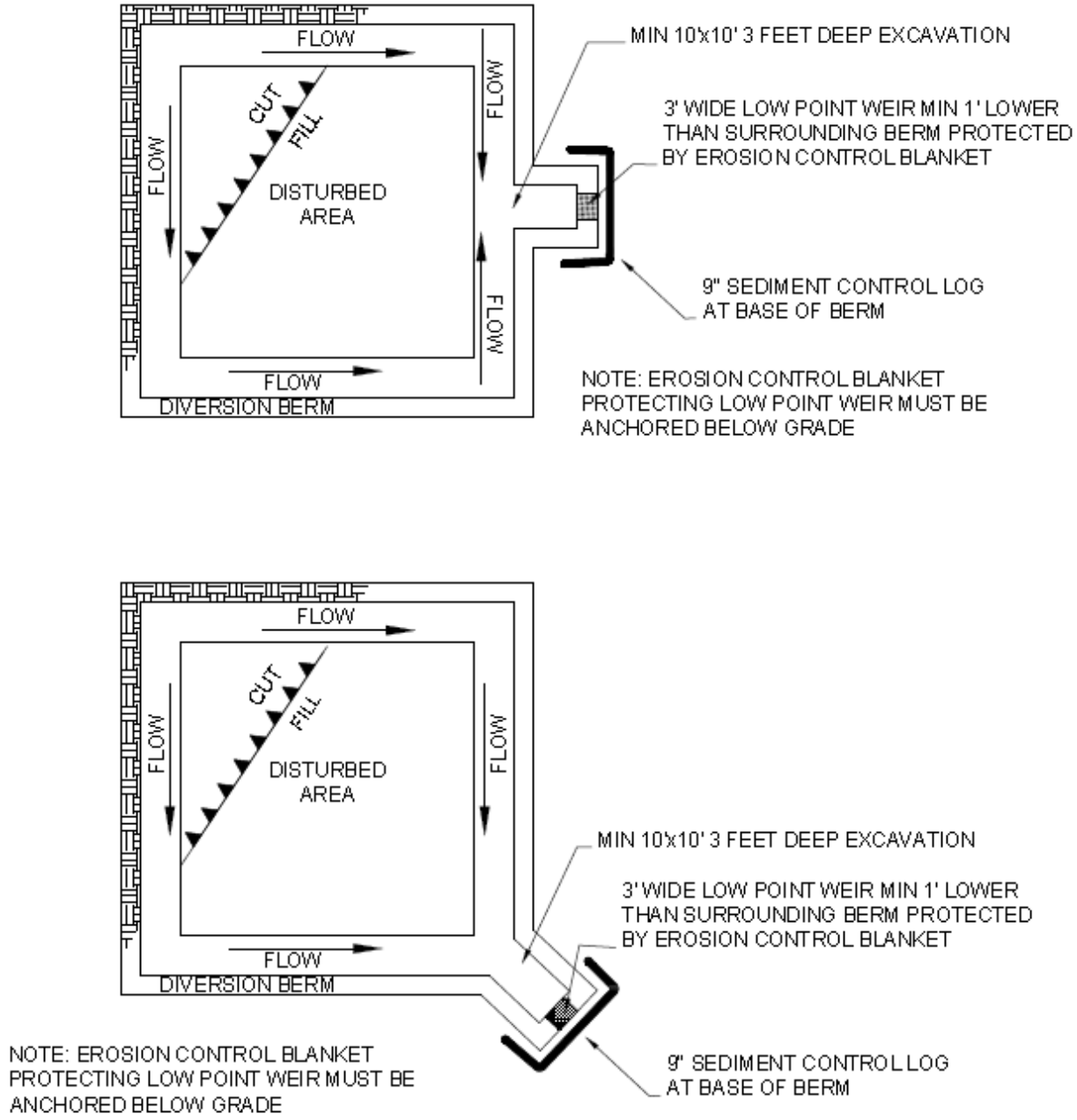


Figure ST-3.

minor revisions to
detail 02/21/2017

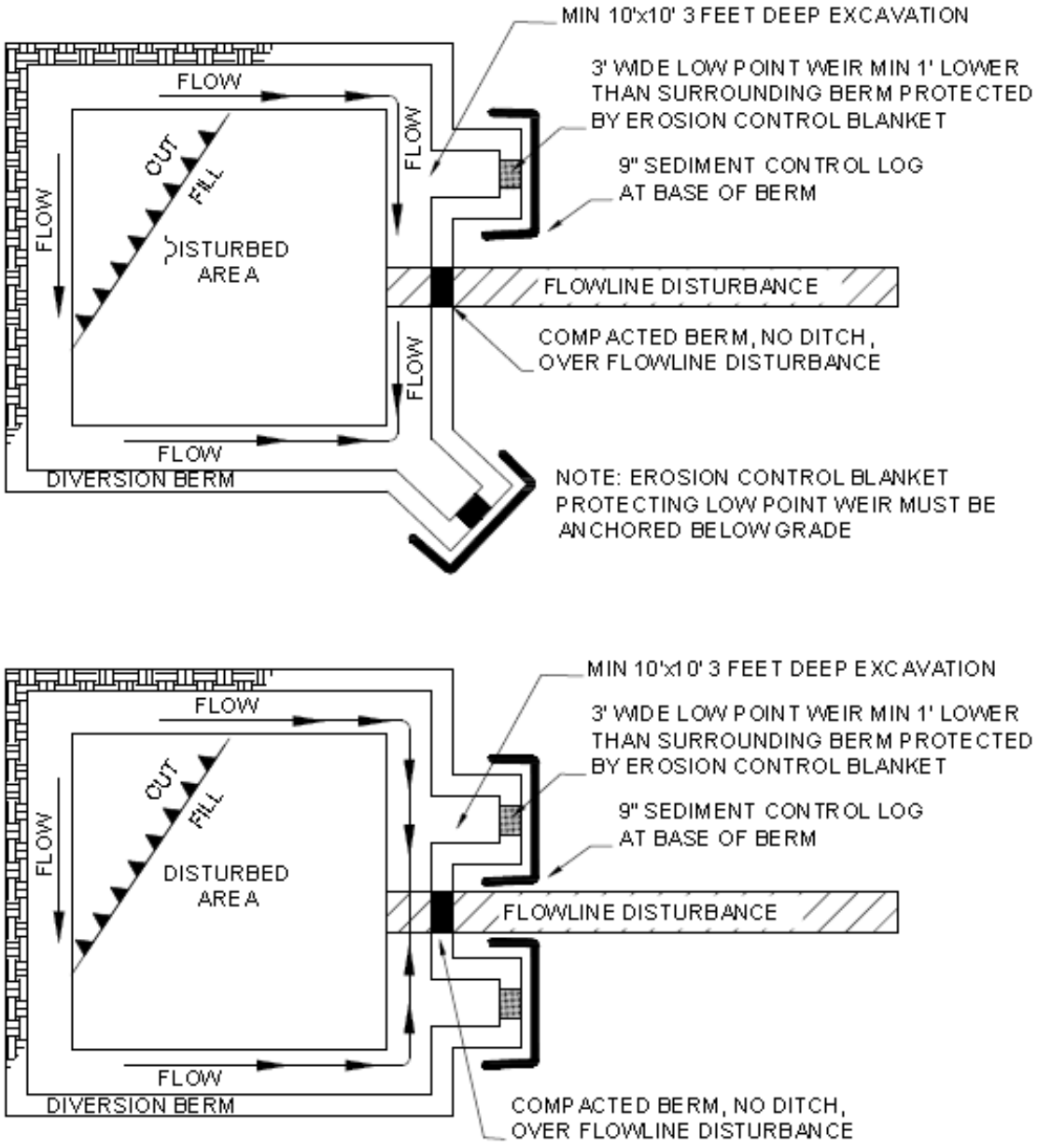


Figure ST-4.

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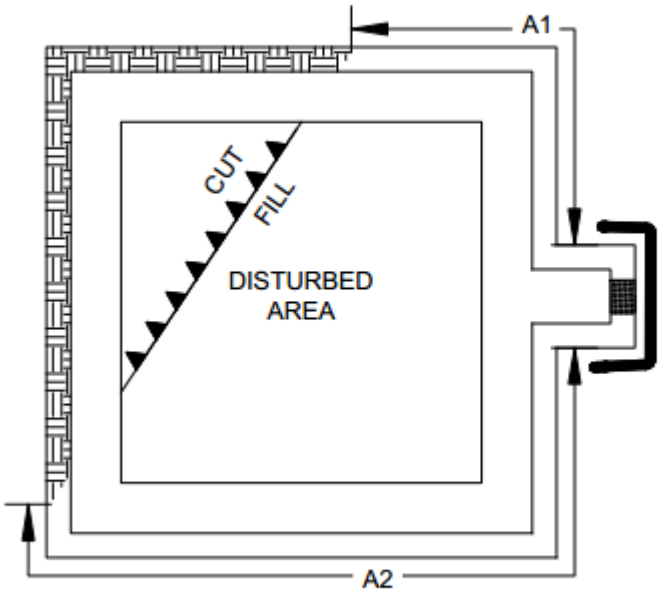


Figure ST-5. A1 + A2 = Total ditch and berm diversion length used to size sediment trap (ft).

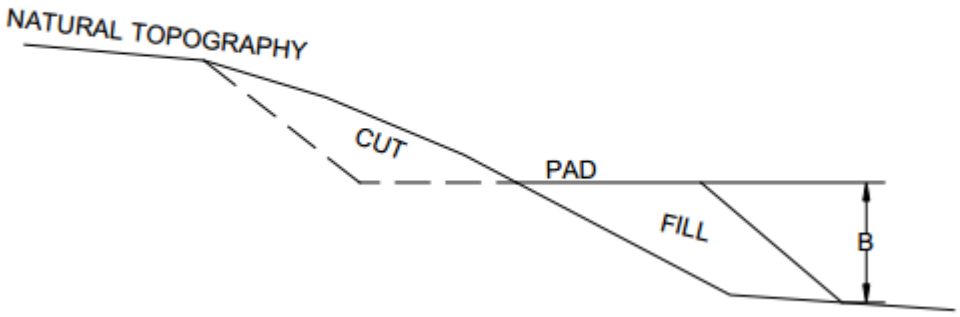


Figure ST-6. B = Pad fill height (ft), at pad low point.

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	**4**	**6**	**8**	**10**	**12**
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	**Area of 3.0' Deep Sediment Trap (ft^2)**					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Culvert

C

Description



Culverts are typically concrete, steel, aluminum, or plastic pipe used to move water under a road or to direct flow under the road or construction area.

Applicability

Culverts are ideal on roads with grades of less than 15%. For grades over 15%, it is best to use frequently spaced relief culverts and drainage crossing culverts, with armored ditches. Culverts may be used in the following applications:

- As drainage crossing culverts in streams and gullies to allow normal drainage to flow under the traveled way;
- As ditch relief culverts to periodically relieve the inside ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway.

Limitations

- Undersized culverts are susceptible to plugging and will require cleaning.
- Culverts will not filter sediment.
- Culverts are easily crushed if not properly designed.

Design Criteria and Construction Specifications

Pipe size can be determined for culverts in Weld County by using their criteria. According to the Weld County Drainage Criteria, a minimum culvert capacity is the capacity required to convey the 10-yr storm. However, the minimum culvert diameter allowed in public right-of-way is 15-inches. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties. Culvert sizing needs to account for the Weld County requirement that a road cannot be overtopped by more than 6-inches of water during the 10-yr event. In jurisdictions other than Weld County, use the jurisdiction's applicable culvert sizing criteria. Table C-1 may be used as a general design guide, but size is ideally based upon site-specific hydrologic analysis.

Culvert

C

Table C-1

Drainage Area (acres)	Size of Drainage Structure (diameter and area)			
	Steep Slopes (Light Vegetation) C=0.7		Gentle Slopes (Heavy Vegetation) C=0.2	
	Round Pipe (In)	Area (sq.ft)	Round Pipe (In)	Area (sq.ft)
0-10	30"	4.9	18"	1.8
10-20	42"	9.6	24"	3.1
20-35	48"	12.6	30"	4.9
35-75	72"	28.3	42"	9.6
75-125	84"	38.5	48"	12.6
125-200	96"	50.3	60"	19.6

* Due to site specific conditions this table may not be used.

Depth

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost to road use and erosion. Weld County requires a minimum of 1–foot of cover. If 1-foot of cover is not possible, the culvert material must be rated for a minimum of HS-20 loading or the largest expected loads crossing it (oil rigs, semis, etc.)

Firmly compact well-graded fill material (soil or road base) around culverts, particularly around the bottom half, using placement in layers to achieve a uniform density. Use slightly plastic sandy gravel with fines. Avoid the use of fine sand and silt rich soils for bedding material because of their susceptibility to piping. Pay particular attention to culvert bedding and compaction around the haunches of the pipe. Do not allow the compaction to move or raise the pipe. In large fills, allow for settlement.

End Sections

Culverts installed in Weld County public right-of-ways must be equipped with a flared end section on the entrance and outlet. Erosion protection such as riprap may be required. See Culvert Protection BMP Fact Sheet for details on riprap installation.

Drainage crossing culverts

Make road crossings of natural drainages perpendicular to the drainage to minimize pipe length and area of disturbance (See Drainage Crossing Culvert Detail).

Use single large pipes versus multiple smaller diameter pipes to minimize plugging potential in most channels (unless roadway elevation is critical). In very broad channels, multiple pipes are desirable to maintain the natural flow spread across the channel. All culverts should be concrete corrugated metal pipe made of steel or aluminum, or properly bedded and backfilled corrugated plastic pipe.

Culvert

C

Align culverts in the bottom and middle of the natural channel flowline so that installation causes no change in the stream alignment or stream bottom elevation. Culverts should not cause damming or pooling or increase stream velocities significantly.

Extend the outlet of the culvert at least one foot beyond the toe of the slope to prevent erosion of the fill material. Alternatively, use retaining walls (headwalls) to hold back the fill slope.
It may be necessary to install rip rap, erosion control blanketing, or a combination of both or other energy-dissipater device at the outlet end of the culvert to reduce soil erosion or to trap sediment (See Culvert Protection BMP Fact Sheet).

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Ditch Relief Culverts See Ditch Relief Culvert Detail and the Discharge Locations for Ditch Relief Culverts Detail for installation details.

Ditch relief culverts can provide better flow when skewed 0 to 30 degrees perpendicular to the road.

The culvert gradient should be at least 2% greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris from plugging the culvert inlet. Discharge the culvert at natural ground level where possible (see Discharge Locations For Ditch Relief Culverts Detail, Type A), on firm, non-erosive soil or in rocky or bushy areas. If discharging on fill slopes, armor outlets with riprap or logging slash (see Discharge Locations For Ditch Relief Culverts Detail, Type B.)

Extend the inlet of the culvert at least one foot beyond the flowline of the roadside ditch. Extend the outlet of the culvert at least one foot beyond the toe slopes to prevent erosion of the fill material.

It may be necessary to install riprap or other energy-dissipater devices at the outlet end of the culvert to prevent soil erosion or to trap sediment (see Culvert Protection BMP Fact Sheet). Spacing of culverts is dependent on the road gradient, soil types, and runoff characteristics according to the table below.

Soil Type	Road Grade		
	3-4%	5-8%	9-12%
Highly Corrosive Granitic or Sandy	240'	180'	140'
Intermediate Erosive Clay or Load	310'	260'	200'
Low Erosive Shale or Gravel	400'	325'	250'

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Maintenance and Removal Considerations

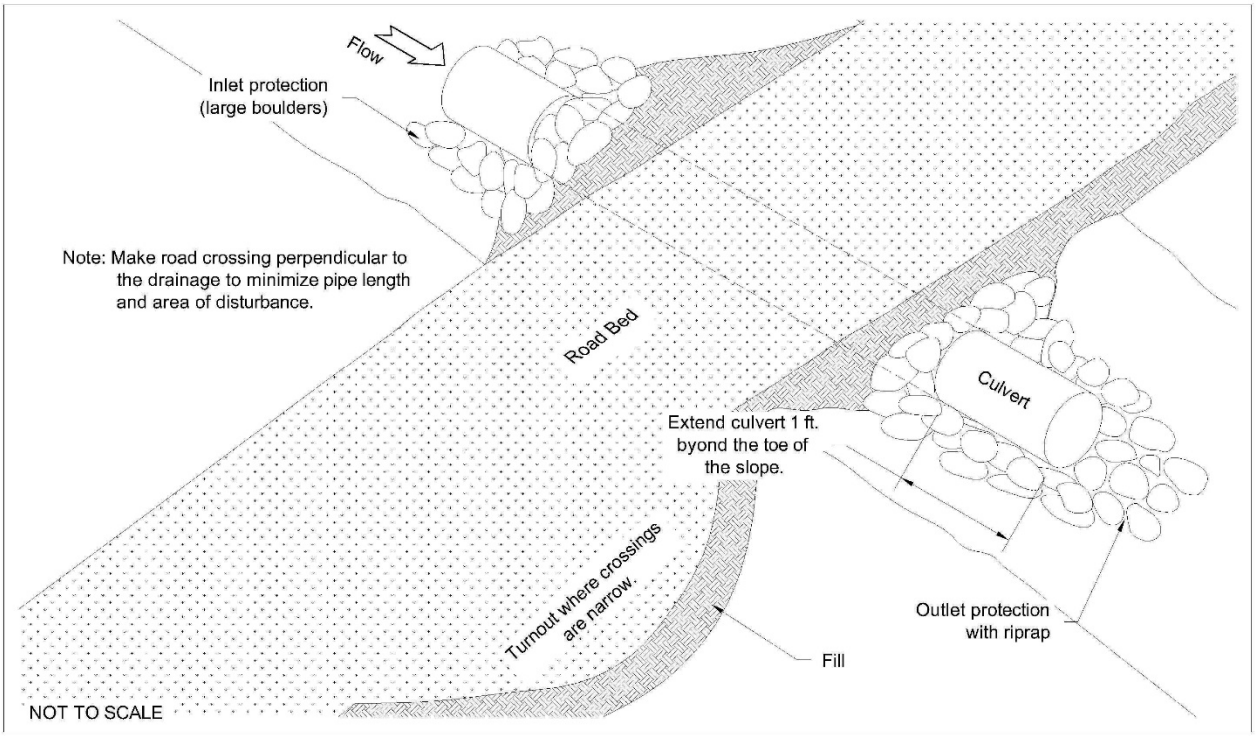
The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). If any damage to culvert or inlet/outlet protection is noted or if there is any evidence of scour, repairs should be made immediately. Any debris that may be blocking the culvert inlet or outlet should be removed. Culverts are typically left in place for permanent drainage for the site.

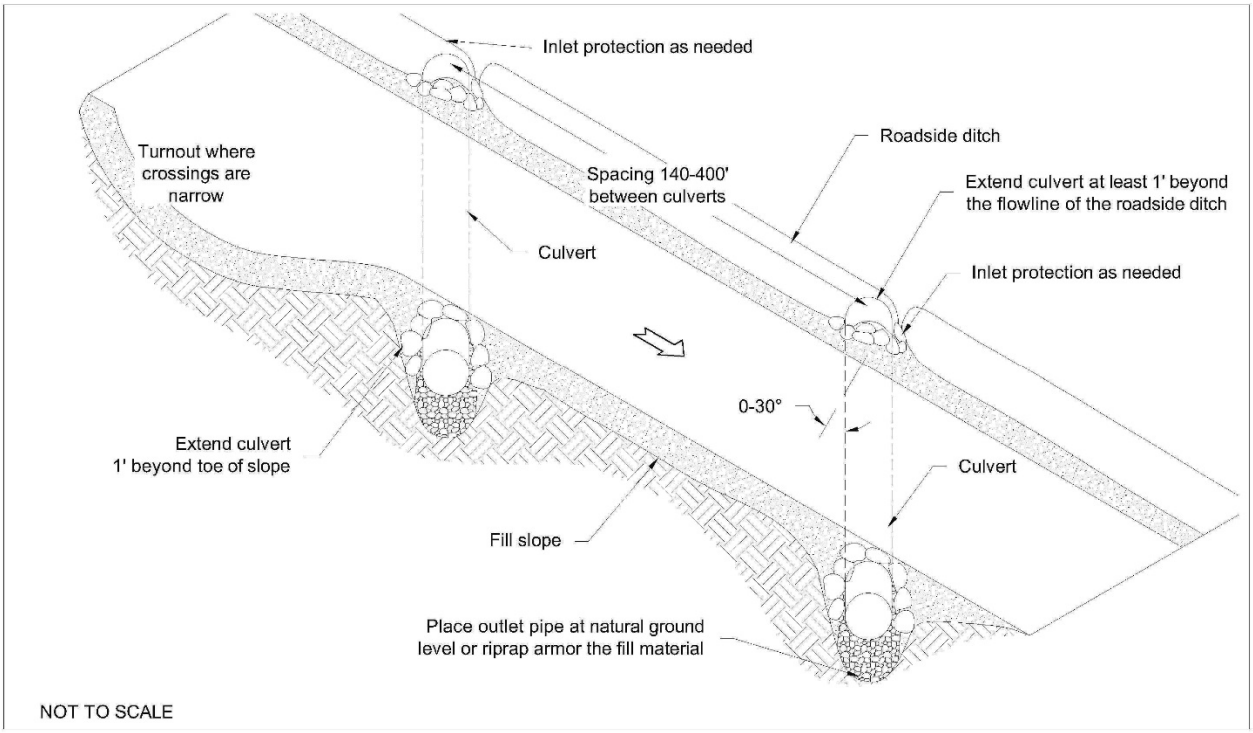
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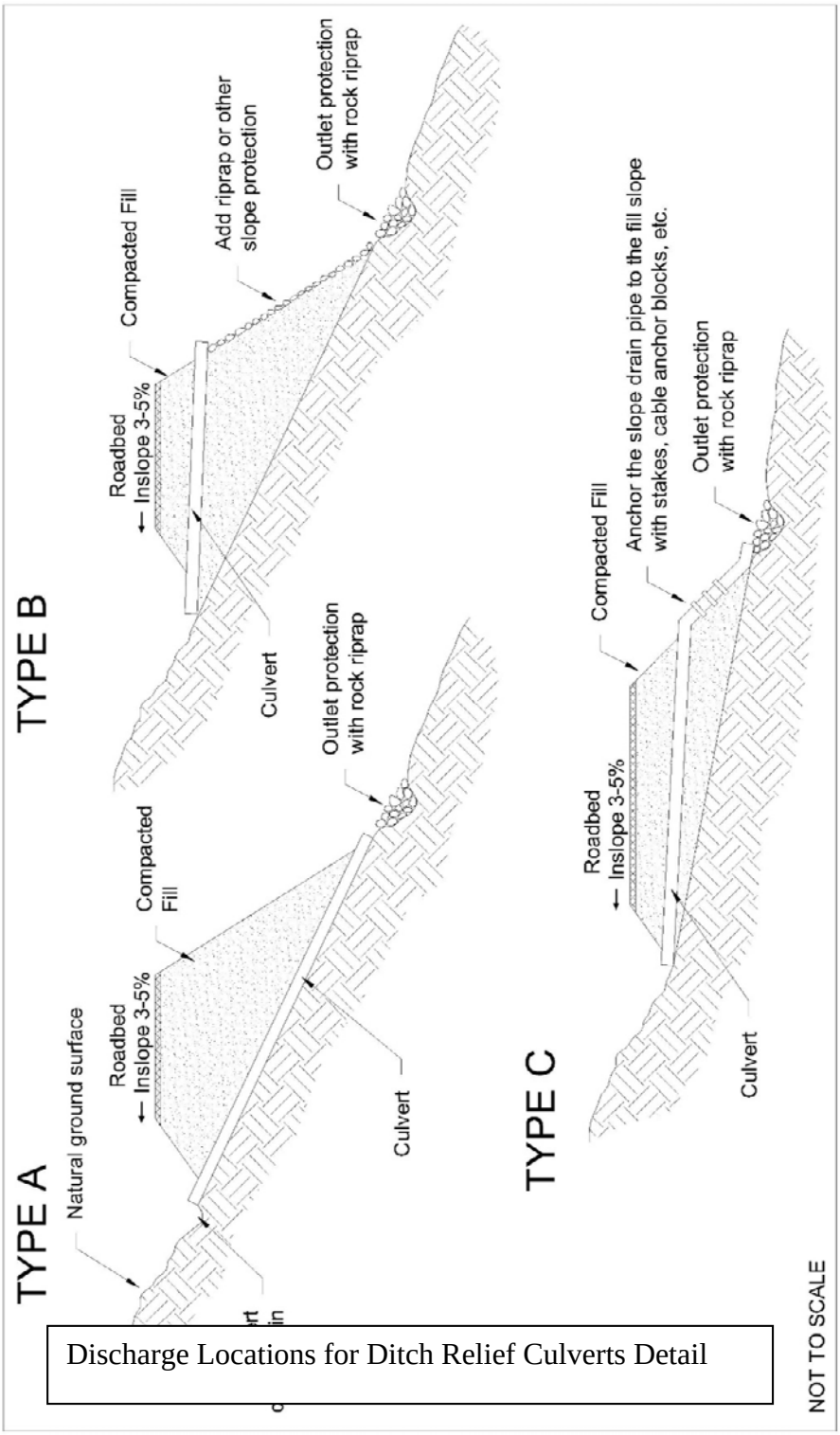




Ditch Relief Culverts Detail

Culvert

C



Discharge Locations for Ditch Relief Culverts Detail

Culvert Protection

IPC/OPC

Description

Culvert protection may be required at the inlet (upstream side) of the culvert and/or the outlet side of the culvert (downstream side).



Photograph. Riprap outlet protection with flared end

Culvert inlet protection may involve placing riprap, gabions, sediment control logs, rock socks, erosion control blankets/turf reinforced mats, and/or any other protection at the inlet pipes. Riprap, or other energy-dissipating devices, will reduce the velocity of stormwater flows and armor the banks, thereby preventing erosion and helping to protect the inlet structure. Sediment control logs minimize the potential for sediment from upgradient construction activities to enter the culvert.

Culvert outlet protection typically involves placing riprap or other appropriate energy-dissipating devices at the outlets of the pipes to reduce the velocity of stormwater flows, reducing the scour potential at stormwater outlets, protecting the outlet structure, and minimizing the potential for erosion downstream. Sediment control logs are also frequently used on the outlet to minimize erosion; however, they do not provide the energy dissipation that rock does.

Applicability

To prevent erosion from occurring at the culvert inlet and outlet, and to reduce the potential for sediment to enter into the culvert, culvert protection may be necessary. Riprap should be used where velocities and energies at the inlets and outlets of culverts are sufficient to erode the structure or the next downstream reach.

Limitations

Inlet protection should not block flow into the culvert. Rock aprons at the culvert outlets should not be placed on slopes steeper than 10 percent. Runoff from pipe outlets at the top of cut/fills or on slopes steeper than 10 percent should be routed via slope drains or riprap chutes to a rock apron at the toe of the slope. Otherwise, the flow will re-concentrate and gain velocity as the flow leaves the apron.

Design Criteria and Construction Specifications

Culvert Inlet protection

Erosion control blanket, riprap, gabions, rock socks or sediment control logs at culvert inlets shall be designed according to the appropriate BMP Fact Sheet for that material.

Culvert Inlet Protection Detail shows typical culvert inlet protection. However, site specifics shall dictate actual design. Modification which differ from the detail sheet must be based on good engineering and hydrologic design and documented in the SWMP.

Culvert Protection

IPC/OPC

Culvert Outlet Protection

Sediment control logs may also be used for temporary outlet protection during construction (see Sediment Control Log Culvert Outlet Protection Detail). If additional erosion protection and energy dissipation are required, riprap may be needed. If riprap is required and the riprap will be in place less than two years, the Temporary Outlet Protection Riprap Detail may be used. If the riprap will be permanently installed, the design methodologies outlined in the Hydraulic Structures chapter of the UDFCD Manual (Volume 2) must be followed.

Maintenance and Removal Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Inspect for debris at the entrance to culverts and within culverts. Inspect culvert protection for damage and erosion. The maintenance needs are usually very low for properly installed riprap aprons at culvert outlets; however, inspect for evidence of scour beneath the riprap at outlet aprons or dislodged stones which have moved beyond the outlet structure. Corrective action items found to reduce the effectiveness of the culvert or culvert outlet protection should be repaired immediately. See additional notes at the end of the details for maintenance.

References

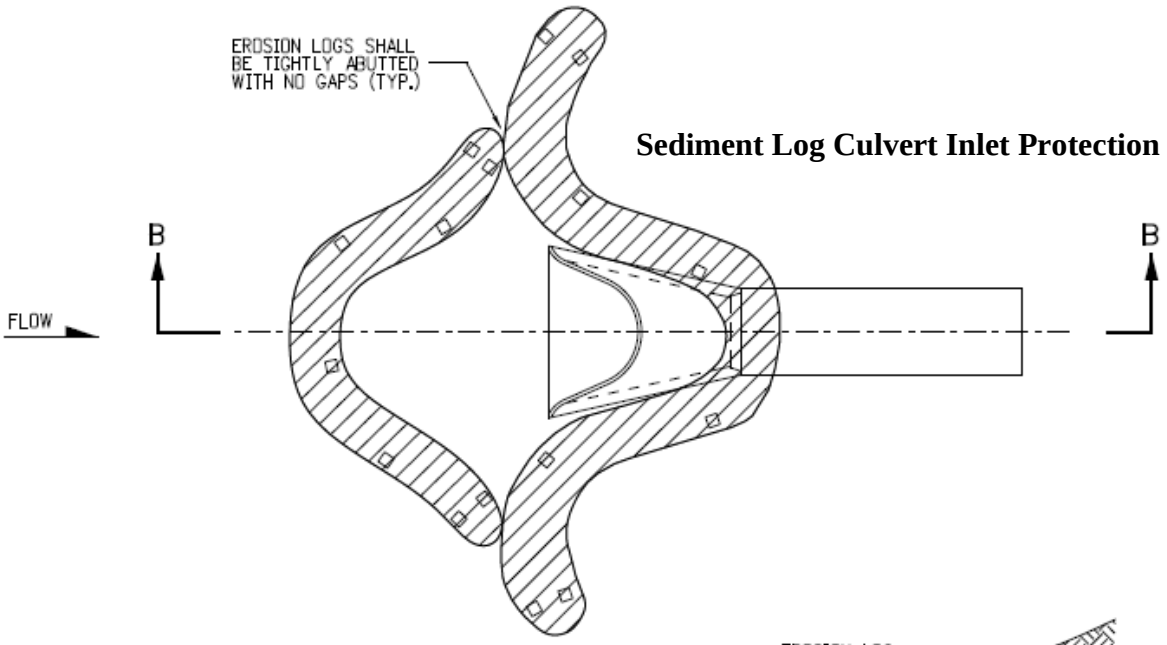
Keller, Gordon and James Sherar, *Low-Volume Roads Engineering, Best Management Practices Field Guide.* United States Department of Agriculture (USDA), Forest Service, US Agency of International Development (USAID), 2003. http://www.blm.gov/bmp/field%20guide.htm

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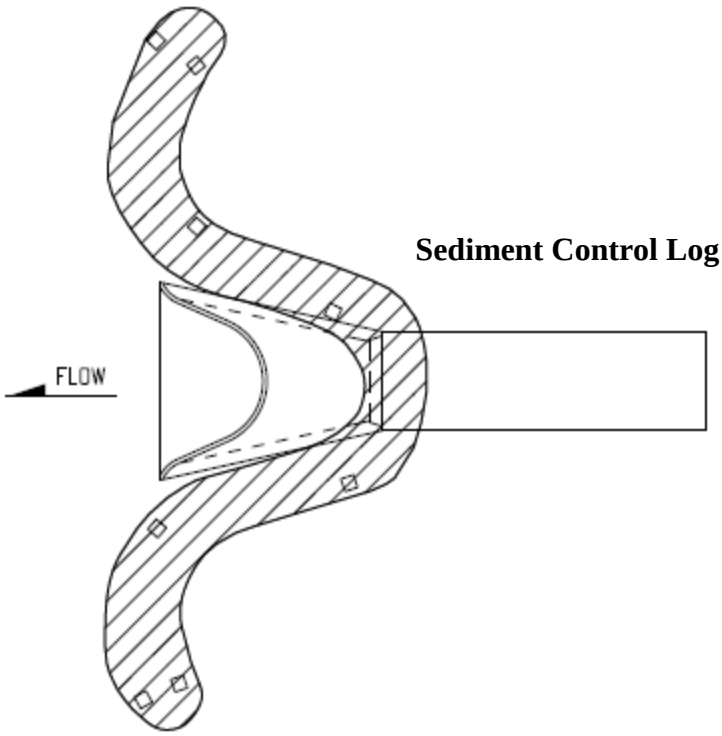
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Culvert Protection

IPC/OPC



Sediment Log Culvert Inlet Protection

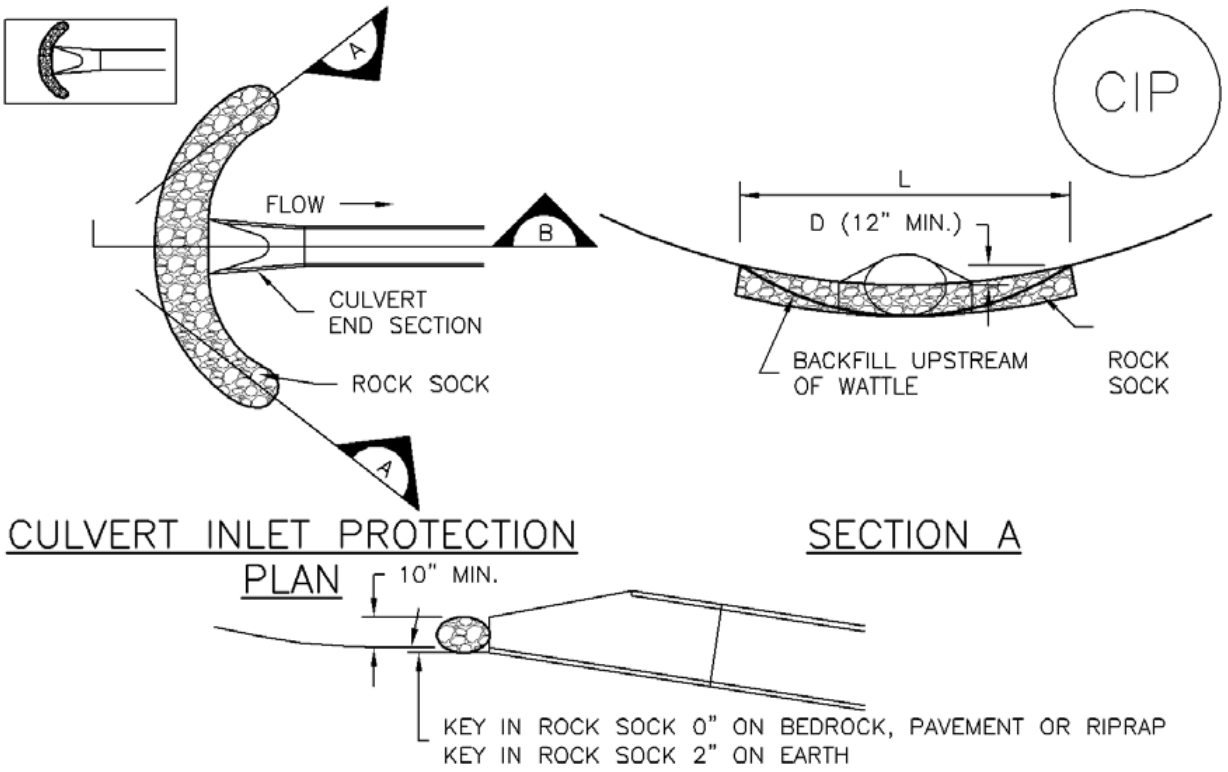


Sediment Control Log Culvert Outlet Protection

Culvert Protection

IPC/OPC

CULVERT PROTECTION DETAIL



CIP-1. CULVERT INLET PROTECTION – ROCK SOCK DETAIL

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CULVERT INLET PROTECTION.

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL OR SEDIMENT CONTROL LOG.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

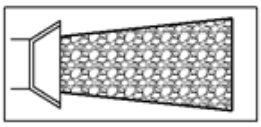
(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

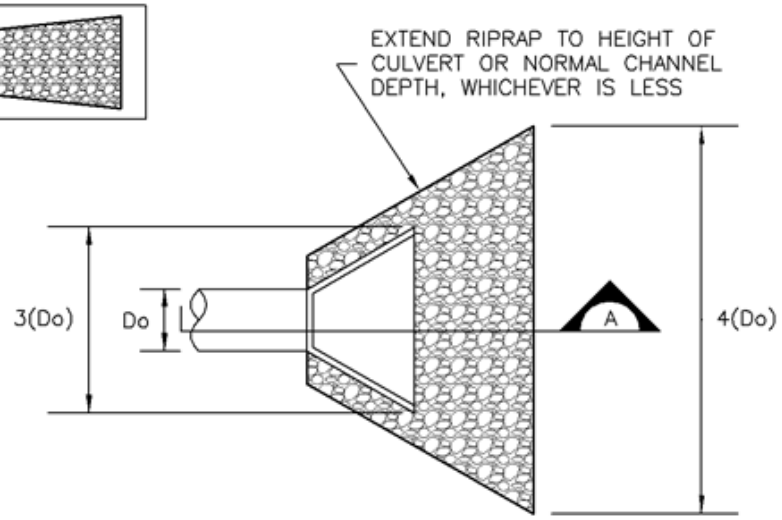
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Culvert Protection

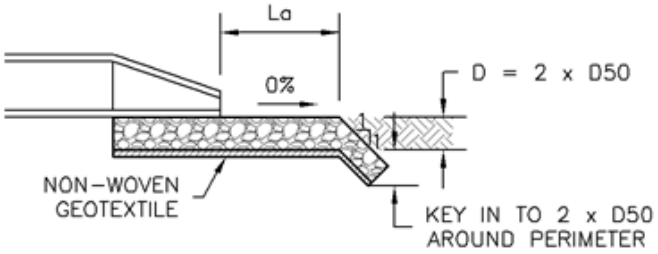
IPC/OPC

OP





TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

TEMPORARY OUTLET PROTECTION RIPRAP DETAIL

Culvert Protection

IPC/OPC

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   - –LOCATION OF OUTLET PROTECTION.
   - –DIMENSIONS OF OUTLET PROTECTION.

2. DETAIL IS INTENDED FOR PIPES WITH SLOPE $\leq$ 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Temporary and Permanent Seeding (TS/PS)

TS/PS

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.



Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period, proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms,

rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period, plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. See applicable seed mixes and/or landowner agreements for revegetation requirements. Other seed mixes may be used if the site conditions warrant a different seed mix.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Various Known Seeding Mixes for Kerr-McGee

Anadarko Dryland Pasture Mix (Lot 20071)

Kind and Variety	Pure%	Germ%	Origin
Tetraploid Perennial Ryegrass	19.68	91	OR
Smooth Brome, Lincoln	18.66	96	KS
Intermediate Wheatgrass, Oahe	14.76	91	SD
Dahurain Wildrye	14.44	93	WA
Orchardgrass, Paiute	14.29	94	OR
Pubescent Wheatgrass, Luna	13.35	97	CAN
Crop: .23% Inert: 3.94% Weeds: .15% Net Wt: 27.9167# (25 pls) 1 ac			

H2 Salty Dog Mix (Lot 20195)

Kind and Variety	Pure%	Germ%	Origin
Newhy Saltlander Wheatgrass	36.34	97	MT
Western Wheatgrass	15.85	98	KS
Canada Wildrye	15.48	97	CAN
Indian Ricegrass	13.19	94	WA
Tall Fescue	8.61	91	OR
Alkali Grass, Fults	3.44	95	WA
Alkali Sacaton	.82	80	OK
Crop: .00% Inert: 5.75% Weeds: .52% Net Wt: 15.34# (13.78 pls) 1 ac			

Temporary and Permanent Seeding (TS/PS)

TS/PS

Sandy Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.4	9.0	15%
Intermediate Wheatgrass	Thinopyrum intermedia	4.5	9.0	15%
Sand Dropseed	Sporobolus cryptandrus	0.1	9.0	15%
Indian Ricegrass	Achnatherum hymenoides	2.8	9.0	15%
Green Needlegrass	Nassella viridula	2.2	9.0	15%
Sideoats Grama	Bouteloua curtipendula	2.05	9.0	15%
Switchgrass	Panicum virgatum	0.7	6.0	10%
Total	--	12.6	60.0	100%

Clay Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	3.3	12.0	20%
Sideoats Grama	Bouteloua curtipendula	2.7	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Green Needlegrass	Nassella viridula	1.4	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	11.8	60.0	100%

Temporary and Permanent Seeding (TS/PS)

TS/PS

Salty Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Alkaligrass (Fults)	Puccinellia distans	0.5	15.0	25%
Newhy Saltlander	Hybrid wheatgrass	4.3	12.0	20%
Tall Fescue	Festuca arundinacea	2.3	12.0	20%
Indian Ricegrass	Achnatherum hymenoides	1.9	6.0	10%
Alkali sacatons	Sporobolus airoides	0.1	6.0	10%
Western Wheatgrass	Pascopyrum smithii	1.2	3.0	5%
Canada Wildrye	Elymus Canadensis	2.3	6.0	10%
Total	--	12.6	60.0	100%

Lowland Equine Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Green Needlegrass	Nassella viridula	2.9	12.0	20%
Timothy	Phleum Prantense	0.4	12.0	20%
Intermediate Wheatgrass	Thinopyrum intermedia	5.9	12.0	20%
Sand Dropseed	Sporobolus cryptandrus	0.1	12.0	20%
Sideoats Grama	Bouteloua curtipendula	1.4	6.0	10%
Little Bluestem	Schizachyrium scoparium	1.0	6.0	10%
Total	--	11.7	60.0	100%

Lowland Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Mountain brome	Bromus marginatus	5.8	12.0	20%
Blue grama	Bouteloua gracilis	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	1.6	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	12.4	60.0	100%

Arkansas Valley Seed, Inc.

Premium Irrigated Pasture Mix

A mixture of perennial, cool season grasses formulated with varieties that produce the highest quality and yielding forage. These grasses are palatable and excellent for grazing and hay production. Performs well in the Intermountain West as well as the High Plains of the Rocky Mountain region.

Characteristics:

Grows 2-6 feet tall
Premium varieties
High yielding and quality irrigated forage

Seeding Rate:

New Seeding
Broadcast: 30-35 lbs/acre
Drilled: 20-25 lbs/acre
Overseeding
Broadcast: 15-20 lbs/acre
Drilled: 10-15 lbs/acre

Mix Contains:

25% Elite Tetraploid Perennial Rye

Bunchgrass with ermination in 5-10 days.
One of the most widely used grasses and is adaptable to a wide variety of soils and climate conditions. A leafy pasture type perennial rye.

25% Potomac Orchardgrass

Bunchgrass with germination in 14-21 days.
One of the earliest species to exhibit growth in the spring, making tremendous forage potential under cooler conditions. Performs well on different textured soils. Found throughout the west, this grass is great forage and hay producer.

20% Improved Meadow Brome

Bunchgrass with germination in 10-14 days.
Meadow Brome is a long-lived perennial that is slow to establish. It is very palatable and highly productive.

15% Crown Royale Orchardgrass

Bunchgrass with germination in 14-21 days.
Similar to Potomac, but with a later maturity date.

10% Manchar Smooth Bromegrass

Sod-forming grass with germination in 10-14 days.
Smooth bromegrass is resistant to drought and extremes in temperature. It is the most widely used of the cultivated brome grasses. Grows throughout most of the US.

Foothills Mix

A mixture developed for elevations of 3,000 to 8,000 feet to provide natural cover under dryland conditions. Contains both cool and warm season grasses adapted to the Western Great Plains and Southwest region. Has excellent cold and drought tolerance. Good for soil stabilization on poor soils.

Characteristics:

Grows 36-60 inches with average rainfall
Excellent natural cover for dryland areas

Seeding Rate:

New Seeding
Broadcast: 20-25 lbs/acre
Drilled: 15-20 lbs/acre
Overseeding
Broadcast: 10-15 lbs/acre
Drilled: 5-10 lbs/acre

Mix Contains:

25% Annual Ryegrass

Cool season bunchgrass with germination in 5-10 days.
Noted for quick germination. Provides fast green up and root structure to stabilize soil.

15% Slender Wheatgrass

Cool season bunchgrass with germination in 21-28 days.
A native species to the mountain and intermountain areas of the western United States and the northern Great Plains.

12% Pubescent Wheatgrass

Cool season bunchgrass with germination in 14-21 days.
Drought tolerant, and winter hardy grass with deep rooted system making an excellent soil binder.

10% Mountain Brome

A cool-season bunchgrass with germination in 10-14 days.
Survives on thin, dry or coarse soils, and displays strong winter hardiness. Will produce best in moist deep fertile soils.

10% Hard Fescue
Cools bunchgrass with germination in 7-10 days.
Well adapted to many soil types and often used for erosion control.

10% Canada Bluegrass
Cool season bunchgrass with germination in 14-21 days.
Often used for soil stabilization.

6% Sideoats Grama
Warm season bunch/sod forming grass with germination in 14-21 days.
A medium-sized perennial 15 – 30" tall, it is adapted to most soil conditions.

6% Big Bluestem
Warm season sod-former with germination in 14-21 days.
It is tall grass, reaching a height of 6 to 8 feet on most sites when left un-grazed.

5% Blue Grama (Coated)
Warm season bunchgrass with germination in 7-10 days.
This grass demonstrates good drought, fair salinity, and moderate alkalinity tolerances.

5% Switchgrass
Warm season bunchgrass with germination in 21-28 days.
Very tolerant of poor soils, flooding and drought. Often used in reclamation of sand dunes and dikes.

1% Sand Dropseed
Warm season bunchgrass with germination in 14-21 days.
Commonly grows on sandy soils but is adapted to medium textured soils also.

Landowners may also have special requests for specific seed mixes. In these cases, those seed mixes will take precedence.

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

Section 7

Dust Suppressant Plan

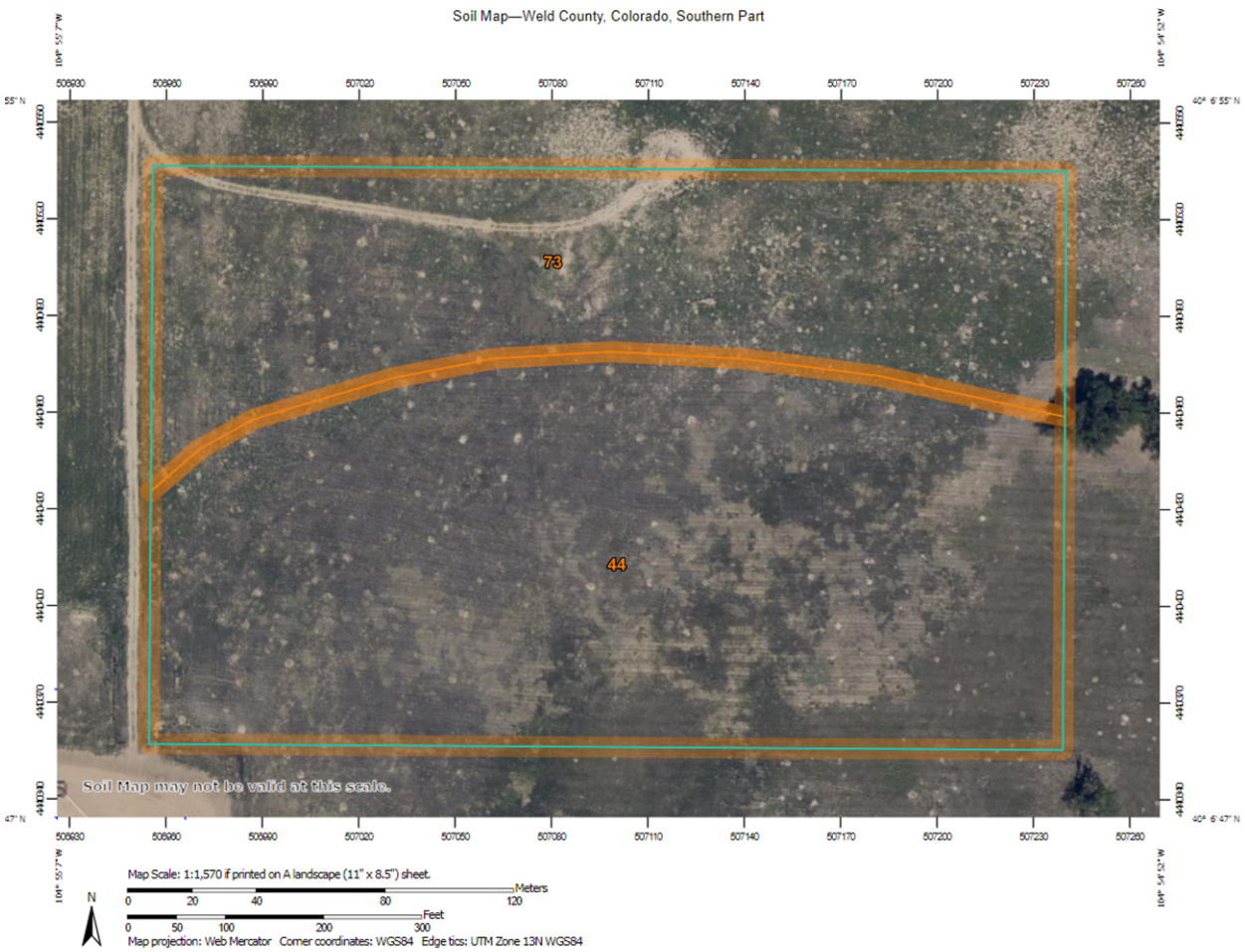
Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP (KMOG)
Dust Mitigation Plan - Columbine 4-29HZ

KMOG has developed this Dust Mitigation Plan in compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 427.

427.a(1) Soil Type



Map Unit Symbol	Map Unit Name
44	Olney loamy sand, 1 to 3 percent slopes
73	Vona loamy sand, 3 to 5 percent slopes

427.a(2) Proposed Vehicle Speed Limits to Minimize Dust

- 10 mph on lease road from WCR 18/Grant Ave. south into location and 5 mph once vehicles reach well pad/ facility

427.a(3) Total Area of Disturbance (In Acres)

- 12.66 acres (Well pad and Facility)

427.a(4) Whether Access Roads are Paved

- Access roads are not paved

427.a(5) Number of Anticipated Truck Trips During Each Phase

- Construction Phase (includes pad and production facility construction) – 4,747 truck trips
- Drilling Phase – 4,508 truck trips
- Completions Phase – 5,845 truck trips
- Production Phase – 188/ average annual truck trips

427.a(6) A plan for Suppressing Fugitive Dust Caused Solely by Wind

- On active locations, in the event dust is caused solely by the wind KMOG will have fresh water deployed to suppress dust for the duration of the wind event
- In addition, disturbed soils will be placed to minimize ability for soil particles to become airborne. Various techniques to be used depending on soil type specific to each location:
    - Track pack/compact topsoil piles, consolidate soil used to construct perimeter ditch/berm and sediment traps
    - Hydro mulch and/or hydroseed topsoil piles and/or other stormwater BMP features
    - Seed/straw crimp disturbed soils where feasible
    - Place and compact gravel layer on working pad surfaces and access roads

427.a(7) Best Management Practices

- KMOG will proactively deploy fresh water to suppress dust along access road to well pad/ facility during all phases of pre-production operations
- Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach well pad/ facility
- Access roads and Vehicle Tracking Control will receive maintenance as needed throughout operations
- In the event of high winds that generate dust that cannot be mitigated with an application of water, KMOG will shut down construction operations
- KMOG will coordinate with Firestone and Weld County to apply magnesium chloride on WCR 18 from our location entrance east to WCR 19 (1.7 miles)

Section 8

Wildlife Assessment and Weed Management Plans

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

June 16, 2021

Joseph Riemer
Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Subject: Summary of the Environmental and Cultural Considerations Pertaining to the Columbine Project

Dear Mr. Riemer,

Two Dot Consulting, LLC (2DOT) has prepared this letter on behalf of Kerr-McGee Oil & Gas Onshore LP (KMOG) to summarize the current environmental considerations pertaining to the environmental surface inspection (Survey) for the Columbine multi well pad and production facility (Project). The environmental considerations covered by the Survey included the following: a wildlife and wildlife habitat assessment, an evaluation of the impacts of the proposed operation on wildlife and wildlife habitat, an evaluation and assessment of Waters of the United States (WOTUS) and wetlands, a updated Phase I environmental site assessment (ESA), a cultural desktop review, and a summary of the ecological site characteristics. 2DOT conducted the Survey on 6/9/2021.

1. Project Location and Site Conditions

The Project is located in the Town of Firestone in section 29, township 2N, range 67W, Weld County, CO (**Appendix A**: *Figure 1*). The Project is approximately 12.6 acres and is situated entirely on agricultural land with an existing oil and gas access road and wellhead located within. Weld County Road (WCR) 18 is located approximately 520 feet north and WRC 15 is approximately 1,500 feet west of the Project (**Appendix A**: *Figure 2*).

2. Wildlife and Wildlife Habitat Assessment/Evaluation of Impacts to Wildlife and Wildlife Habitat

A. Raptors

2DOT conducted a site visit on 3/11/2021. During the site visit, four raptor nests, RNest_407, RNest_408, RNest_1286, and RNest_1287 were observed within 0.5 mile of the Project (**Appendix A**: *Figure 2*). RNest_408 and RNest_1287 were active and occupied by Swainson's hawks and hatchlings. RNest_407 and RNest_1286 were in good condition, had a direct line-of-sight to the Project, and were unoccupied during the site visit. A subsequent site visit on 6/9/2021 was performed. RNest_408 was active, with a single adult Swainson's hawk observed; RNest_407 and RNest_1286 were inactive. RNest_1287 was undetermined. See Table 1 for a summary of the survey observations. Raptor surveys are recommended if the Project is constructed between 2/15 and 7/31, or until nest has fledged if active nest is observed.

Table 1: Raptor Nests Within 0.5 Mile of Project

Nest ID	Location [NAD 1983 (2011)]		Nest Condition	Distance to Project (feet)	Status
	Latitude	Longitude			
RNest_407	40.11441	-104.915	Good	Within Project	Inactive
RNest_408	40.11633	-104.919	Good	434 North	Active
RNest_1286	40.11734	-104.921	Good	1,495 Northeast	Inactive
RNest_1287	40.12127	-104.9/12/	Good	2,347 Northeast	Undetermined

B. Eagles

There were no eagle nests or bald eagle winter night roosts observed within 0.5 mile of the Project. The nearest mapped eagle nest, Nest_13, is located approximately 1.08 miles east of the Project. The nearest mapped bald eagle winter night roost is located over five miles northwest and northeast of the Project. There are no current constraints pertaining to bald eagles.

C. Burrowing Owls

There is suitable burrowing owl habitat located approximately 200 feet east of the Project (**Appendix A**: *Figure 2*). Burrowing owl surveys were conducted on 7/15, 7/22, and 7/29/2020. No burrowing owls were observed. 2DOT recommends an additional survey be conducted to confirm that burrowing owls have not moved into the Project if construction activities are set to occur prior to 8/31.

D. Preble's Meadow Jumping Mouse

The Project is located within Colorado Parks and Wildlife (CPW) mapped Preble's Meadow Jumping Mouse (PMJM) overall range. The U.S. Fish and Wildlife Service (USFWS) recommends that projects within 300 feet of the 100-year floodplain associated with rivers, creeks, and their tributaries (and projects which may have potential secondary impacts to such areas) be assessed as to their potential direct and indirect impacts to PMJM and PMJM's habitat. However, no suitable habitat exists within the Project. Therefore, no constraints are expected pertaining to PMJM.

E. Ute Ladies'-Tresses Orchid

No suitable habitat was identified for the Ute ladies'-tresses orchid. There are no current constraints pertaining to the Ute ladies'-tresses orchid.

3. WOTUS and Wetlands

No WOTUS or wetlands were identified within the Project. The nearest hydrologic feature is an excavated pond located approximately 480 linear feet northeast of the Project. An ephemeral drainage is present south of the Project, where a berm has been constructed to redirect surface water flow following storm events (**Appendix A:** *Figure 2*).

4. Phase I Environmental Site Assessment (ESA) and Cultural Desktop Review

A. Phase I ESA

2DOT conducted an updated Phase I ESA of the Project on 6/11/2021. No recognized environmental conditions, business environmental risks, or *de minimis* conditions were found. See *(603-128) Columbine Updated Phase I ESA June 2020* for the full Phase I report.

B. Cultural Desktop Review

A search of the Colorado Inventory of Cultural Resources was received from the Office of Archaeology and Historic Preservation on 7/7/2020. No cultural sites or surveys were located in the Project (**Appendix** B: *Cultural Review*).

5. Ecological Site Characteristics

A. Site Description

The Project is located within an agricultural field (**Appendix C**: *Photographs*). During the site visit on 6/9/2021, the field was a recently harvested of what appeared to be a wheat crop (*Triticum* sp.). The topography is uniformly flat and even with very little elevation gain or loss. There was no sign of livestock observed within the Project. An oil and gas access road that leads to a wellhead intersects the northern end of the Project.

B. Soils

The Project is comprised of Olney loamy sand, 1 to 3 percent slopes and Vona loamy sand, 3 to 5 percent slopes.

C. Vegetative Communities

The Project is comprised of entirely cropland (**Appendix C**: *Photographs*). Several opportunistic species were also observed within the cultivated areas, including field bindweed (*Convolvulus arvensis*), kochia (*Bassia scoparia*), Russian thistle (*Salsola tragus*), thistle poppy (*Argemone polyanthemos*), cheatgrass (*Bromus tectorum*), and smooth brome (*Bromus inermis*).

D. Noxious Weeds

The following Colorado Noxious Weeds were observed dispersed throughout the Project; field bindweed (List C) and cheatgrass (List C).

E. Proposed Mitigation to Address Impacts

The proposed mitigation to address the potential impacts to vegetation is to limit the potential of noxious weeds being introduced to the Project. Where needed, best management practices (BMPs) such as routine equipment inspections and wash down stations will limit the potential of introducing noxious weeds and impacts to vegetation. 2DOT also recommends chemically treating the noxious weeds within the Project. Herbicide application in compliance with the Colorado Department of Agriculture has been proven to effectively treat noxious weeds.

Upon KMOG's completion of the proposed disturbance, restoration and revegetation should occur as soon as practicable and follow COGCC 1003. Interim Reclamation rules and regulations.

If the disturbance occurs on crop lands, then the following is recommended to be implemented: COGCC 1003.e(1): "All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour, and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established".

To obtain the final reclamation threshold for release of financial assurance, the following shall be met: COGCC 1004.c(1): "reclamation has been performed as per Rules 1003 and 1004, and observation by the Director over two growing seasons has indicated no significant unrestored subsidence."

Please let me know if you have any questions.

Sincerely,

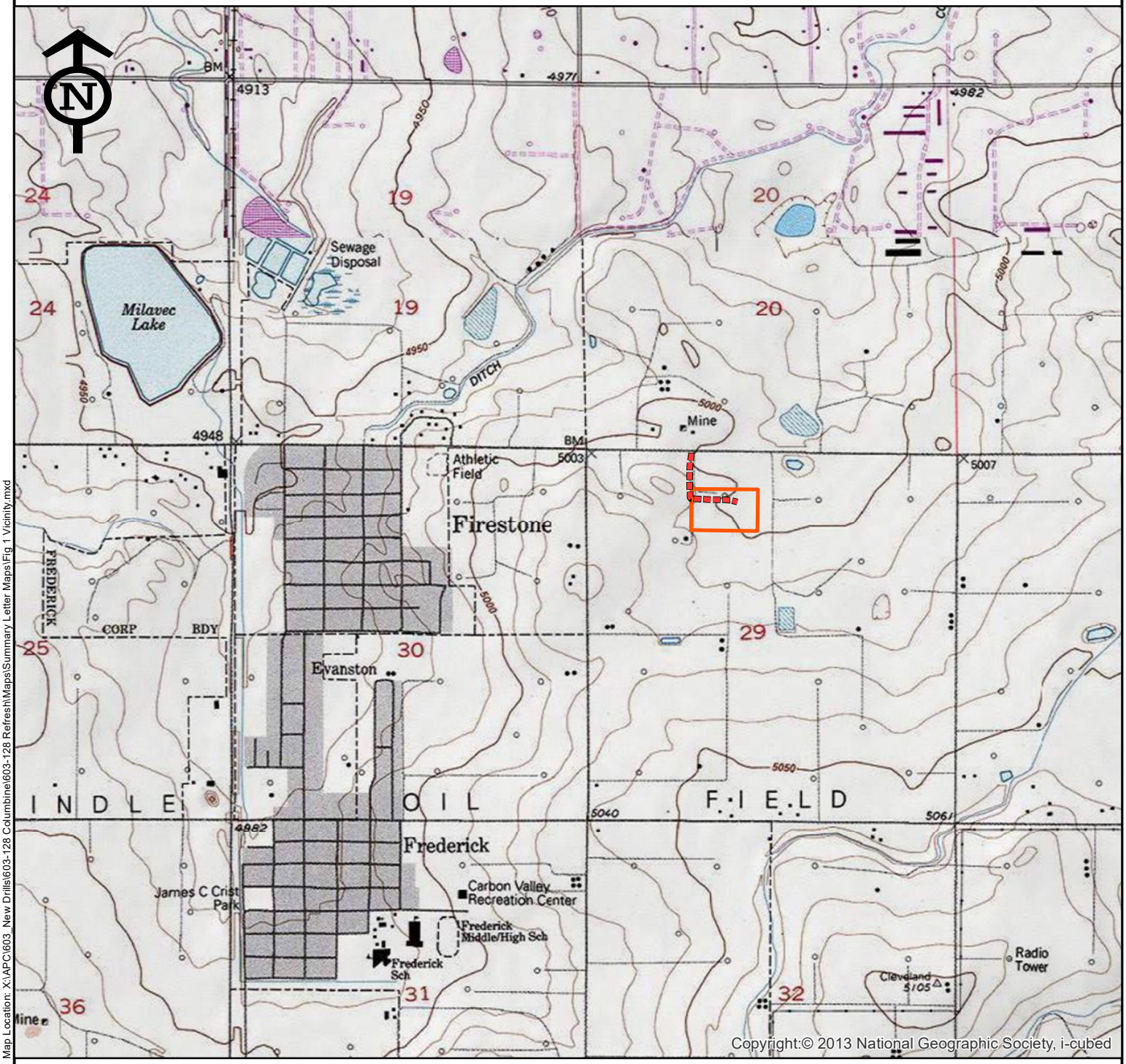
SAM JOSEPH
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Appendix A: *Figures*

Columbine

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-128 Columbine\603-128 Refresh\Maps\Summary Letter Maps\Fig 1 Vicinity.mxd

Preliminary Survey Area

Access Road

PREPARED BY:

2. two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 1,000 2,000 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/11/2021
Drafted By: MC Reviewed By: SJ

Vicinity Map
Figure 1

(603-128) Columbine

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-128 Columbine\603-128 Refresh\Maps\Summary Letter Maps\(603-128) Columbine_Environmental Map 2_210611.mxd

- Raptor Nest
- Raptor Nest Removed
- Potential Burrowing Owl Habitat
- Raptor Nest 600 ft Buffer
- Preliminary Survey Area
- Kerr-McGee Facilities Half Mile Buffer
- Access Road
- NHD Mapped Ditch
- NHD Mapped Lake/Pond
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Riverine

PREPARED BY:

two dot
7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 650 1,300 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/11/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 2



Appendix B: *Cultural Review*

HISTORY COLORADO
Office of Archaeology and Historic Preservation
1200 Broadway, Denver, Colorado 80203

Morgan Colacone
Two Dot Consulting
7674 Grandview Ave, Ste. 210
Arvada, CO 80002

July 7, 2020

Re: Columbine
File Search No. 22883

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources within the area shown in the provided map, located in the following areas:

PM	T	R	S
6th	2N	67W	29

0 sites and 0 surveys were located in the designated area(s).

If information on any district, site, building, structure, or object in the project area was found, detailed information follows the summary. If no properties were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Our letter should not be interpreted as formal consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) or the Colorado Register of Historic Places (CRS 24-80.1). In the event that there is federal or state agency involvement, please note that it is the responsibility of the agencies to meet the requirements of these regulations.

We look forward to consulting with you regarding the effect of the proposed project on significant cultural resources in accordance with the Advisory Council on Historic Preservation regulations titled "Protection of Historic Properties" or the Colorado Register of Historic Places, as applicable (http://www.historycolorado.org/oahp/consultation-guidance).

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3392. Thank you for your interest in Colorado's cultural heritage.

Steve Turner, AIA
State Historic Preservation Officer

*Information regarding significant archaeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.



Appendix C: *Photographs*



Photograph 1. Center of the Project.



Photograph 2. Center of the Project. View is looking east towards nest tree with RNest_407.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Proposed wellhead locations within the Project.

Section 9

Phase I Environmental Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Phase I Environmental Site Assessment Update

Columbine Oil and Gas Multi-Well Pad and Production Facility
Town of Firestone, Colorado

June 2021

Prepared for:

Kerr-McGee Oil and Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Prepared by:

Two Dot Consulting, LLC | 7674 Grandview Avenue Suite 210 | Arvada CO 80002 | 303.953.2255 | www.2dotconsulting.com

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Acronyms and Abbreviations

2DOT	Two Dot Consulting, LLC
AAI	All Appropriate Inquiry
AMSL	Above Mean Sea Level
APCDP	Air Pollution Control Division Permitted Facilities
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity Use Limitations
BER	Business Environmental Risk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CREC	Controlled Recognized Environmental Condition
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
HREC	Historical Recognized Environmental Condition
IPaC	Information for Planning and Consultation
KMOG	Kerr-McGee Oil & Gas Onshore LP
MSD	Minimum Search Distance
OSMRE	Office of Surface Mining Reclamation and Enforcement
PCB	Polychlorinated Biphenyl
REC	Recognized Environmental Condition
Site	Columbine Oil and Gas Project, Town of Firestone, Colorado
SMCRA	Surface Mining Control and Reclamation Act Sites
T&E	Threatened and Endangered
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
WOTUS	Waters of the U.S.

Executive Summary

Two Dot Consulting, LLC (2DOT) has conducted an updated Phase I Environmental Site Assessment (Phase I ESA) of the Columbine Oil and Gas Project located in the Town of Firestone, Colorado. This updated Phase I ESA has been prepared for Kerr-McGee Oil and Gas Onshore LP (KMOG) to determine the property's suitability for oil and gas operations.

The property, referenced herein as the "Site", encompasses approximately 12.8 acres for a proposed multi-well pad, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad boundary. The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of County Road 15 and County Road 18 in section 29, township 2 north, range 67 west (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with some oil and gas operations present and an existing access road. Land use adjacent to the Site consists of agriculture, rangeland, oil and gas operations, and private residences.

A review of historical sources, including aerial photographs and historical topographic maps, indicates the Site has been primarily vacant and agricultural land since 1937.

The Phase I ESA was conducted in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM). Elements of the Phase I ESA include: (i) interviews with owners, operators, and occupants; (ii) searches for recorded environmental records; (iii) reviews of federal, tribal, state, and local government records; (iv) visual inspections of the property and of adjoining properties; and (v) the declaration by the environmental professional responsible for the assessment.

The objective of this Phase I ESA was to identify the presence or likely presence, use, or release on the Site of hazardous substances or petroleum products as defined in ASTM Practice E 1527-13 as a Recognized Environmental Condition (REC). This report includes a summary of the site reconnaissance conducted on July 8, 2020 and June 9, 2021, a review of environmental databases, and a review of historical data sources. Any exceptions to or deletions from these ASTM practices are described later in this report.

RECs

Recognized Environmental Condition (REC):

A REC is defined as - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

Based on conditions noted within the Site, 2DOT did not identify any RECs in connection with the Site.

Findings and Conclusions

2DOT has developed the following findings and conclusions:

- The Site is comprised of predominately actively managed agricultural land with an oil and gas access road and wellhead located along the northern border of the Site and a well pad located adjacent to the southwestern border.

- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

1. Introduction

Two Dot Consulting, LLC (2DOT) conducted an updated Phase I Environmental Site Assessment (ESA) of the property proposed for the Columbine Oil and Gas Project (Site) located in the Town of Firestone, Colorado (Site). This updated Phase I ESA has been prepared for Kerr-McGee Oil & Gas Onshore LP (KMOG), in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM, 2013). This report documents our findings, opinions, and conclusions of the updated Phase I ESA.

1.1 Property Location and Description

The Site is a proposed oil and gas multi-well pad, production facility, and access road.

The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of the intersections of County Road 15 and County Road 18 in section 29, township 2 north, range 67 west.

The Site consists of approximately 12.8 acres of farmlands and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. See **Appendix A: Figure 2.**

The Site currently operates as agricultural land.

1.2 Purpose

2DOT understands that the purpose for conducting this updated Phase I ESA is to assess and document the current environmental conditions at the Site. The goal of the Phase I ESA is to identify recognized environmental conditions (RECs) in connection with the Site. ASTM Practice E 1527-13 defines the following categories of RECs:

Recognized Environmental Condition (REC):

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not RECs (see definition below).

ASTM E 1527-13 defines release as a release of any hazardous substance or petroleum product and shall have the same meaning as the definition of "release" in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 United States Code (U.S.C.) § 9601(22)).

Historical REC (HREC):

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Controlled REC (CREC):

A REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of

required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Additional conditions that are not included under the definitions of a REC, but are defined by ASTM Practice 1527-13 include:

De minimis:

A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Business Environmental Risk (BER):

A risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations.

1.3 Report Users

ASTM E1527-13, Section 3, Terminology, defines "user" as "the party seeking to use Practice E1527 to complete an ESA of the property. A user may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager. ASTM E1527-13, Section 10.7.1, defines "user" as "the person on whose behalf the Phase I Environmental Site Assessment is being conducted."

2DOT received authorization from KMOG to conduct a Phase I ESA on June 29, 2020. A request to perform an updated Phase I ESA was received on June 7, 2021. The Site is defined as approximately 12.8 acres of agricultural fields and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. This updated Phase I ESA has been prepared for KMOG, and only KMOG has the right to rely on the contents of this Phase I ESA without written authorization.

1.4 Scope of Services

ASTM Practice E 1527-13 states that there are four components of a Phase I ESA: 1) Records Review; 2) Site Reconnaissance; 3) Interviews; and 4) Report.

The scope of services provided for this Phase I ESA include:

- On-site assessment of the Site to identify environmental conditions.
- Observation of adjacent properties and the local area to evaluate the potential for adverse environmental impact to the Site.
- Review of available environmental documents for the Site.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the Site.
- Review historical data sources for the Site, including aerial photographs, topographic maps, ownership records, and other readily available development data.
- Interviews with persons represented to be familiar with the operation and history of the Site.

- Determine data gaps in the information obtained and comment on their significance in identifying RECs for the Site.
- Prepare a written report of methods, findings, opinions, and conclusions.

The goal of this scope of services is to assist the user in identifying conditions at the Site that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three "defenses" identified in the 2002 Brownfields Amendments to the CERCLA Section 9607 (All Appropriate Inquiry [AAI] subsections). These three defenses include:

- The "innocent landowner" defense to potential liabilities under 42 U.S.C. § 9601
- The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
- The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. §9607r

Federal regulations at (42 U.S.C §9601(35)(A) & (B), §9607(b)(3), §9607(q); and §9607(r)), promulgated by the United States (U.S.) Environmental Protection Agency (EPA), require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-13: 3.2.6) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-13 as the party seeking to use Practice E 1527 to complete an ESA of the site and may include, without limitation, a potential purchaser of land at the site, a potential tenant of the site, an owner of land at the site, a lender, or a site manager.

Investigative areas not included in the standard ASTM ESA scope include: asbestos-containing building materials, radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, endangered species, indoor air quality, mold, biological agents, cultural and historic resources, ecological resources, health and safety, and industrial hygiene.

1.5 Significant Assumptions

2DOT has made certain assumptions in preparing the scope of this assessment:

- Boundaries of the Site were provided by KMOG. 2DOT assumed this information was accurate.
- Data gathered from public information sources (i.e. libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases and no intentional concealment of environmental conditions or releases has occurred.
- Interview information is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.
- Regulatory information is limited to sites identified after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

1.6 Limitations

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-13, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this updated Phase I ESA, and 2DOT's interpretation of the information obtained as part of this updated Phase I ESA. The findings and conclusions are limited to the Site and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs associated with a site within reasonable limits of time and cost. In conducting its services, 2DOT used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. This Phase I ESA conforms to the level of documentation required in ASTM Practice E 1527-13. However, 2DOT may omit discussion of certain records, i.e., sources deemed, in 2DOT's professional opinion, to be inapplicable, or of limited value, to the specific needs of KMOG. In accordance with ASTM, if the lack of available documentation results in a data gap, this data gap is identified herein, and its significance is discussed.

2. User-Provided Information

The user of the report provided a location drawing via pdf of the Site boundaries. Full access to the Site was granted to 2DOT.

3. Records Review

3.1 Environmental Records Review

GeoSearch was contracted by 2DOT to complete a database search of federal, state, and tribal environmental records for the Site and facilities in the ASTM-designated search radius. A computerized environmental information database search was performed by GeoSearch on July 2, 2020 and June 8, 2021. The databases searched included federal, state, local, and tribal databases as defined by ASTM E 1527-13. A summary of the sources and results of the database search where the number of records found were greater than zero is listed below in Table 1. A complete copy of the GeoSearch environmental database report (GeoSearch Radius Report) is included in **Appendix B: Environmental Records Review** (GeoSearch, 2021f). The approximate minimum search distance (MSD) for this review is noted for each database listed below.

Table 1 - Summary of Environmental Database Search

Database	Description	Search Radius (MSD)	Records Found
Federal			
Resource Conservation & Recovery Act – Corrective Action Facilities (RCRAC)	The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and	1.0 mi	1

Database	Description	Search Radius (MSD)	Records Found
	other hazardous substances. This listing refers to facilities with corrective action activity.		
Surface Mining Control and Reclamation Act Sites (SMCRA)	An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of Abandoned Mine Land impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.	0.5 mi	2
State			
Air Pollution Control Division Permitted Facilities (APCDP)	This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.	0.5 mi	5
Total			8

Two records were identified in the July 2021 GeoSearch Radius Report that were not previously identified in the June 2020 GeoSearch Radius Report. These records were identified with the addition of the access road that was not included in the previous Phase I ESA.

The following table (Table 2) summarizes the site-specific information provided by the database and/or gathered by this office for identified facilities of potential concern to the Site. The remaining facilities listed in the database report do not appear to represent RECs to the Site based upon regulatory status, apparent topographic gradient, and/or distance from the Site.

Table 2 – Summary of facilities of potential concern to the Site

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
RUSSELL MINE	845 ft north, northwest / Higher	SMCRA	No, reclamation completed.

Well Search Report

A Water Well Report (Geosearch, 2021c) received from GeoSearch on June 9, 2021 listed 33 water wells within ½ mile of the Site boundary. No wells were listed within the Site. No water wells were observed within the Site during the ESA.

An Oil & Gas Report that searched environmental databases for oil and gas well and pit locations (Geosearch, 2021b) was received from GeoSearch on June 9, 2021 (**Appendix C: Oil & Gas Report**). A total of 57 oil and gas wells and 5 pits were listed within ½ mile of the site boundary. Two oil and gas wells are listed within the Site; one shut in well owned by KMOG (3-29A HSR-TEETS) and one plugged and abandoned well owned by KP Kaufman Company, Inc. (2 BERNARD E. TEETS B.).

3.2 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses at and in the vicinity of the Site and to assess these uses for potential hazardous materials impacts that may affect the Site. 2DOT reviewed those historical sources that were reasonably ascertainable and likely to provide useful information, as defined by the ASTM standard.

Historical Aerial Photographs

2DOT reviewed historical aerial photographs provided by GeoSearch (**Appendix D: Historical Aerial Photographs**) (GeoSearch, 2020d) for the following years: 1937, 1948, 1953, 1963, 1970, 1975, 1978, 1984, 1999, 2004, 2005, 2006, 2009, 2011, 2013, 2015, and 2017. Google Earth imagery from 9/29/2020 was also reviewed (Google Earth, 2021). The Site appears to have changed from undeveloped land and agriculture fields to agricultural fields with some oil and gas operations present from 1937 to 2020. Hydrologic and geologic features remain relatively unchanged throughout the time span.

1937-1970: The Site appears to be mostly vacant land used for agriculture and rangeland. The adjacent properties appear to be vacant/agricultural land with some development and a railroad likely associated with underground mining located north of County Road 18. The railway appears to be removed by 1970.

1975-1978: The imagery shows the addition of an oil and gas access road and associated equipment located along the north end of the Site as well as some additional oil and gas access roads and infrastructure on the adjacent properties.

1984-2020: The imagery shows more development and oil and gas activities surrounding the Site, in addition to the oil and gas access road and associated equipment noted on the north edge of the property. The well pad located adjacent to the southwestern border of the Site is present by 1984. There is a large housing development present to the west of County Road 15 by 2004.

Historical Topographic Maps

2DOT reviewed historical topographic maps of the Site provided by GeoSearch (**Appendix E: Historical Topographic Maps**) (GeoSearch, 2020e). The following United States Geological Survey (USGS) 7.5 minute series topographic maps were reviewed: 1950, 1969, 1979, 1994, and 2013 Frederick, CO; and 1950, 1969, 1979, and 2013 Gowanda, CO. The 30-minute 1902 Greeley, CO topographic map was also reviewed.

1902: The Site appears as relatively flat, vacant land. There are two mine symbols located north of the Site. County Road 15 and County Road 18 are not mapped.

1950-1969: The Site appears as entirely vacant land. County Road 15 and 18 are mapped. There is a railroad located north of County Road 18 that leads to the mine shaft north of the Site. There is a pond located adjacent to the northeast corner of the Site.

1979-1994: There is an oil and gas access road and wellhead located in the north portion of the Site. The railroad is no longer mapped by 1979. The 1994 topo shows the addition of the oil and gas access road and associated equipment located along the southwestern boundary of the Site.

2013: The Site appears as vacant land. There are no roads or structures depicted within the Site or its adjacent boundaries.

Fire Insurance Maps

GeoSearch reviewed fire insurance maps (GeoSearch, 2020a) and determined there is no coverage available for this area.

City Directory Information

A City Directory Report (**Appendix F: City Directory**) was received from GeoSearch for County Road 15 for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, and 2019 and for County Road 18 for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, and 2019 (Geosearch, 2020g).

All addresses listed on County Road 15 were residential with the exception of 10230, which is listed as D & D Auto Repair during 2001, 11955 listed as H & J Nelson Management LLC in 2006 & 2014, and 10558 listed as 24 HR Locksmith in 2011.

The addresses listed on County Road 18 were residential except for the following:

2880 County Road 18	Human Resrc Sltns (2001); Human Resource Solutions & Des (2006)
3801 County Road 18	Chldrns Hse Wld (2001)
390 County Road 18	Empire Warehouse Inc (2006)
3991 County Road 18	Mid Amer Tl&Mach (2001)
4300 County Road 18	Peak Indstrs Inc (2001); Delphi Medical Systems (2006)
5136 County Road 18	Wit Systems (2001)
5151 County Road 18	Equine Energy Works Llc (2006)
5306 County Road 18	Cowan Family Properties Llc (2006); Eds Electric (2006); 2 Ash Court Llc (2006)
5327 County Road 18	Medicine Hat Farriers (2006)
5366 County Road 18	Double Eagle Services (2006)
547 County Road 18	Amrcn Eng&Sply (2001); Aquatic And Fitness Professional Int (2011); Aquatic & Fitness Pro Intl (2014-2019)
5976 County Road 18	Tri Town Nrsy Llc (2001)
603 County Road 18	Charken Construction Inc (2006-2011)
677 County Road 18	Flying Piglet Rnch (2001-2006); (2011); Flying Piglet Ranch (2014-2019)

3.3 Environmental Liens and Activity and Use Limitations

GeoSearch performed an environmental lien and activity use limitations (AULs) search for the Site identified as Tax Parcel Number 131129200002 in July 2020. None were found. Based on GeoSearch's recommendation and with agreement from KMOG, environmental lien and AULs were not reordered for this June 2021 update since ownership has not changed.

4. Site Reconnaissance

On July 8, 2020, Shannon Regan and Morgan Colacone conducted a Phase I ESA site reconnaissance at the Site. The site reconnaissance included approximately 12.8 acres. On June 9, 2021, Sam Joseph and Morgan Colacone conducted an updated Phase I ESA site reconnaissance consisting of approximately 12.8 acres of farmlands and oil and gas operations, in addition to an access road that extends approximately 0.13 miles beyond the proposed well pad. The purpose of the site reconnaissance was to observe Site conditions and identify exposed features that could represent or indicate ASTM RECs. Features of interest included, but were

not limited to, underground storage tanks (USTs), aboveground storage tanks (ASTs), chemical storage areas, transformers, stressed vegetation, and staining. Adjoining properties were observed from the property boundaries and public rights-of-way. During the walkover, photographs were taken of the Site and adjoining properties. Selected photographs are included in **Appendix G: Site Photographs**.

The Site was accessed from vehicle within the agricultural roads located on Site as well as on foot for areas that could not be verified from the vehicle. Public roads were utilized to observe the surrounding and adjacent properties.

4.1 Methodology and Limiting Conditions

The Phase I ESA site reconnaissance consisted of visual and/or physical observations of the Site and adjoining properties. The methodology for the site reconnaissance included walking and driving the Site to observe current conditions.

4.2 General Site Setting

The Site encompasses approximately 12.8 acres for a proposed well pad and an access road that extends approximately 0.13 miles beyond the proposed well pad. The Site is located approximately 0.97 mile east of Firestone, Colorado; southeast of the intersections of County Road 18 and County Road 15 in section 29, township 2 north, range 67 west. (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with an oil and gas access road and wellhead located along the northern boundary of the Site. There is a line of metal stakes/posts oriented from east to west located in the center of the Site and a stand of cottonwoods located on the eastern edge of the Site. (**Appendix A: Figure 2; Appendix G: Site Photographs**).

Adjacent land use surrounding the Site is mostly agricultural with historic mining operations located north of County Road 18 and development associated with oil and gas access roads and operations located on the adjacent properties.

Current Uses of the Site

The Site is comprised of actively managed agricultural land, an oil and gas wellhead, and access road associated with the oil and gas wellhead.

Past Uses of the Site

The Site appears to have historically been used for pasture and cropland.

Adjoining Properties and Surrounding Area

Land use south of the Site consists of cropland and oil and gas operations. East of the Site pasture for cattle. West of the Site is cropland. North of the project area is cropland and grazing and a historic mine located north of County Road 18.

Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

According to the United States Geologic Survey (Tweto, 1979) Special Geographic Map, the Site is located within the Eolian deposits map unit which includes dune sand and silt and Peoria Loess.

According to the Natural Resources Conservation Service's Soil Survey Geographic database, the Site is comprised of Olney loamy sand, 1 to 3 percent slopes and Vona loamy sand, 3 to 5 percent slopes.

Topographic maps and aerial imagery indicate that the highest point is located along the western border at approximately 5,011 feet above mean sea level (AMSL). The lowest point is located along the northeastern edge at approximately 5,001 feet ASML. The Site consists of relatively flat agricultural fields with elevation generally decreasing with northeastern travel.

Groundwater flow is assumed to follow topography and flows northeast toward Coal Ridge Ditch.

General Description of Structures and Roads

There is an oil and gas access road located along the northern and western borders of the Site. No additional structures, other than the oil and gas wellhead and fencing, were observed within the Site.

Potable Water Supply

There is no potable water supply for the Site.

Sewage Disposal System

There is no sewage disposal system for the Site.

4.3 Exterior and Interior Observations

Hazardous Substances and Petroleum Products in Connection with Identified Users

There is an oil and gas wellhead on Site. No leaks or stains were observed.

Storage Tanks – ASTs and USTs

There were no storage tanks observed within the Site.

Odors

No odors were observed.

Pools of Liquid

No abnormal puddles or pools of liquid were observed within the Site.

Drums

There were no drums observed within the Site.

Hazardous Substances and Petroleum Product Containers (Not Necessarily in Connection with Identified Uses)

No hazardous substances or petroleum product containers were located within the Site, that are not in connection with identified uses.

Unidentified Substance Containers

No unidentified substance containers were observed within the Site.

Utilities and PCBs

Although no longer commercially produced in the United States, Polychlorinated Biphenyl (PCB) may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include:

- Transformers and capacitors;
- Electrical equipment including voltage regulators, switches, re-closers, bushings, and electromagnets; and

- Oil used in motors and hydraulic systems.

No evidence of PCBs was observed.

Pits, Ponds, or Lagoons

No pits, ponds, or lagoons were observed within the Site.

Stained Soil or Pavement

No stained soil or pavement was observed within the Site.

Stressed Vegetation

No areas of stressed vegetation were observed within the Site.

Solid Waste

No solid waste was observed within the Site.

Wastewater

No wastewater or stormwater was observed within the Site.

Wells

One oil and gas well, 3-29A HSR-TEETS, was located within the Site. This well is owned by KMOG and is currently listed as shut in.

5. Non-Scope Considerations

The following sections briefly discuss investigative areas that are not included in the standard ASTM Practice E 1527-13 scope. These items are presented as anecdotal information.

Radon

Radon testing was not conducted as part of this Phase I ESA.

Lead-in-Drinking Water

Drinking water at the Site was not tested for lead as part of the Phase I ESA.

Wetlands

Field surveys were conducted on July 8, 2020 and on June 9, 2021 to evaluate the Site for any potential wetlands or waters of the U.S. (WOTUS). No wetlands or WOTUS are located within 150 feet of the Site. The nearest hydrologic feature is an excavated pond located approximately 480 linear feet northeast of the Project. An ephemeral drainage is present south of the Project, where a berm has been constructed to redirect surface water flow following storm events (**Appendix A: Figure 2**).

Endangered Species Act

An Information for Planning and Consultation (IPaC) test for threatened and endangered (T&E) species from the United States Fish and Wildlife Service (USFWS) was run for the Site on June 10, 2021. Based on the results, the following T&E birds, fishes, and flowering plants were identified as potentially occurring in or near the Site:

- Preble's Meadow Jumping Mouse, *Zapus hudsonius preblei* (Threatened)
- Eastern Black Rail, *Laterallus jamaicensis ssp. Jamaicensis* (Threatened)

- Piping plover, *Charadrius melodus* (Threatened)
- Whooping Crane, *Grus americana* (Endangered)
- Pallid Sturgeon, *Scaphirhynchus albus* (Endangered)
- Ute Ladies'-tresses, *Spiranthes diluvialis* (Threatened)
- Western Prairie Fringed Orchid, *Platanthera praeclara* (Threatened)

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures. An IPaC test for migratory bird species from USFWS Birds of Conservation Concern list was review for the Site on June 10, 2021. Based on the results, the following migratory birds were identified as potentially occurring in or near the Site:

- Bald Eagle, *Haliaeetus leucocephalus*
- Burrowing Owl, *Athene cunicularia*
- Cassin's Sparrow, *Aimophila cassinii*
- Chestnut-collared Longspur, *Calcarius ornatus*
- Golden Eagle, *Aquila chrysaetos*
- Lark Bunting, *Calamospiza melanocorys*
- Lesser Yellowlegs, *Tringa avipes*
- Long-billed Curlew, *Numenius americanus*
- Mccown's Longspur, *Calcarius mccownii*
- Semipalmated Sandpiper, *Calidris pusilla*
- Willet, *Tringa semipalmata*

6. Interviews

Tom Crouch, Senior Landman for KMOG, completed a questionnaire regarding the history and current conditions of the Site in July 2020 and June 2021. The questions are below with Tom's answers from June 2021 in **bold**.

To the best of your knowledge…

1. Have any current or past environmental permits been obtained? (solid waste, disposal permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits)…
    a. **Not to my knowledge.**
2. Are there any underground or above ground storage tanks on the property? If yes, what are their contents?
    a. **There is an oil and gas facility located on the property.**

3. Are you aware of any environmental investigations or problems on the property or on adjacent properties?
    a. **I am unaware of any environmental investigations or problems related to the property or adjacent properties.**
4. Have any past or current environmental violations relating to environmental laws occurred?
    a. **Not to my knowledge.**
5. Are there any underground injection systems on the property?
    a. **I am unaware of any underground injection systems on the property.**
6. Were there any unreported spills?
    a. **I am unaware of any unreported spills. Might need to check with operations if there are any spills associated with the Oil & Gas wells and facilities.**
7. Are there any environmental liens on the property?
    a. **Not to my knowledge**
8. Is there any environmental waste on the property?
    a. **Not to my knowledge**
9. What has the property previously been used for? (back to what year are you aware of the property use)
    a. **Not sure**
10. What is the property presently used for?
    a. **The parcel is classified as range land. We are currently planning horizontal wells on this parcel.**
11. Are there any aboveground or underground storage tanks on the site such as gasoline tanks, diesel tanks?
    a. **Not that I am aware of.**
12. Are there any hazardous materials stored on the property such as drums, fuel, chemicals, pesticides, etc?
    a. **Not That I am aware of.**
13. Are there any oil or gas lines, wells, or pumps on the property?
    a. **The parcel does have active wells and facility located on the property.**
14. What are the adjacent properties used for?
    a. **Residential to the west, Agricultural to the west**
15. Has there ever been a fuel spill, fire, or emergency response at the property?
    a. **Not to my knowledge.**
16. Are there active water wells on the property? Have any of the wells ever been contaminated?
    a. **Not sure and not to my knowledge.**

7. Data Gap Analysis

The ASTM E 1527-13 standards require a listing of "data gaps," including data failure encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-13, Section 12.7, Data Gaps, requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring

basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this Site, the following items may constitute a data gap as defined by ASTM E 1527-13:

- Absence of aerial photography prior to 1937
- Absence of Sanborn Fire Insurance Maps
- Absence of Tax Map coverage
- Absence of previous landowner(s) interviews

These data gaps do not appear to be significant because the presence of other supporting historical information along with the lack of development in the area, both past and present, provided enough information to determine the historical usage of the Site.

8. Findings, Opinions, and Conclusions

2DOT has conducted a Phase I ESA of the Columbine proposed oil and gas multi-well pad and production facility and access road located in the Town of Firestone, Colorado. The Phase I ESA was performed in accordance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described previously in this report. Included in this updated Phase I ESA are summaries of site reconnaissance conducted on July 8, 2020 and June 9, 2021, the review of the environmental database search report (**Appendix B: Environmental Records Review**), historical data sources (**Appendix D, E, & F**) and other records.

8.1 Findings and Opinions

2DOT has developed the following findings and opinions:

- The Site is comprised of predominately actively managed agricultural land with an oil and gas access road and wellhead located along the northern border of the Site and a well pad located adjacent to the southwestern border.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

8.2 Conclusions

Based upon the Findings and Opinions, 2DOT concludes that no RECs have been identified in connection with the Site.

The following statement is required by ASTM E 1527-13 as a declaration of whether RECs were found:

> *2DOT has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of the Site (Columbine, Firestone, Colorado). Any exceptions to, or deletions from, this practice are described in previous sections of this report. This assessment has revealed zero RECs, zero HRECs, zero CRECs, zero de minimis, and zero BERs in connection with the Site.*

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year

timeframe. The report is valid for use in any of the CERCLA defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

9. Qualifications of Environmental Professionals

2DOT has performed a Phase I ESA for the Columbine Oil and Gas Project located in the Town of Firestone, Colorado. We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in § 312.10 of 40 CFR § 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the "all appropriate inquiries" in conformance with standards and practices set forth in 40 CFR Part 312.

The scope of the ESA was consistent with practices and procedures set forth in ASTM Practice E 1527-13.

This Phase I ESA was performed by the following 2DOT personnel:



Qualified Environmental Professional, Sam Joseph

Site Reconnaissance, Project Manager

Mr. Sam Joseph, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Wildlife & Fisheries Biology & Management Conservation Biology, a Bachelor of Science Degree Environment and Natural Resources, and a minor in Zoology. Mr. Joseph has worked in the environmental field over 5 years. Mr. Joseph has the following registrations and certifications relevant to the environmental field: OSHA 10-Hour Construction Program, OSHA 40-Hour HAZWOPER, OSHA H2S Safety, Wetland Training Institute Wetland Delineation Training, Boulder County Open Spaces T&E Species Identification, SafeLand USA Training.



Qualified Environmental Professional, Kathleen Madigan

Quality Assurance/ Quality Control

Ms. Kathleen Madigan, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Bioresource and Agricultural Engineering with a minor in Spatial Information Management Systems. Ms. Madigan has worked in the environmental field for more than 18 years as a project

manager and field technician working on a variety of projects. Ms. Madigan has the following registrations and certifications relevant to the environmental field: SafeLand USA Training, Erosion Control Supervisor Certificate CDOT, and 40-Hour OSHA Hazwoper Training. Additionally, Ms. Madigan has taken online courses for ASTM E1527 Standard Practice for Environmental Site Assessments.

10. References

American Society for Testing and Materials (ASTM) Practice E 1527-13, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

GeoSearch, 2020a. Fire Insurance Map Abstract. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2021b. GeoPlus Oil & Gas Report. Columbine, Longmont, Weld County, CO 80504. June 9, 2021.

GeoSearch, 2021c. GeoPlus Water Well Report. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2020d. Historical Aerial Photographs. Columbine, Longmont, Weld County, CO 80504. July 8, 2020.

GeoSearch, 2020e. Historical Topographic Maps. Columbine, Longmont, Weld County, CO 80504. July 8, 2020.

GeoSearch, 2021f. Radius Report. Columbine, Longmont, Weld County, CO 80504. July 2, 2020.

GeoSearch, 2020g. City Directory. Longmont, Weld County, CO 80504. July 2, 2020.

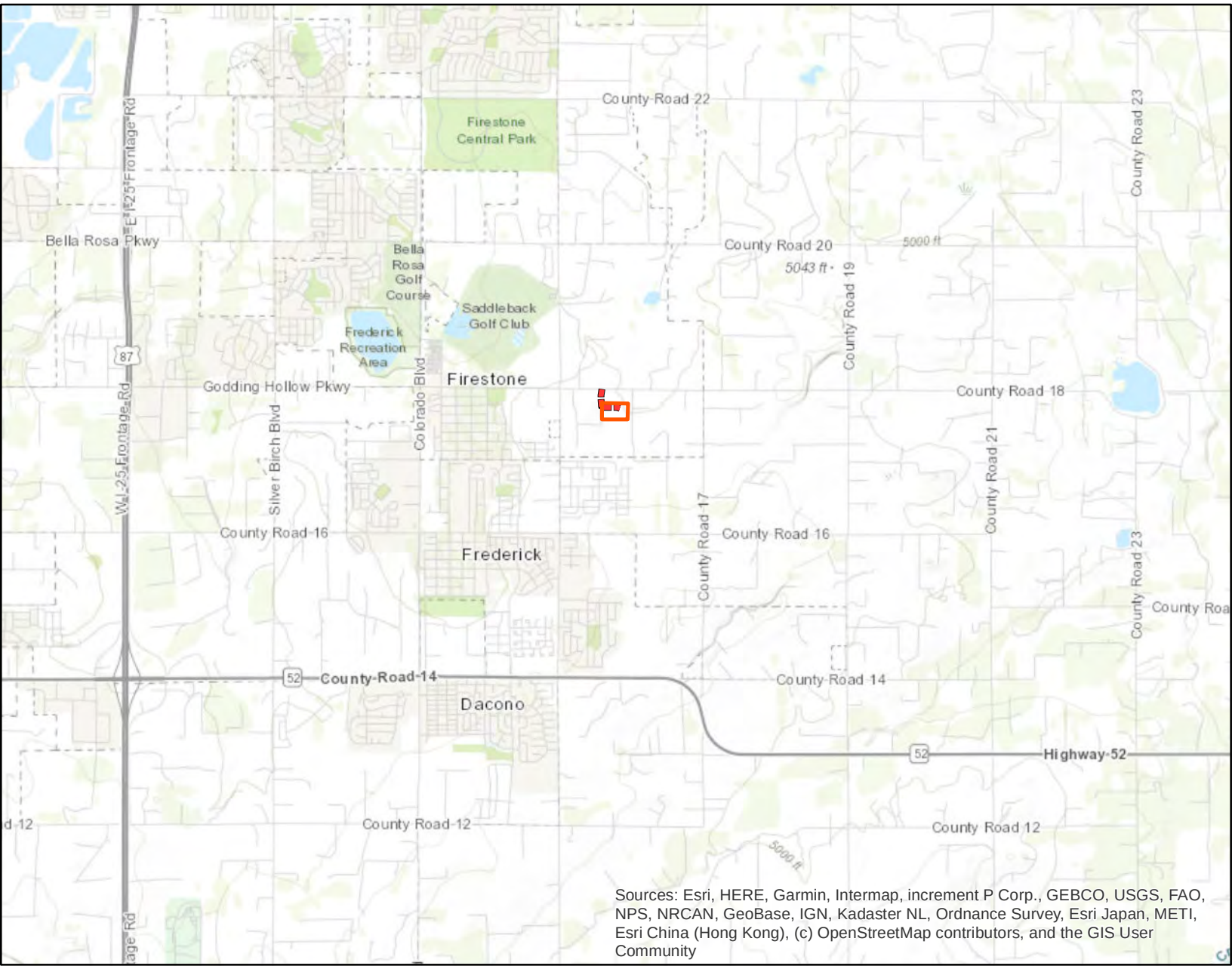
Google Earth, 2021. Aerial Imagery. 40.114348,-104.916659. Imagery date 9/29/2020.

Tweto, Ogden, 1979. Geologic Map of Colorado: U.S. Geological Survey Special Geologic Map, scale 1:500,000.

Appendix A: Figures

Columbine Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

two dot

PREPARED FOR:

KerrMcGee

Figure 1: Vicinity Map

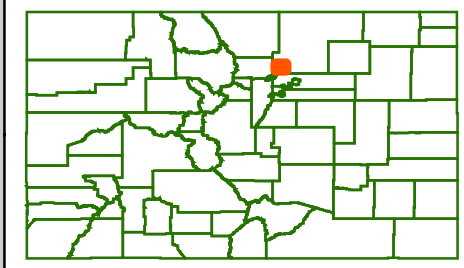
0 0.5 1 Miles

Project Area

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Columbine Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

two dot

PREPARED FOR:

KerrMcGee

Figure 2: Site Location

0 500 1,000 Feet

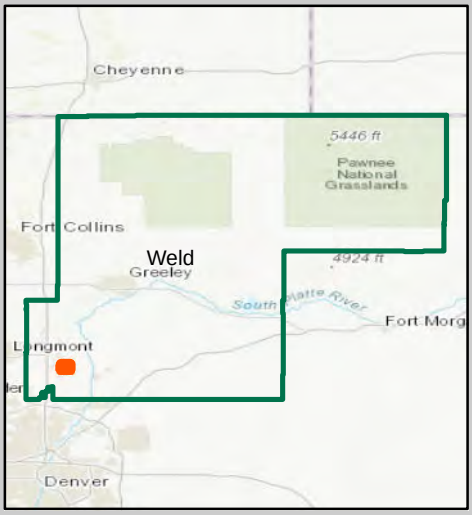
Weld County Streets

Project Area

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Appendix B: Environmental Records Review

GeoSearch
On time. On target. In touch.™

Radius Report

GeoLens by GeoSearch

Target Property:

Columbine
Frederick, Weld County, Colorado 80530

Prepared For:

Two Dot Consulting, LLC

Order #: 166399
Job #: 412762
Project #: 603-128
Date: 06/08/2021

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Unlocatable Report . . . . . See Attachment

Zip Report . . . . . See Attachment

Disclaimer

This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquiries Rule (40 CFR ï¿½312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal,state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR ï¿½312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.

The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers And independent contractors cannot be held liable For actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

Target Property Summary

Target Property Information

Columbine
Frederick, Colorado 80530

Coordinates
Area centroid (-104.91666, 40.1143466)
4,998 feet above sea level

USGS Quadrangle
Frederick, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530
Fort Lupton CO: 80621

Database Summary

FEDERAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSCO	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	TP/AP
RCRA SITES WITH CONTROLS	RCRASC	0	0	TP/AP
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR	RCRAGR08	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR	RCRANGR08	0	0	0.1250
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - NON-CORRACTS TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM	SEMS	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM ARCHIVED SITE INVENTORY	SEMSARCH	0	0	0.5000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	1	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - SUBJECT TO CORRECTIVE ACTION FACILITIES	RCRASUBC	0	0	1.0000

SUB-TOTAL		1	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	0	0	TP/AP
BIENNIAL REPORTING SYSTEM	BRS	0	0	TP/AP
CERCLIS LIENS	SFLIENS	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	TP/AP
EPA DOCKET DATA	DOCKETS	0	0	TP/AP
ENFORCEMENT AND COMPLIANCE HISTORY INFORMATION	ECHOR08	0	0	TP/AP
FACILITY REGISTRY SYSTEM	FRSCO	0	0	TP/AP

Database Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR08	0	0	TP/AP
HAZARDOUS WASTE COMPLIANCE DOCKET FACILITIES	HWCD	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	0	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR08	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	PCSR08	0	0	TP/AP
SEMS LIEN ON PROPERTY	SEMSLIENS	0	0	TP/AP
SSEHRI PFAS CONTAMINATION SITES	SSEHRIPFAS	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	TP/AP
TOXICS RELEASE INVENTORY	TRI	0	0	TP/AP
ALTERNATIVE FUELING STATIONS	ALTFUELS	0	0	0.2500
FEMA OWNED STORAGE TANKS	FEMAUST	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
INTEGRATED COMPLIANCE INFORMATION SYSTEM DRYCLEANERS	ICISCLEANERS	0	0	0.2500
MINE SAFETY AND HEALTH ADMINISTRATION MASTER INDEX FILE	MSHA	0	0	0.2500
MINERAL RESOURCE DATA SYSTEM	MRDS	0	0	0.2500
OPEN DUMP INVENTORY	ODI	0	0	0.5000
SURFACE MINING CONTROL AND RECLAMATION ACT SITES	SMCRA	2	0	0.5000
URANIUM MILL TAILINGS RADIATION CONTROL ACT SITES	USUMTRCA	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMER MILITARY NIKE MISSILE SITES	NMS	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	FUSRAP	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000

SUB-TOTAL		2	0	

Database Summary

STATE (CO) LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ENVIRONMENTAL REAL COVENANTS LIST	COVENANTS	0	0	TP/AP
HAZARDOUS WASTE SITES- GENERATOR	HWSG	0	0	0.1250
ABOVEGROUND STORAGE TANK FACILITIES	AST	0	0	0.2500
UNDERGROUND STORAGE TANK FACILITIES	UST	0	0	0.2500
COLORADO BROWNFIELD SITES	BF	0	0	0.5000
HISTORICAL SOLID WASTE LANDFILLS	HISTSWLF	0	0	0.5000
LEAKING STORAGE TANK FACILITIES	LST	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS TRUST FUND SITES	LUSTTRUST	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	0	0.5000
VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM SITES	VCRA	0	0	0.5000
HAZARDOUS WASTE SITES- CORRECTIVE ACTION	HWSCA	0	0	1.0000
SUPERFUND SITES	SF	0	0	1.0000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ASBESTOS ABATEMENT AND DEMOLITION PROJECTS	ASBESTOS	0	0	TP/AP
COLORADO DISCHARGE PERMIT SYSTEM FACILITIES	CDPS	0	0	TP/AP
SPILLS LISTING	SPILLS	0	0	TP/AP
DRY CLEANING FACILITIES	CLEANERS	0	0	0.2500
AIR POLLUTION CONTROL DIVISION PERMITTED FACILITIES	APCDP	5	0	0.5000
HAZARDOUS WASTE SITES- TREATMENT, STORAGE & DISPOSAL	HWSTSD	0	0	0.5000
METHANE GAS STUDY SITES	METHANESITES	0	0	0.5000
REGISTERED RECYCLING FACILITIES	RECYCLERS	0	0	0.5000
URANIUM MILL TAILINGS SITES	UMTS	0	0	0.5000
SUB-TOTAL		5	0	

Database Summary

LOCAL LISTING

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
WELD COUNTY SOLID WASTE FACILITIES	WCSWF	0	0	0.5000
SUB-TOTAL		0	0	

TRIBAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR08	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR08	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		8	0	

Database Radius Summary

FEDERAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200	0	NS	NS	NS	NS	NS	0
BRS	0.0200	0	NS	NS	NS	NS	NS	0
CDL	0.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	0.0200	0	NS	NS	NS	NS	NS	0
EC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
ECHOR08	0.0200	0	NS	NS	NS	NS	NS	0
ERNSCO	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
FRSCO	0.0200	0	NS	NS	NS	NS	NS	0
HMIRSR08	0.0200	0	NS	NS	NS	NS	NS	0
HWCD	0.0200	0	NS	NS	NS	NS	NS	0
ICIS	0.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	0.0200	0	NS	NS	NS	NS	NS	0
LUCIS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
MLTS	0.0200	0	NS	NS	NS	NS	NS	0
NPDESR08	0.0200	0	NS	NS	NS	NS	NS	0
PADS	0.0200	0	NS	NS	NS	NS	NS	0
PCSR08	0.0200	0	NS	NS	NS	NS	NS	0
RCRASC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SEMSLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SSEHRIPFAS	0.0200	0	NS	NS	NS	NS	NS	0
SSTS	0.0200	0	NS	NS	NS	NS	NS	0
TRI	0.0200	0	NS	NS	NS	NS	NS	0
TSCA	0.0200	0	NS	NS	NS	NS	NS	0
RCRAGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
RCRANGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
ALTFUELS	0.2500	0	0	0	NS	NS	NS	0
FEMAUST	0.2500	0	0	0	NS	NS	NS	0
HISTPST	0.2500	0	0	0	NS	NS	NS	0
ICISCLEANERS	0.2500	0	0	0	NS	NS	NS	0
MRDS	0.2500	0	0	0	NS	NS	NS	0
MSHA	0.2500	0	0	0	NS	NS	NS	0
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
DNPL	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
NLRRCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**

Database Radius Summary

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ODI	0.5000	0	0	0	0	NS	NS	0
RCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMS	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMSARCH	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SMCRA	0.5000	0	1	0	1	NS	NS	2
USUMTRCA	0.5000	0	0	0	0	NS	NS	0
DOD	1.0000	0	0	0	0	0	NS	0
FUDS	1.0000	0	0	0	0	0	NS	0
FUSRAP	1.0000	0	0	0	0	0	NS	0
NLRRCRAC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
NMS	1.0000	0	0	0	0	0	NS	0
NPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
PNPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RCRAC	**1.0000**	**0**	**0**	**0**	**0**	**1**	**NS**	**1**
RCRASUBC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RODS	1.0000	0	0	0	0	0	NS	0

SUB-TOTAL		0	1	0	1	1	0	3

Database Radius Summary

STATE (CO) LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ASBESTOS	0.0200	0	NS	NS	NS	NS	NS	0
CDPS	0.0200	0	NS	NS	NS	NS	NS	0
COVENANTS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SPILLS	0.0200	0	NS	NS	NS	NS	NS	0
HWSG	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
AST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
CLEANERS	0.2500	0	0	0	NS	NS	NS	0
UST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
APCDP	0.5000	0	1	1	3	NS	NS	5
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HISTSWLF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSTSD	0.5000	0	0	0	0	NS	NS	0
LST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
LUSTTRUST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
METHANESITES	0.5000	0	0	0	0	NS	NS	0
RECYCLERS	0.5000	0	0	0	0	NS	NS	0
SWF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
UMTS	0.5000	0	0	0	0	NS	NS	0
VCRA	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSCA	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
SF	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**

SUB-TOTAL		0	1	1	3	0	0	5

Database Radius Summary

LOCAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
WCSWF	0.5000	0	0	0	0	NS	NS	0
SUB-TOTAL		0	0	0	0	0	0	0

Database Radius Summary

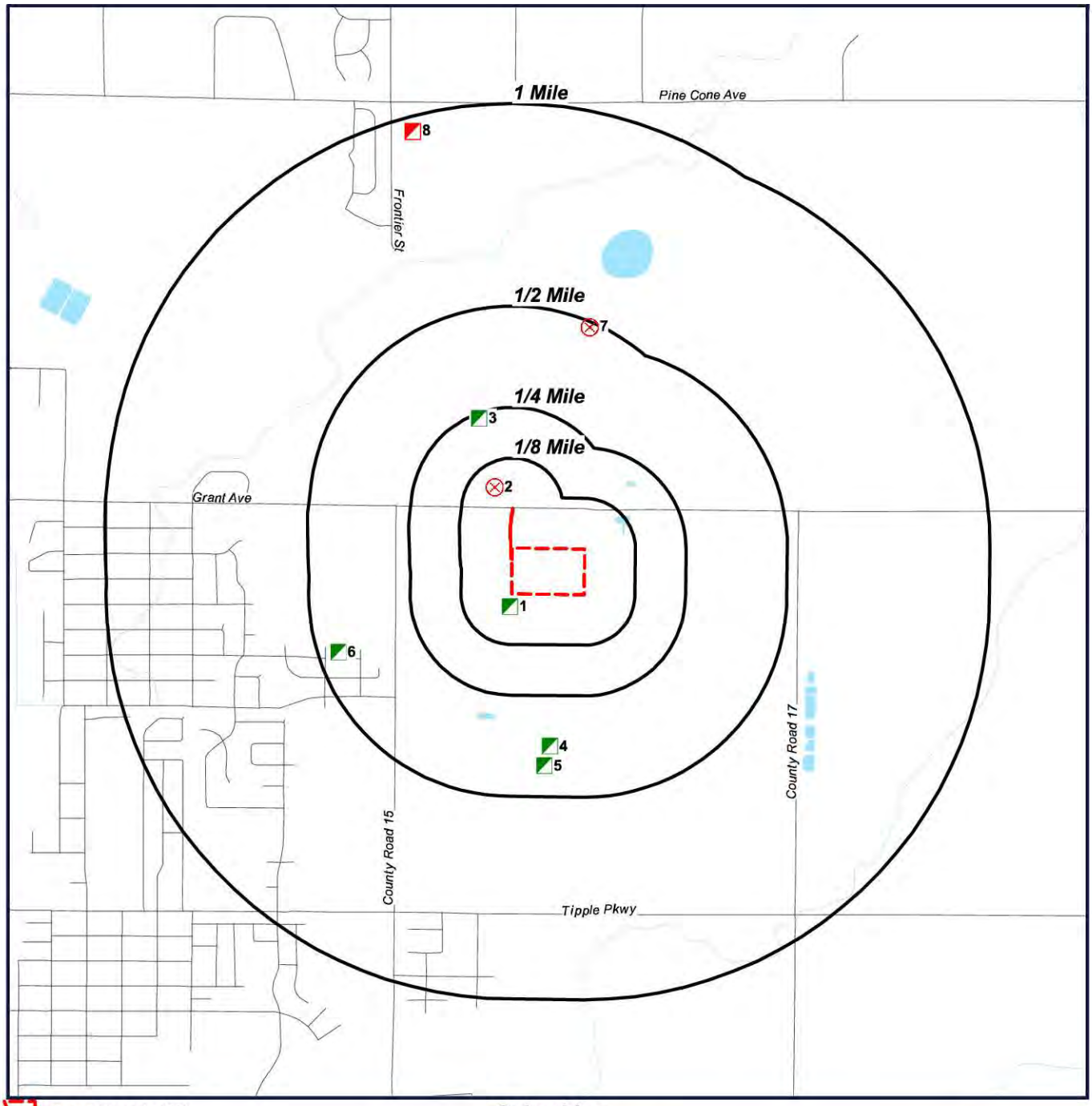
TRIBAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR08	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
LUSTR08	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
ODINDIAN	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
INDIANRES	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	0	0	0	0	0	0
TOTAL		0	2	1	4	1	0	8

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

Radius Map 1



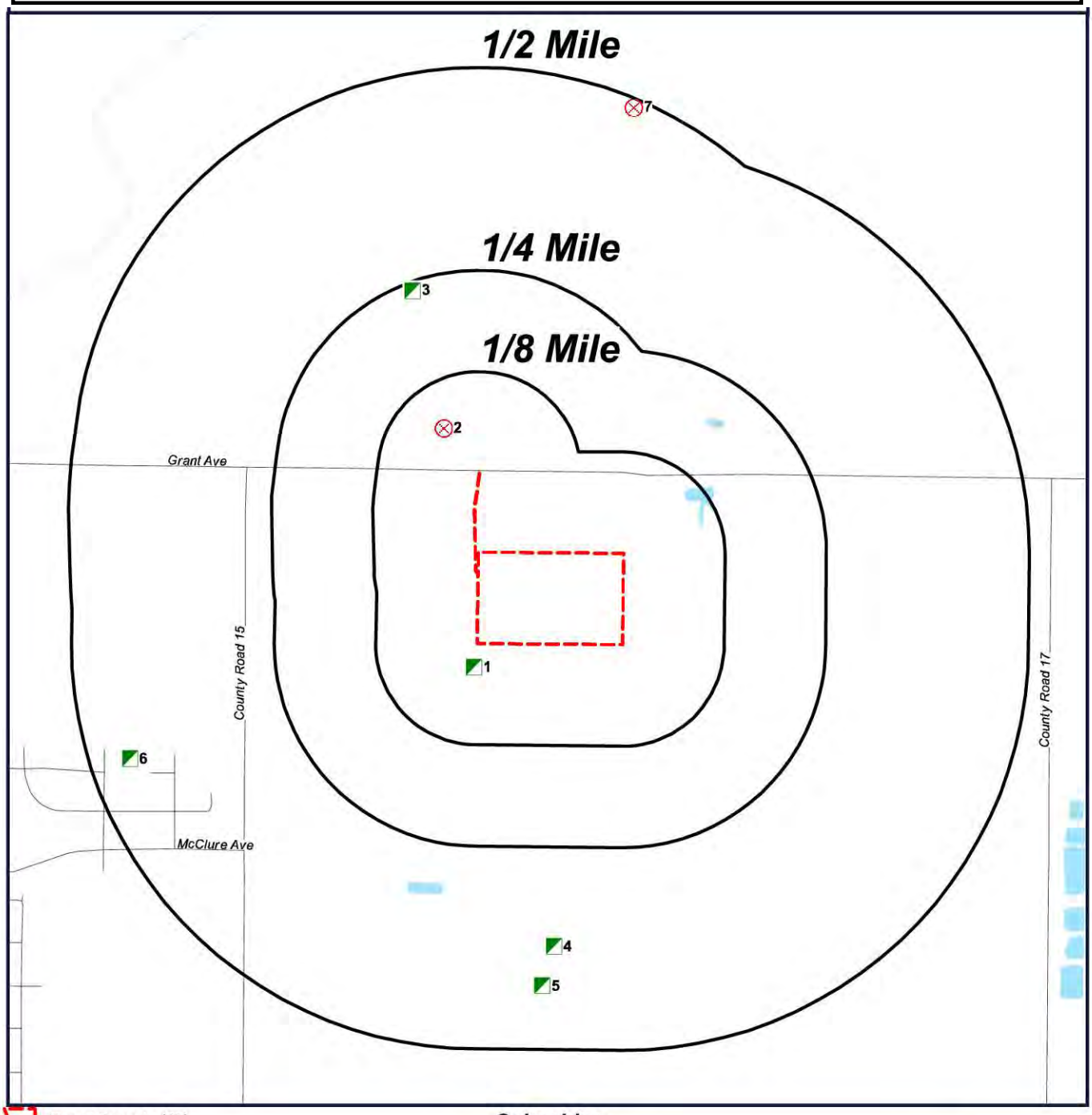
Target Property (TP)
APCDP
SMCRA
RCRAC

Columbine
Frederick, Colorado
80530

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Radius Map 2



Target Property (TP)
APCDP
SMCRA
RCRAC

Columbine
Frederick, Colorado
80530

N
W E
S

0' 500' 1000' 1500'
SCALE: 1" = 1000'

Ortho Map



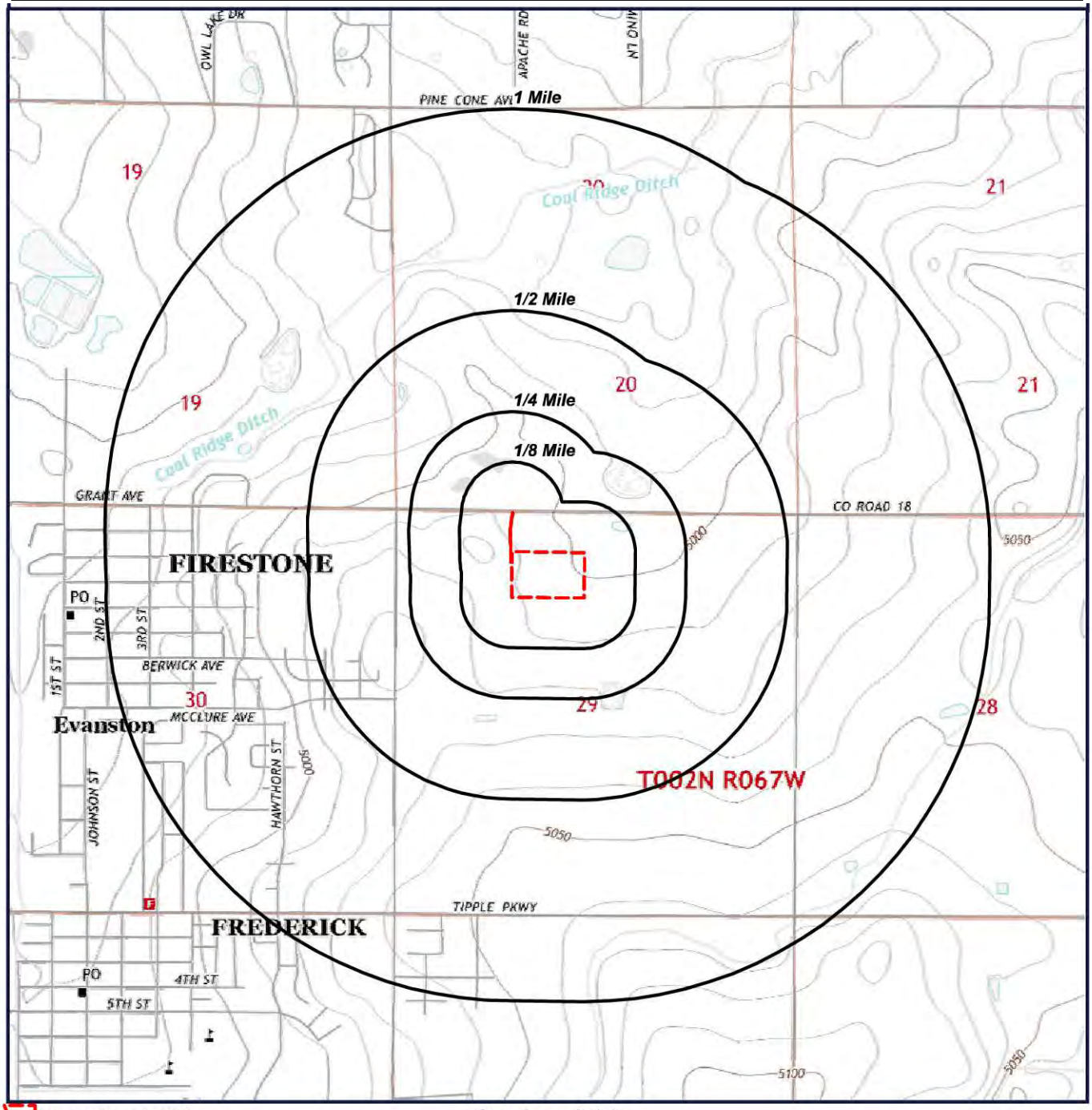
Target Property (TP)
APCDP
SMCRA
RCRAC

Quadrangle(s):
Frederick
Columbine
Frederick, Colorado
80530

N
W E
S

0' 500' 1000' 1500'
SCALE: 1" = 1000'

Topographic Map



Target Property (TP)

Quadrangle(s):
Frederick
Source: USGS,
07/17/2013
Columbine
Frederick, Colorado
80530

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Located Sites Summary

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address	PAGE #
1	APCDP	123-8269	Higher (5,013 ft.)	0.028 mi. SSW (148 ft.)	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530	19
2	SMCRA	CO006202	Higher (4,999 ft.)	0.071 mi. NW (375 ft.)	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621	39
3	APCDP	123-5128	Lower (4,986 ft.)	0.241 mi. NNW (1272 ft.)	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504	41
4	APCDP	123-9A3B	Higher (5,027 ft.)	0.370 mi. S (1954 ft.)	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621	58
5	APCDP	123-7840	Higher (5,027 ft.)	0.419 mi. S (2212 ft.)	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530	69
6	APCDP	123-7847	Higher (5,022 ft.)	0.450 mi. WSW (2376 ft.)	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530	72
7	SMCRA	CO006228	Lower (4,964 ft.)	0.491 mi. NNE (2592 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621	100
8	***RCRAC***	***COR000005207***	***Lower (4,977 ft.)***	***0.966 mi. NNW (5100 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***102***

Site Summary By Database

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address
1	APCDP	123-8269	Higher (5,013 ft.)	0.028 mi. SSW (148 ft.)	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530
3	APCDP	123-5128	Lower (4,986 ft.)	0.241 mi. NNW (1272 ft.)	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504
4	APCDP	123-9A3B	Higher (5,027 ft.)	0.370 mi. S (1954 ft.)	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621
5	APCDP	123-7840	Higher (5,027 ft.)	0.419 mi. S (2212 ft.)	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530
6	APCDP	123-7847	Higher (5,022 ft.)	0.450 mi. WSW (2376 ft.)	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530
8	***RCRAC***	***COR000005207***	***Lower (4,977 ft.)***	***0.966 mi. NNW (5100 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***
2	SMCRA	CO006202	Higher (4,999 ft.)	0.071 mi. NW (375 ft.)	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621
7	SMCRA	CO006228	Lower (4,964 ft.)	0.491 mi. NNE (2592 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621

Elevation Summary

Elevations are collected from the USGS 3D Elevation Program 1/3 arc-second (approximately 10 meters) layer hosted at the NGTOC. .

Target Property Elevation: 4998 ft.

*NOTE: Standard environmental records are displayed in **bold**.*

EQUAL/HIGHER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
1	APCDP	5,013 ft.	KERR-MCGEE - 62367	NWNW-29-2N-67W, FIRESTONE, CO 80530	19
2	SMCRA	4,999 ft.	RUSSELL MINE	WELD COUNTY, FORT LUPTON, CO 80621	39
4	APCDP	5,027 ft.	KERR-MCGEE 36114104	NESW-29-2N-67W, FREDERICK, CO 80621	58
5	APCDP	5,027 ft.	KERR-MCGEE 62366	NESW-29-2N-67W, FREDERICK, CO 80530	69
6	APCDP	5,022 ft.	KERR-MCGEE O&G ONSHORE - 34002441	SENE-30-2N-67W, FIRESTONE, CO 80530	72

LOWER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
3	APCDP	4,986 ft.	KERR-MCGEE 62492	SWSW-20-2N-67W, FIRESTONE, CO 80504	41
7	SMCRA	4,964 ft.	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621	100
8	***RCRAC***	***4,977 ft.***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***102***

MAP ID# 1

Distance from Property: 0.028 mi. (148 ft.) SSW
Elevation: 5,013 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-8269**
FACILITY NAME: **KERR-MCGEE - 62367**
ADDRESS: **NWNW-29-2N-67W**
FIRESTONE, CO 80530
PERMIT NAME: **KERR-MCGEE - 62367**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **12/09/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**
CONTACT PHONE: **(720)929-6916**
SITE DESCRIPTION:**E&P SITE. 34002422, ALSO KNOWN AS 62367.**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13439**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68790**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.01535**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.30718**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.64832**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.64832**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **15.65146**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **182.23696**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13439	**2.68790**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.64880 **0.64880** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
15.65146	**182.23696**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03290	**0.47582**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.50181	**2.50181**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.28787	**4.16357**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.98475	**0.98475**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
25.66445	**278.50685**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00159	**0.01200**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01392	**0.10499**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.90865	**6.85001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2014**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2014**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **0.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **0.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2015**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS UNCONTROLLED**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **6.88380**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **6.88380**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13439**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68790**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01535	**0.30718**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.64832	**1.64832**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
8.76766	**175.35316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
13.30749	**266.14990**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.98475	**0.98475**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.50181	**2.50181**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02331	**0.46624**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20398	**4.07968**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
6.88380	**6.88380**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2014**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64880	**0.64880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.47315	**5.47315**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00958	**0.00958**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.08389	**0.08389**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Surface Mining Control and Reclamation Act Sites (SMCRA)

MAP ID# 2

Distance from Property: 0.071 mi. (375 ft.) NW
Elevation: 4,999 ft. (Higher than TP)

FACILITY INFORMATION

GEOSEARCH ID: **CO006202**

AMLIS KEY: **CO006202**

PROBLEM AREA NUMBER: **6202**

PROBLEM AREA NAME: **RUSSELL MINE**

ADDRESS: **WELD COUNTY**

FORT LUPTON, CO 80621

COUNTY: **WELD**

PLAN UNIT NUMBER: **154**

PLAN UNIT NAME: **FREDERICK**

FACILITY DETAIL(S)

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **P**
PROBLEM PRIORITY: **2**
MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/6/1993 0:00**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **35533**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **VO**
PROBLEM PRIORITY: **2**

Surface Mining Control and Reclamation Act Sites (SMCRA)

MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/6/1993 0:00**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **10476**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

Back to Report Summary

MAP ID# 3

Distance from Property: 0.241 mi. (1,272 ft.) NNW
Elevation: 4,986 ft. (Lower than TP)

SITE INFORMATION

SITE ID: **123-5128**
FACILITY NAME: **KERR-MCGEE 62492**
ADDRESS: **SWSW-20-2N-67W**
FIRESTONE, CO 80504
PERMIT NAME: **KERR-MCGEE 62492**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **08/03/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**CONDENSATE STORAGE TANK**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.02535**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.50716**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31100**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31100**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.35982**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **33.79105**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.12241**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.12241**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00413	**0.05919**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.31100 **0.31100** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.31100 **0.31100** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.31100 **0.31100** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*
0.02535 **0.50716** **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.35982	**33.79105**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.00715 **0.11126** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.06264	**0.97356**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
4.08671	**63.51320**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00471	**0.04188**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20991	**0.20991**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08262	**0.08262**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.69205	**23.90650**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK
EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2007**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2007**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.70555	**0.70555**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02535	**0.50716**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31100	**0.31100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.65427	**33.08550**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00289	**0.05796**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.12241	**0.12241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.11655	**22.33100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08262	**0.08262**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.20991	**0.20991**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00195	**0.03912**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00123	**0.00123**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01081	**0.01081**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.08671	**63.51320**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00715	**0.11126**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06264	**0.97356**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 4

Distance from Property: 0.370 mi. (1,954 ft.) S
Elevation: 5,027 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-9A3B**
FACILITY NAME: **KERR-MCGEE 36114104**
ADDRESS: **NESW-29-2N-67W**
FREDERICK, CO 80621
PERMIT NAME: **KERR-MCGEE 36114104**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **KATHERINE DOOLITTLE**
CONTACT PHONE: **(720)929-6511**
SITE DESCRIPTION:**CONDENSATE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07975**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.59500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00825**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.16500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.04699**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **56.81949**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07975**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.59500**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.04699	**56.81949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.04699	**56.81949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

4.04699 **56.81949** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

4.04699 **56.81949** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00825 **0.16500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00825 **0.16500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
0.00000	**0.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26949	**1.26949**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.77750	**55.55000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00825	**0.16500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07975	**1.59500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 5

Distance from Property: 0.419 mi. (2,212 ft.) S
Elevation: 5,027 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-7840**
FACILITY NAME: **KERR-MCGEE 62366**
ADDRESS: **NESW-29-2N-67W**
FREDERICK, CO 80530
PERMIT NAME: **KERR-MCGEE 62366**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **KATHERINE DOOLITTLE**
CONTACT PHONE: **(720)929-6511**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68520**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.68520**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.45230**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **2.45230**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

STACK

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2012**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.68520	**2.68520**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 6

Distance from Property: 0.450 mi. (2,376 ft.) WSW
Elevation: 5,022 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-7847**
FACILITY NAME: **KERR-MCGEE O&G ONSHORE - 34002441**
ADDRESS: **SENE-30-2N-67W**
FIRESTONE, CO 80530
PERMIT NAME: **KERR-MCGEE O&G ONSHORE - 34002441**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **DAVID STEGER**
CONTACT PHONE: **(720)929-6075**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY (FORMERLY 62410)**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.31949**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.68527**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00821**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.16430**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.88162**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.88162**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **23.36352**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **112.46421**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.31949	**1.68527**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
23.36352	**112.46421**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.82614 **0.82614** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.02707	**228.14554**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.02707	**228.14554**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.24796	**228.36643**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.24796	**228.36643**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00961	**0.19199**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08410	**1.68001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.48651	**109.60001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00339	**0.05040**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02973	**0.44100**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.93958	**28.77001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **HC LOADOUT**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
3081.00000	**51.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
14.00000	**1.87000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2016**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **HC LOADOUT**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **3081.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **51.00000**
STACK HEIGHT: **14.00000**
STACK DIAMETER: **1.87000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2015**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE LOADOUT**
STACK GAS FLOW RATE: (CUBIC FEET PER MINUTE): **0.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): (CUBIC FEET PER MINUTE): **0.00000**
STACK HEIGHT:
STACK DIAMETER:
PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

5916.00000 **98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2012**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS UNCONTROLLED**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2010**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*

5916.00000 **98.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.00000** **0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.52024	**2.52024**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24761	**0.24761**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
16.15377	**16.15377**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07188	**1.43766**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00821	**0.16430**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.88162	**0.88162**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2016**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.68951	**93.79020**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34702	**0.34702**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
11.16413	**223.28260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
11.16413	**223.28260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.82614	**0.82614**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
2.09886	**2.09886**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01955	**0.39116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.17112	**3.42258**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.41213	**28.24256**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00247	**0.04948**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02164	**0.43292**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.52024	**2.52024**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.74113	**2.74113**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.34270	**2.34270**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00410	**0.00410**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03591	**0.03591**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.34270	**2.34270**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.48651	**109.60001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00961	**0.19199**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08410	**1.68001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

UNIT COMMENT

TANK NAME: 34002441

Back to Report Summary

Surface Mining Control and Reclamation Act Sites (SMCRA)

MAP ID# 7

Distance from Property: 0.491 mi. (2,592 ft.) NNE
Elevation: 4,964 ft. (Lower than TP)

FACILITY INFORMATION

GEOSEARCH ID: **CO006228**

AMLIS KEY: **CO006228**

PROBLEM AREA NUMBER: **6228**

PROBLEM AREA NAME: **EMERSON**

ADDRESS: **WELD COUNTY**

FORT LUPTON, CO 80621

COUNTY: **WELD**

PLAN UNIT NUMBER: **154**

PLAN UNIT NAME: **FREDERICK**

FACILITY DETAIL(S)

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **S**
PROBLEM PRIORITY: **2**
MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/27/2013 20:13**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **15**
COMPLETED COSTS: **3688.74**
COMPLETED GPRA ACRES: **15**
COMPLETED METRIC UNITS: **6.1**

FUNDING SOURCE/PROGRAM: **SGA**
PROBLEM TYPE: **VO**
PROBLEM PRIORITY: **2**

Surface Mining Control and Reclamation Act Sites (SMCRA)

MINING TYPE: **U**
ORE TYPES: **NOT REPORTED**
DATE PREPARED: **8/6/1993 0:00**
DATE REVISED: **8/27/2013 20:13**
PRIVATE OWNER %: **100**
STATE OWNER %: **0**
OTHER FEDERAL OWNER %: **0**
PARK SERVICE OWNER %: **0**
FOREST SERVICE OWNER %: **0**
INDIAN OWNER %: **0**
BLM OWNER %: **0**
UNFUNDED STANDARD UNITS: **0**
UNFUNDED COSTS: **0**
UNFUNDED GPRA ACRES: **0**
UNFUNDED METRIC UNITS: **0**
FUNDED STANDARD UNITS: **0**
FUNDED COSTS: **0**
FUNDED GPRA ACRES: **0**
FUNDED METRIC UNITS: **0**
COMPLETED STANDARD UNITS: **1**
COMPLETED COSTS: **10476**
COMPLETED GPRA ACRES: **0.1**
COMPLETED METRIC UNITS: **1**

Back to Report Summary

Resource Conservation & Recovery Act - Corrective Action Facilities (RCRAC)

MAP ID# 8

Distance from Property: 0.966 mi. (5,100 ft.) NNW
Elevation: 4,977 ft. (Lower than TP)

FACILITY INFORMATION

EPA ID#: **COR000005207**
NAME: **ARC COLORADO INC**
ADDRESS: **7040 WCR 20**
LONGMONT, CO 80504

CONTACT NAME: **REES JONES**
CONTACT ADDRESS: **7040 WCR 20**
LONGMONT CO 80504
CONTACT PHONE: **303-833-6130**
NON-NOTIFIER:
DATE RECEIVED BY AGENCY: **03/02/2020**

OWNER TYPE: **PRIVATE**
OWNER NAME: **ARC COLORADO INC**
OPERATOR TYPE: **PRIVATE**
OPERATOR NAME: **ARC COLORADO INC**

CERTIFICATION

CERTIFICATION NAME:	CERTIFICATION TITLE:	CERTIFICATION SIGNED DATE:
KEVIN SCHWINDT	**CONTROLLER**	**02/15/2010**
KEVIN SCHWINDT	**GENERAL MANAGER**	**02/06/2012**
DEREK H SHELTON	**EH&S MANAGER**	**02/17/2014**
DEREK SHELTON	**EH&S DIRECTOR**	**02/29/2016**
SHAWN COWLING	**SHAWN COWLING**	**03/01/2018**
REES JONES	**METALLURGIST**	**02/28/2020**
DEREK SHELTON	**MGR**	**09/20/2011**
DEREK SHELTON	**EH&S MGR**	**08/15/2012**
REES JONES	**METALLURGIST**	**03/02/2020**
NICOLLE DESANTIS	**ENV MGR**	**09/16/2003**
NICOLLE E DESANTIS	**EHS COORDINATOR**	**10/31/2003**
DOUGLAS BALL	**ENV MGR**	**08/03/2004**
DOUGLAS G BALL	**EH & S COORDINATOR**	**10/18/2004**
MARK ROSE	**PRESIDENT**	**02/27/2006**
MIM DUFFY	**HR/SAFETY MGR**	**02/07/2007**
MIM DUFFY	**HR/SAFETY MGR**	**02/28/2008**

INDUSTRY CLASSIFICATION (NAICS)

332117 - POWDER METALLURGY PART MANUFACTURING
332999 - ALL OTHER MISCELLANEOUS FABRICATED METAL PRODUCT MANUFACTURING
33911 - MEDICAL EQUIPMENT AND SUPPLIES MANUFACTURING
339999 - ALL OTHER MISCELLANEOUS MANUFACTURING

CURRENT ACTIVITY INFORMATION

GENERATOR STATUS: **LARGE QUANTITY GENERATOR** LAST UPDATED DATE: **03/02/2020**
SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**
TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: **NO**
TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**
NON TSDFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **YES**
CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**

IMPORTER: **NO**
MIXED WASTE GENERATOR: **NOT REPORTED**
UNDERGROUND INJECTION: **NO**
UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**
TRANSFER FACILITY: **NO**
TRANSPORTER: **NO**
USED OIL FUEL BURNER: **NO**
ONSITE BURNER EXEMPTION: **NO**
USED OIL PROCESSOR: **NO**
FURNACE EXEMPTION: **NO**
USED OIL FUEL MARKETER TO BURNER: **NO**
USED OIL REFINER: **NO**
SPECIFICATION USED OIL MARKETER: **NO**
USED OIL TRANSFER FACILITY: **NO**
USED OIL TRANSPORTER: **NO**

COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION

EVALUATIONS

01/10/2006	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
01/29/2018	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
02/01/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/03/2004	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/11/2014	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
03/05/2012	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/05/2012	**SNN**	**NOT A SIGNIFICANT NON-COMPLIER**
03/06/2014	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/09/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
08/17/2017	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
10/28/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
11/30/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
12/02/1999	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**SNY**	**SIGNIFICANT NON-COMPLIER**

VIOLATIONS

02/01/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
02/11/2014	**262.C**	**GENERATORS - PRE-TRANSPORT**
10/28/2010	**262.A**	**GENERATORS - GENERAL**
10/28/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
12/15/2011	**262.C**	**GENERATORS - PRE-TRANSPORT**

ENFORCEMENTS

02/01/2010	**175**	**COMPLIANCE ADVISORY**
02/11/2014	**175**	**COMPLIANCE ADVISORY**
03/08/2012	**310**	**FINAL 3008(A) COMPLIANCE ORDER**
10/28/2010	**175**	**COMPLIANCE ADVISORY**
12/15/2011	**175**	**COMPLIANCE ADVISORY**

HAZARDOUS WASTE

D001	**IGNITABLE WASTE**
D002	**CORROSIVE WASTE**
D003	**REACTIVE WASTE**
D006	**CADMIUM**
D007	**CHROMIUM**
D008	**LEAD**
D010	**SELENIUM**

D039	**TETRACHLOROETHYLENE**
D040	**TRICHLORETHYLENE**
F001	**THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE,TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE ANDCHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
F002	**THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE,TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE,CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001,F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
U228	**ETHENE, TRICHLORO-**
U228	**TRICHLOROETHYLENE**

UNIVERSAL WASTE

WASTE TYPE:	ACCUMULATED WASTE ON-SITE:	GENERATED WASTE ON-SITE:	SOURCE TYPE:
BATTERIES	**YES**		**NOTIFICATION**
OTHER	**YES**	**YES**	**NOTIFICATION**
LAMPS	**YES**		**NOTIFICATION**
PESTICIDES	**YES**		**NOTIFICATION**
MERCURY CONTAINING EQUIPMENT	**YES**		**NOTIFICATION**
A	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**
LAMPS	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**

CORRECTIVE ACTION AREA (RELEASE)

AREA NAME:	AIR:	GROUNDWATER:	SOIL:	SURFACE WASTE:
ENTIRE FACILITY		**Y**	**Y**	

CORRECTIVE ACTION EVENT

CA EVENT CODE: **CA375**
EVENT DESCRIPTION: **INTERIM DECISION FOR NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA400**
EVENT DESCRIPTION: **REMEDY DECISION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA550NR**
EVENT DESCRIPTION: **REMEDY CONSTRUCTION-NO REMEDY CONSTRUCTED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA900NC**
EVENT DESCRIPTION: **CA PERFORMANCE STANDARDS ATTAINED - NO CONTROLS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA999NF**
EVENT DESCRIPTION: **CA PROCESS IS TERMINATED-NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA190**
EVENT DESCRIPTION: **INVESTIGATION REPORT RECEIVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA370**
EVENT DESCRIPTION: **PETITION FOR NO FUR. ACTION RECEIPT DATE**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA070YE**

EVENT DESCRIPTION: **DETERMINATION OF NEED FOR AN INVESTIGATION-INVESTIGATION IS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA075LO**
EVENT DESCRIPTION: **CA PRIORITIZATION-LOW CA PRIORITY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA100**
EVENT DESCRIPTION: **INVESTIGATION IMPOSITION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA150**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN APPROVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA060**
EVENT DESCRIPTION: **NOTICE OF CONTAMINATION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA110**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN RECEIVED**
EVENT SEQUENCE NUMBER: **1**

EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

Back to Report Summary

Unlocated Sites Summary

This list contains sites that could not be mapped due to limited or incomplete address information.

No Records Found

Environmental Records Definitions - FEDERAL

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance. Enforcement and Compliance History Online (ECHO) Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014, the EPA retired this system for Clean Air Act stationary sources.

ALTFUELS Alternative Fueling Stations

VERSION DATE: 10/28/20

Nationwide list of alternative fueling stations made available by the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Bio-diesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE).

BF Brownfields Management System

VERSION DATE: 01/11/21

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment. This database includes tribal brownfield sites.

BRS Biennial Reporting System

VERSION DATE: 12/31/17

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 06/17/20

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

DNPL Delisted National Priorities List

VERSION DATE: 04/26/21

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

DOCKETS EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

DOD Department of Defense Sites

VERSION DATE: 12/01/14

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 04/27/21

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. The data displays remedy component information for Superfund decision documents issued in fiscal years 1982-2017, and it includes final and deleted NPL sites as well as sites with a Superfund Alternative Approach (SAA) agreement in place. The only sites included that are not on the NPL, proposed for NPL, or removed from proposed NPL, are those with an SAA Agreement in place. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the

potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ECHOR08 Enforcement and Compliance History Information

VERSION DATE: 11/28/20

The U.S. Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database, provides compliance and enforcement information for facilities nationwide. This database includes facilities regulated as Clean Air Act stationary sources, Clean Water Act direct dischargers, Resource Conservation and Recovery Act hazardous waste handlers, Safe Drinking Water Act public water systems along with other data, such as Toxics Release Inventory releases.

ERNSCO Emergency Response Notification System

VERSION DATE: 03/28/21

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FEMAUST FEMA Owned Storage Tanks

VERSION DATE: 12/01/16

This is a listing of FEMA owned underground and aboveground storage tank sites. For security reasons, address information is not released to the public according to the U.S. Department of Homeland Security.

FRSCO Facility Registry System

VERSION DATE: 03/02/21

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

FUDS Formerly Used Defense Sites

VERSION DATE: 12/31/18

The Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not

all properties currently have polygon data available. DISCLAIMER: This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

FUSRAP Formerly Utilized Sites Remedial Action Program

VERSION DATE: 03/04/17

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

HISTPST Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR08 Hazardous Materials Incident Reporting System

VERSION DATE: 03/24/21

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

HWCD Hazardous Waste Compliance Docket Facilities

VERSION DATE: 10/29/20

This list of the Federal Agency Hazardous Waste Compliance Docket Facilities is maintained by the United States Environmental Protection Agency (EPA). According to the EPA, Section 120(c) of CERCLA requires EPA to establish a listing, known as the Federal Facility Hazardous Waste Compliance Docket (Docket), of Federal facilities which are managing or have managed hazardous waste; or have had a release of hazardous waste. Thus, the Docket identifies all Federal facilities that must be evaluated to determine whether they pose a risk to human health and the environment and it makes this information available to the public. In order for the Docket to remain current and accurate it requires periodic updating.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 09/19/20

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISCLEANERS Integrated Compliance Information System Drycleaners

VERSION DATE: 09/19/20

This is a listing of drycleaner facilities from the Integrated Compliance Information System (ICIS). The U.S. Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments. The following Primary SIC Codes are included in this data: 7211, 7212, 7213, 7215, 7216, 7217, 7218, and/or 7219; the following Primary NAICS Codes are included in this data: 812320, 812331, and/or 812332.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 04/26/20

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. This database is provided by the U.S. Environmental Protection Agency.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 06/29/17

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements. Disclaimer: Due to agency regulations and policies, this database contains applicant/licensee location information which may or may not be related to the physical location per MLTS site.

MRDS Mineral Resource Data System

VERSION DATE: 03/15/16

MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps. A few updates last occurred 2015 and early 2016 for select mine site area/s.

MSHA Mine Safety and Health Administration Master Index File

VERSION DATE: 08/07/20

The Mine dataset lists all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970. It includes such information as the current status of each mine (Active, Abandoned, NonProducing, etc.), the current owner and operating company, commodity codes and physical attributes of the mine. Mine ID is the unique key for this data. This information is provided by the United States Department of Labor - Mine Safety and Health Administration (MSHA).

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 03/22/21

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 03/22/21

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

NMS Former Military Nike Missile Sites

VERSION DATE: 12/01/84

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline,

heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

NPDESR08 National Pollutant Discharge Elimination System

VERSION DATE: 04/01/07

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES database was collected from the U.S. Environmental Protection Agency (EPA) from December 2002 through April 2007. Refer to the ICIS and/or ICIS-NPDES database as source of current data. This database includes permitted facilities located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

NPL National Priorities List

VERSION DATE: 04/26/21

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

ODI Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

PADS PCB Activity Database System

VERSION DATE: 11/19/20

PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of Polychlorinated Biphenyls (PCB) who are required to notify the U.S. Environmental Protection Agency of such activities.

PCSR08 Permit Compliance System

VERSION DATE: 08/01/12

The historic Permit Compliance System tracked enforcement status and permit compliance of facilities controlled

by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. This database includes permitted facilities located in EPA Region 8 states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. This system has since been modernized by United States Environmental Protection Agency and is now integrated into the Integrated Compliance Information System (ICIS). Please refer to the ICIS database as the current source for this data.

PNPL Proposed National Priorities List

VERSION DATE: 04/26/21

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.

RCRAGR08 Resource Conservation & Recovery Act - Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities currently generating hazardous waste. EPA Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRANGR08 Resource Conservation & Recovery Act - Non-Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities classified as non-generators. Non-Generators do not presently generate hazardous waste. EPA

Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRASC RCRA Sites with Controls

VERSION DATE: 05/16/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with institutional controls in place.

RCRASUBC Resource Conservation & Recovery Act - Subject to Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities subject to corrective actions.

RCRAT Resource Conservation & Recovery Act - Non-CORRACTS Treatment, Storage & Disposal Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities recognized as hazardous waste treatment, storage, and disposal sites (TSD).

RODS Record of Decision System

VERSION DATE: 09/21/20

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

SEMS Superfund Enterprise Management System

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.

SEMSARCH Superfund Enterprise Management System Archived Site Inventory

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System Archived Site Inventory (List 8R Archived) replaced the CERCLIS NFRAP reporting system in 2015. This listing reflects sites at which the EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program.

SEMSLIENS SEMS Lien on Property

VERSION DATE: 06/22/20

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs. This is a listing of SEMS sites with a lien on the property.

SFLIENS CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete. Please refer to the SEMSLIENS database as source of current data.

SMCRA Surface Mining Control and Reclamation Act Sites

VERSION DATE: 12/18/20

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as information on the cost associated with the reclamation of those problems.

The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

SSEHRIPFAS SSEHRI PFAS Contamination Sites

VERSION DATE: 12/12/19

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Please access the following source link for the most current information: https://pfasproject.com/pfas-contamination-site-tracker/

SSTS Section Seven Tracking System

VERSION DATE: 08/04/20

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. "Production" includes formulation, packaging, repackaging, and relabeling. For this database, the Product Information is only available for establishments up through 2014 or prior years, product details are no longer released by the EPA within the current SSTS non-Confidential Business Information data.

TRI Toxics Release Inventory

VERSION DATE: 12/31/18

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/31/16

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured,

imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency (EPA) authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site. The EPA has collected Chemical Data Reporting (CDR) data since in 1986 (as Inventory Update Reporting). Collections occur approximately every four years and reporting requirements changed from collection to collection.

USUMTRCA Uranium Mill Tailings Radiation Control Act Sites

VERSION DATE: 03/04/17

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Environmental Records Definitions - STATE (CO)

APCDP Air Pollution Control Division Permitted Facilities

VERSION DATE: 06/29/20

This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.

ASBESTOS Asbestos Abatement and Demolition Projects

VERSION DATE: 12/28/17

The Colorado Department of Public Health and Environment's Air Pollution Control Division assists schools and businesses to comply with air pollution laws regulating asbestos and asbestos containing materials. The regulation that governs asbestos in Colorado is the Colorado Air Quality Control Commission s Regulation No. 8, Part B, "Emission Standards for Asbestos." Notification is required for all demolitions of all facilities and all asbestos abatement projects that exceed the trigger levels, whatever is the lesser quantity. The notification requirements apply to both friable and non-friable asbestos materials. This database contains those related projects since January 2008.

AST Aboveground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of aboveground storage tank (AST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

BF Colorado Brownfield Sites

VERSION DATE: 11/12/20

This list of Colorado brownfields is maintained by the Colorado Department of Public Health & Environment (CDPHE) Hazardous Materials and Waste Management Division Brownfields Program in conjunction with the Voluntary Cleanup Program (VCUP). The brownfields database is an inventory of sites for which CPDHE has provided brownfields assistance in the form of targeted brownfields assessments, a revolving loan or grant through the Colorado Brownfields Revolving Loan Fund, and/or assistance through our state brownfields grants program. Most of these incentives are available only to local governments or nonprofits. In some cases, sites that receive state incentives also go through the VCUP program but most of the VCUP applicants are private entities not eligible for other state brownfields incentives.

CDPS Colorado Discharge Permit System Facilities

VERSION DATE: 02/03/19

The Colorado Department of Public Health & Environment's Water Quality Control Division regulates the

Colorado Discharge Permit System. This system controls stormwater discharges from construction activities by requiring a Stormwater Construction Permit to reduce pollutants from entering streams, river, lakes and wetlands as a result of runoff from residential, commercial and industrial areas. This database also includes facilities with Industrial Stormwater Permits.

CLEANERS Dry Cleaning Facilities

VERSION DATE: 04/16/21

This list of dry cleaners, which have obtained an air permit through the Air Pollution Control Division, is maintained by the Colorado Department of Public Health and Environment.

COVENANTS Environmental Real Covenants List

VERSION DATE: 11/23/20

This list of environmental covenants is maintained by the Colorado Division of Public Health and Environment. Senate Bill 01-145 gave authority to the Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental covenant. These covenants, which are recorded with the deed and run with the land, provide a mechanism to ensure that institutional controls that are part of environmental remediation projects are properly implemented and that engineered structures are protected and maintained, so that implemented remedies continue to be protective of human health and the environment for as long as any residual contamination remains a risk.

HISTSWLF Historical Solid Waste Landfills

VERSION DATE: NR

This historical solid waste landfills database contains data from the Hazardous Materials Waste Management Division (HMWMD) of the Colorado Department of Public Health and other various state and local agencies. In the early 1980s, the HMWMD conducted a survey of staff members and local agencies to compile this listing of sites that were known or thought to have waste issues. This Solid Waste Historical Data is not considered complete or verifiable and has not been maintained since the late 1980s. The HMWMD is not responsible and shall not be liable to the used for damages of any kind arising out of the use of this data or information.

HWSCA Hazardous Waste Sites- Corrective Action

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by Congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the Hazardous and Solid Waste Amendments (HSWA) were added to RCRA providing for corrective action at facilities subject to RCRA. That same year, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. Corrective action may be implemented as part of a RCRA Hazardous Waste Permit, an Order, or a Corrective Action Plan pursuant to the Colorado Hazardous Waste Regulations. Corrective action is the process by which regulated facilities investigate and remediate, as necessary, all contamination (soil, ground water, surface water, air) associated with their releases into the environment. Historic Corrective Action Sites are facilities that have

completed the RCRA Subtitle C corrective Action process. This data was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

HWSG Hazardous Waste Sites- Generator

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. This facility listing includes RCRA sites listed as generators of hazardous waste (Small Quantity Generators and Large Quantity Generators) and was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

Small Quantity Generators (SQG) generate, in any calendar month, more than 100 kg (220 lbs.) but less than 1,000 kg (2,200 lbs.) of RCRA hazardous waste; and generate, in any calendar month, or accumulate at any time, no more than 1 kg (2.2 lbs.) of acute hazardous waste and no more than 100 kg (220 lbs.) of material from the cleanup of a spill of acute hazardous waste; and accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time; or, the site is a Small Quantity Generator if the site met all other criteria for a Conditionally Exempt Small Quantity Generator, but accumulated, at any time, more than 1,000 kg (2,200 lbs.) of RCRA hazardous waste.

Large Quantity Generators (LQG) generate, in any calendar month, 1,000 kg (2,200 lbs.) or more of RCRA hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 1 kg (2.2 lbs.) of RCRA acute hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 100 kg (220 lbs.) of spill cleanup material contaminated with RCRA acute hazardous waste.

HWSTSD Hazardous Waste Sites- Treatment, Storage & Disposal

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. TSD facilities treat, store, dispose, or recycle hazardous waste on site in units and therefore are subject to RCRA permitting requirements. Historic TSDs are facilities that have completed closure and/or post-closure of the RCRA Subtitle C Regulated Unit(s) or the Treatment/Storage/Disposal Unit is no longer regulated. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

LST Leaking Storage Tank Facilities

VERSION DATE: 05/03/21

This database of aboveground and underground storage tank facilities with confirmed releases is a compilation of several lists maintained by the Colorado Department of Labor and Employment. Currently In Use, Never Installed/Existed, Never Installed-Permit Revoked, Not Regulated, Other, Pending Installation, Permanently Closed, Temporarily Out of Use tanks are included in this data. The next set of data is obtained from the Active

and Closed OPS Petroleum Release Events in Colorado database. This data includes the OPS Open Event locations, but also shows locations of closed events (releases that have been issued a No Further Action determination). The Events data utilized in this database includes the following status types: Brownfield, Closed, Enforcement, LUST Trust, Open and State Lead. Please note some Events (confirmed releases) may not have a contaminant present.

LUSTTRUST Leaking Underground Storage Tanks Trust Fund Sites

VERSION DATE: 01/01/00

Suspected tank leaks have been discovered at the sites are included in this database, but the facility responsible for the leak has not been identified. The state's investigation and search for responsible parties is paid for out of the state's Leaking Underground Storage Tank (LUST) Trust Fund. This data was originally collected in 2002 from the Colorado Department of Labor & Employment, Division of Oil & Public Safety, State Fund Section by a former environmental database company known as Satisfi. Please refer to State LST database as source of current LUST Trust sites.

METHANESITES Methane Gas Study Sites

VERSION DATE: 01/01/81

This Investigation of Methane Gas Hazards report was prepared by the Denver Office of Emergency Preparedness in 1981. The purpose of this study was to assess the actual and potential generation, migration, explosive and related problems associated with specified landfills, and to identify existing and potential problems, suggested strategies to prevent, abate, and control such problems and recommend investigative and monitoring functions as may be deemed necessary. The Colorado Department of Health selected eight landfills as priorities due to population density and potential hazards to population and property.

RECYCLERS Registered Recycling Facilities

VERSION DATE: 09/01/19

This list of registered recycling facilities in Colorado is maintained by the Colorado Department of Public Health & Environment. This list includes primarily processing facilities for recyclable materials, such as: material recovery facilities, industrial recycling operations, and recyclable material end user sites. Collection centers/drop-off locations are not included unless the site is also processing recyclable materials (separating, sorting, dismantling, grinding, baling, etc.).

SF Superfund Sites

VERSION DATE: 12/10/20

This list of Superfund Sites is maintained by the Colorado Department of Public Health and Environment. This list contains active, deleted and proposed "Superfund" hazardous waste sites, as well as those sites identified through the Natural Resource Damages section of Superfund legislation and one Private Non-Superfund Cleanup site. A site qualifies for the National Priorities List (NPL or Superfund list) when the U.S. Environmental Protection Agency (EPA) determines there is a release or threatened release of hazardous substances that may

endanger public health, welfare or the environment. In Colorado, the lead agency for Superfund remediation may be either the EPA or the Colorado Department of Public Health and Environment.

SPILLS Spills Listing

VERSION DATE: 02/28/21

The Colorado Department of Public Health and Environment's Division of Emergency Preparedness and Response maintains this listing of chemical spills and/or releases.

SWF Solid Waste Facilities

VERSION DATE: 12/18/20

The Colorado Department of Public Health and Environment maintains this database of solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants. As of 11-6-19, the Waste Grease list has been discontinued and no new sites will be added as waste grease.

UMTS Uranium Mill Tailings Sites

VERSION DATE: 08/09/02

There were nine uranium mill tailings sites in Colorado designated for cleanup under the federal Uranium Mill Tailings Radiation Control Act (UMTRA). These nine sites, know commonly as UMTRA sites, were remediated jointly by the State of Colorado and the U.S. Department of Energy during the late 1980's and early 1990's. Mill tailings were removed from 8 of the mill sites and relocated in engineered disposal cells. A disposal cell is designed to encapsulate the material, reduce radon emanation, and prevent the movement of water through the material. At one site, Maybell, CO, the tailings were stabilized in-place at the mill site. After remediation of the tailings was completed, the State and DOE began to investigate the residual impacts to groundwater at the mill sites. The groundwater phase of the UMTRA program is on-going. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

UST Underground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of underground storage tank (UST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

VCRA Voluntary Cleanup and Redevelopment Program Sites

VERSION DATE: 03/31/21

This list of Voluntary Cleanup and Redevelopment Program Sites is maintained by the Colorado Department of Public Health and Environment (CDPHE) and includes both voluntary cleanup and brownfield properties. The

Voluntary Cleanup and Redevelopment program was created in 1994. The objective of the program is to facilitate the redevelopment and transfer of contaminated properties. Properties that sit untouched because of their real or perceived contamination can be rehabilitated using the CDPHE's Brownfields Program in conjunction with the Voluntary Cleanup Program. Cleanup decisions are based on existing standards and the proposed use of the property. The actual cleanup and verification is the owner's responsibility.

WCSWF Weld County Solid Waste Facilities

VERSION DATE: 01/25/18

This list of solid waste facilities is maintained by the Weld County Public Health Department. The Weld County Code (WCC), Section 23-4-380 is the only section of the WCC that pertains to solid waste operations. The siting, permitting and regulation of solid waste disposal sites is an area of dual jurisdiction between Colorado Department of Public Health and Environment and Weld County. The primary regulations that govern composting and solid waste facilities are the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). These regulations are implemented by the Colorado Department of Public Health & Environment. The Weld County Department of Public Health & Environment interacts with compost and solid waste facilities through the receipt of complaints, the land use planning process for facilities having a Use by Special Review (USR) Permit, site inspections, and investigations.

Environmental Records Definitions - TRIBAL

INDIANRES Indian Reservations

VERSION DATE: 09/27/17

This database is extracted from select geographic and cartographic information from the U.S. Census Bureau. The Bureau of Indian Affairs (BIA) within the U.S. Department of the Interior (DOI) provides the list of federally recognized tribes. The American Indian/Alaska Native/Native Hawaiian (AIANNH) Areas includes the following legal entities: federally recognized American Indian reservations and off-reservation trust land areas, state-recognized American Indian reservations, and Hawaiian home lands (HHLs). The boundaries for federally recognized American Indian reservations and off-reservation trust lands are as of January 2017. The boundaries for state-recognized American Indian reservations and for state designated tribal statistical areas were delineated by state governor-appointed liaisons for the 2010 Census through the State American Indian Reservation Program and Tribal Statistical Areas Program respectively.

LUSTR08 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

USTR08 Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

Appendix C: Well Search Report

GeoPlus Oil & Gas Report

GeoLens by GeoSearch

Target Property:

Columbine
Frederick, Weld County, Colorado 80530

Prepared For:

Two Dot Consulting, LLC

Order #: 166434
Job #: 412875
Project #: 603-128
Date: 06/09/2021

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Target Property Summary

Target Property Information

Columbine
Frederick, Colorado 80530

Coordinates
Area centroid (-104.91666, 40.1143466)

USGS Quadrangle
Frederick, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530
Fort Lupton CO: 80621

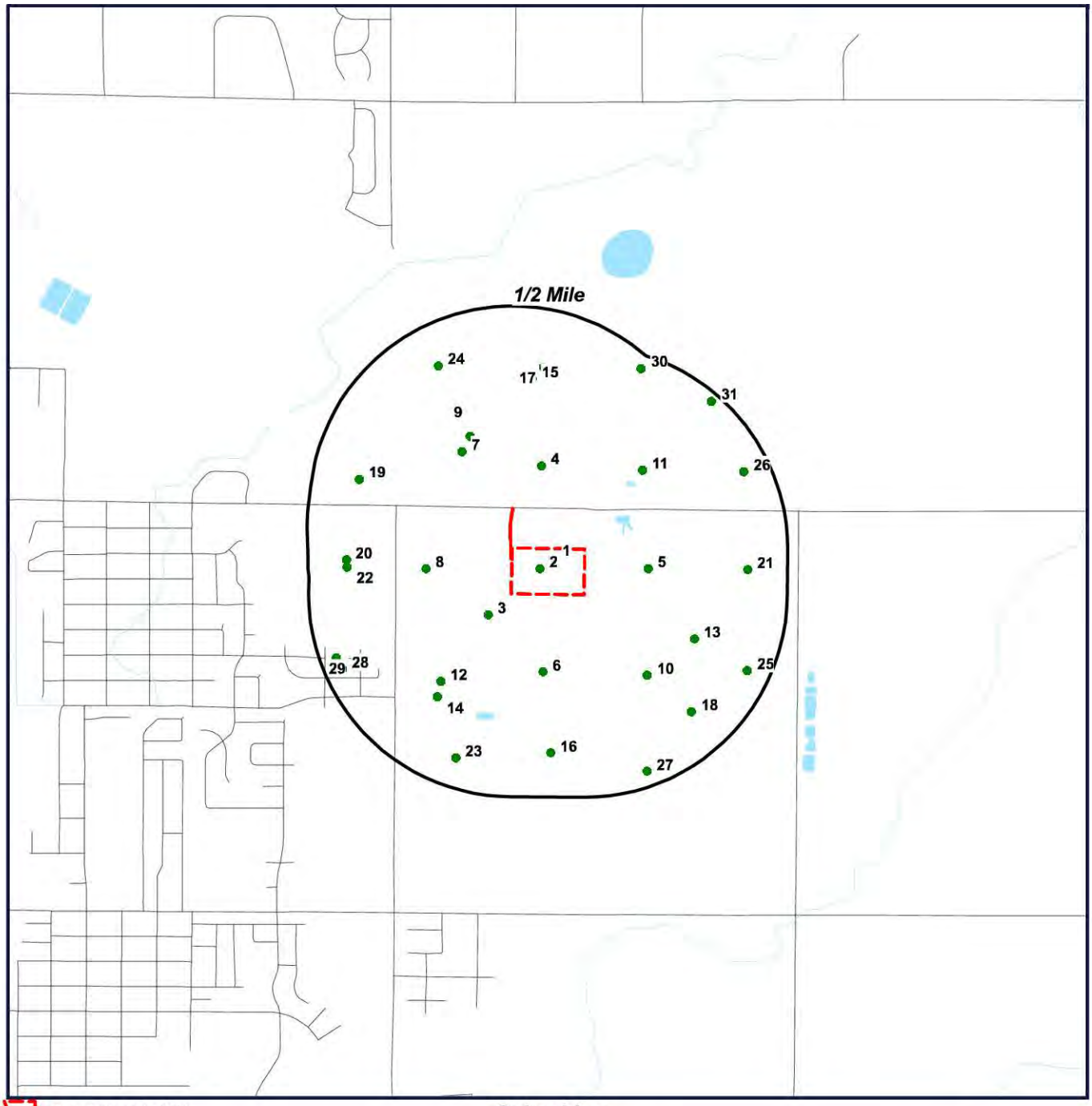
Database Radius Summary

STATE (CO) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
OG	0.5000	2	8	10	37	NS	NS	57
PITS	0.5000	0	0	1	4	NS	NS	5
SUB-TOTAL		2	8	11	41	0	0	62
TOTAL		2	8	11	41	0	0	62

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

OIL & GAS WELL MAP



Target Property (TP)

Well Location

Columbine
Frederick, Colorado
80530

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
1	OG	05-123-20363	TP	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
2	OG	05-123-07532	TP	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-11334	0.059 mi. WSW (312 ft.)	HELLEN RUSSELL PERRIN G.U.-TRUE	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35027	0.066 mi. WSW (348 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35029	0.065 mi. WSW (343 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35030	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35031	0.067 mi. WSW (354 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35032	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35033	0.063 mi. WSW (333 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35035	0.062 mi. WSW (327 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
4	OG	05-123-09501	0.143 mi. NE (755 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-08947	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-30590	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-08815	0.173 mi. S (913 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
7	OG	05-123-07503	0.203 mi. NW (1072 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
7	PITS	118682	0.203 mi. NW (1072 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-09045	0.209 mi. W (1104 ft.)	BERNARD TEETS B	WELD COUNTY, FREDERICK, CO 80530
9	OG	05-123-07271	0.224 mi. NW (1183 ft.)	BERNARD TEETS	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-21592	0.247 mi. NW (1304 ft.)	TEETS	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-07625	0.230 mi. SE (1214 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-30589	0.238 mi. SE (1257 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-07569	0.256 mi. NE (1352 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
11	OG	05-123-20339	0.253 mi. NE (1336 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-20375	0.263 mi. SW (1389 ft.)	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
13	OG	05-123-11399	0.285 mi. ESE (1505 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-07552	0.298 mi. SW (1573 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
14	PITS	118238	0.298 mi. SW (1573 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, FREDERICK, CO 80530
15	OG	05-123-08394	0.342 mi. N (1806 ft.)	TEETS, BERNARD E	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08677	0.375 mi. S (1980 ft.)	PERRIN B	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35013	0.374 mi. S (1975 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35018	0.372 mi. S (1964 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35019	0.370 mi. S (1954 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35020	0.367 mi. S (1938 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35022	0.360 mi. S (1901 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35024	0.368 mi. S (1943 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35025	0.362 mi. S (1911 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35050	0.364 mi. S (1922 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35055	0.376 mi. S (1985 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
17	OG	05-123-19958	0.376 mi. NNE (1985 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
18	PITS	118515	0.378 mi. SE (1996 ft.)	CRESTONE PEAK RESOURCES OPERATING LLC	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-19746	0.388 mi. W (2049 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-07523	0.405 mi. W (2138 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-19978	0.390 mi. W (2059 ft.)	HSR-RUSSELL	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-10239	0.402 mi. E (2123 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-30123	0.395 mi. E (2086 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34151	0.407 mi. W (2149 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
22	OG	05-123-34153	0.405 mi. W (2138 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34155	0.404 mi. W (2133 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34156	0.409 mi. W (2160 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34158	0.413 mi. W (2181 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34159	0.411 mi. W (2170 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-08814	0.408 mi. SSW (2154 ft.)	COLORADO NATL BANK TRUSTE	WELD COUNTY, FREDERICK, CO 80530
24	OG	05-123-09499	0.414 mi. NNW (2186 ft.)	TEETS UNIT	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08948	0.436 mi. ESE (2302 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-09503	0.444 mi. ENE (2344 ft.)	B.E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08781	0.444 mi. SSE (2344 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
27	OG	05-123-30588	0.453 mi. SSE (2392 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
28	PITS	118494	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118495	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-08816	0.453 mi. WSW (2392 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-09502	0.483 mi. NE (2550 ft.)	TEETS, BERNARD E B	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11009	0.494 mi. NE (2608 ft.)	BERNARD E. TEETS	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
1	OG	05-123-20363	4,998 ft.	TP	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530
2	OG	05-123-07532	4,998 ft.	TP	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-11334	5,013 ft.	0.059 mi. WSW (312 ft.)	HELLEN RUSSELL PERRIN G.U.-TRUE	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35027	5,013 ft.	0.066 mi. WSW (348 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35029	5,013 ft.	0.065 mi. WSW (343 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35030	5,013 ft.	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35031	5,013 ft.	0.067 mi. WSW (354 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35032	5,013 ft.	0.064 mi. WSW (338 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35033	5,013 ft.	0.063 mi. WSW (333 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
3	OG	05-123-35035	5,013 ft.	0.062 mi. WSW (327 ft.)	SADDLEBACK	WELD COUNTY, FREDERICK, CO 80530
4	OG	05-123-09501	4,995 ft.	0.143 mi. NE (755 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-08947	4,994 ft.	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-30590	4,994 ft.	0.157 mi. E (829 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-08815	5,009 ft.	0.173 mi. S (913 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
7	OG	05-123-07503	4,986 ft.	0.203 mi. NW (1072 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-09045	5,007 ft.	0.209 mi. W (1104 ft.)	BERNARD TEETS B	WELD COUNTY, FREDERICK, CO 80530
9	OG	05-123-07271	4,986 ft.	0.224 mi. NW (1183 ft.)	BERNARD TEETS	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-21592	4,986 ft.	0.247 mi. NW (1304 ft.)	TEETS	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-07625	5,008 ft.	0.230 mi. SE (1214 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-30589	5,008 ft.	0.238 mi. SE (1257 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-07569	4,982 ft.	0.256 mi. NE (1352 ft.)	BERNARD E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20339	4,982 ft.	0.253 mi. NE (1336 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-20375	5,021 ft.	0.263 mi. SW (1389 ft.)	HSR-TEETS	WELD COUNTY, FREDERICK, CO 80530

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
13	OG	05-123-11399	5,005 ft.	0.285 mi. ESE (1505 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-07552	5,021 ft.	0.298 mi. SW (1573 ft.)	BERNARD E. TEETS B	WELD COUNTY, FREDERICK, CO 80530
15	OG	05-123-08394	4,986 ft.	0.342 mi. N (1806 ft.)	TEETS, BERNARD E	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08677	5,027 ft.	0.375 mi. S (1980 ft.)	PERRIN B	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35013	5,027 ft.	0.374 mi. S (1975 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35018	5,027 ft.	0.372 mi. S (1964 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35019	5,027 ft.	0.370 mi. S (1954 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35020	5,027 ft.	0.367 mi. S (1938 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35022	5,027 ft.	0.360 mi. S (1901 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35024	5,027 ft.	0.368 mi. S (1943 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35025	5,027 ft.	0.362 mi. S (1911 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35050	5,027 ft.	0.364 mi. S (1922 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
16	OG	05-123-35055	5,027 ft.	0.376 mi. S (1985 ft.)	HIDDEN CREEK	WELD COUNTY, FREDERICK, CO 80530
17	OG	05-123-19958	4,986 ft.	0.376 mi. NNE (1985 ft.)	HSR-TEETS	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-19746	4,987 ft.	0.388 mi. W (2049 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-07523	5,009 ft.	0.405 mi. W (2138 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-19978	5,009 ft.	0.390 mi. W (2059 ft.)	HSR-RUSSELL	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-10239	5,002 ft.	0.402 mi. E (2123 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
21	OG	05-123-30123	5,002 ft.	0.395 mi. E (2086 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34151	5,009 ft.	0.407 mi. W (2149 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34153	5,009 ft.	0.405 mi. W (2138 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34155	5,009 ft.	0.404 mi. W (2133 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34156	5,009 ft.	0.409 mi. W (2160 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-34158	5,009 ft.	0.413 mi. W (2181 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
22	OG	05-123-34159	5,009 ft.	0.411 mi. W (2170 ft.)	OVERLOOK	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-08814	5,029 ft.	0.408 mi. SSW (2154 ft.)	COLORADO NATL BANK TRUSTE	WELD COUNTY, FREDERICK, CO 80530
24	OG	05-123-09499	4,991 ft.	0.414 mi. NNW (2186 ft.)	TEETS UNIT	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08948	5,013 ft.	0.436 mi. ESE (2302 ft.)	EMERSON	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-09503	4,992 ft.	0.444 mi. ENE (2344 ft.)	B.E. TEETS B	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08781	5,029 ft.	0.444 mi. SSE (2344 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
27	OG	05-123-30588	5,029 ft.	0.453 mi. SSE (2392 ft.)	EMERSON	WELD COUNTY, FORT LUPTON, CO 80621
29	OG	05-123-08816	5,018 ft.	0.453 mi. WSW (2392 ft.)	TOM L. RUSSELL	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-09502	4,968 ft.	0.483 mi. NE (2550 ft.)	TEETS, BERNARD E B	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11009	4,976 ft.	0.494 mi. NE (2608 ft.)	BERNARD E. TEETS	WELD COUNTY, LONGMONT, CO 80504
7	PITS	118682	4,986 ft.	0.203 mi. NW (1072 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
14	PITS	118238	5,021 ft.	0.298 mi. SW (1573 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, FREDERICK, CO 80530
18	PITS	118515	5,015 ft.	0.378 mi. SE (1996 ft.)	CRESTONE PEAK RESOURCES OPERATING LLC	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118494	5,022 ft.	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
28	PITS	118495	5,022 ft.	0.449 mi. WSW (2371 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504

Oil & Gas Well Report

MAP ID	API #	WELL # AND NAME	OPERATOR NAME	GRND ELEV.	LOCATION QUALIFIER	STATUS	LATITUDE	LONGITUDE
1	05-123-20363	3-29A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	5000 FT	ACTUAL LATLONG	SHUT IN	40.115112000	-104.916460000
2	05-123-07532	2 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5002 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.114725000	-104.917047000
3	05-123-11334	1 HELLEN RUSSELL PERRIN G.U.-TRUE	KERR MCGEE OIL & GAS ONSHORE LP	5013 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.113033000	-104.919278000
3	05-123-35027	21-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113051000	-104.919454000
3	05-123-35029	31-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113078000	-104.919454000
3	05-123-35030	30-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113105000	-104.919454000
3	05-123-35031	6-29X SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5016 FT	ACTUAL LATLONG	SHUT IN	40.113024000	-104.919454000
3	05-123-35032	4-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5015 FT	ACTUAL LATLONG	SHUT IN	40.113132000	-104.919454000
3	05-123-35033	36-20 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5014 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.113159000	-104.919454000
3	05-123-35035	29-29 SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	5014 FT	ACTUAL LATLONG	SHUT IN	40.113186000	-104.919454000
4	05-123-09501	10 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4996 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118383000	-104.916984000
5	05-123-08947	31-29 EMERSON	EXTRACTION OIL & GAS INC	4993 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.114712000	-104.912001000
5	05-123-30590	31-29J EMERSON	SUNDANCE ENERGY INC	4996 FT	PLANNED LATLONG	ABANDONED LOCATION	40.114568000	-104.912001000
6	05-123-08815	7 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5013 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.111031000	-104.916910000
7	05-123-07503	1 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4985 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.118890000	-104.920691000
8	05-123-09045	8 BERNARD TEETS B	KP KAUFFMAN COMPANY INC	5005 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.114720000	-104.922363000
9	05-123-07271	1 BERNARD TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4985 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119439000	-104.920315000
9	05-123-21592	12-20A TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4990 FT	ACTUAL LATLONG	SHUT IN	40.119737000	-104.920514000
10	05-123-07625	32-29 EMERSON	EXTRACTION OIL & GAS INC	5010 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.111054000	-104.912041000
10	05-123-30589	32-29J EMERSON	SUNDANCE ENERGY INC	5012 FT	PLANNED LATLONG	ABANDONED LOCATION	40.110910000	-104.912041000
11	05-123-07569	4 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	4984 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118226000	-104.912266000
11	05-123-20339	15-20A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4989 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.118262000	-104.912442000
12	05-123-20375	5-29A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	5040 FT	ACTUAL LATLONG	SHUT IN	40.110692000	-104.921663000
13	05-123-11399	2-29 J EMERSON	CRESTONE PEAK RESOURCES OPERATING LLC	5006 FT	ACTUAL LATLONG	SHUT IN	40.112215000	-104.909857000
14	05-123-07552	3 BERNARD E. TEETS B	KP KAUFFMAN COMPANY INC	5023 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.110134000	-104.921840000
15	05-123-08394	B #5 TEETS, BERNARD E	KP KAUFFMAN COMPANY INC	4985 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121482000	-104.917402000
16	05-123-08677	1 PERRIN B	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108094000	-104.916715000
16	05-123-35013	36-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108121000	-104.916550000
16	05-123-35018	35-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	SHUT IN	40.108139000	-104.916539000
16	05-123-35019	13-29X HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108175000	-104.916550000
16	05-123-35020	23-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.108220000	-104.916538000
16	05-123-35022	22-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108310000	-104.916550000
16	05-123-35024	19-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108202000	-104.916550000

16	05-123-35025	25-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108283000	-104.916550000
16	05-123-35050	12-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5029 FT	ACTUAL LATLONG	SHUT IN	40.108256000	-104.916550000
16	05-123-35055	14-29 HIDDEN CREEK	KERR MCGEE OIL & GAS ONSHORE LP	5030 FT	ACTUAL LATLONG	SHUT IN	40.108085000	-104.916550000
17	05-123-19958	11-20A HSR-TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4985 FT	ACTUAL LATLONG	SHUT IN	40.121906000	-104.916874000
19	05-123-19746	19-16JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4987 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.117911000	-104.925469000
20	05-123-07523	1 TOM L. RUSSELL	KP KAUFFMAN COMPANY INC	5007 FT	ACTUAL LATLONG	PRODUCING	40.115038000	-104.926082000
20	05-123-19978	1-30A HSR-RUSSELL	KERR MCGEE OIL & GAS ONSHORE LP	5007 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.115227000	-104.925812000
21	05-123-10239	41-29 EMERSON	EXTRACTION OIL & GAS INC	5004 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.114673000	-104.907366000
21	05-123-30123	41-29J EMERSON	SUNDANCE ENERGY INC	5006 FT	PLANNED LATLONG	ABANDONED LOCATION	40.114583000	-104.907495000
22	05-123-34151	21-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5011 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926118000
22	05-123-34153	7-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5012 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926082000
22	05-123-34155	8-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5012 FT	ACTUAL LATLONG	SHUT IN	40.114776000	-104.926047000
22	05-123-34156	2-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5011 FT	ACTUAL LATLONG	SHUT IN	40.114785000	-104.926153000
22	05-123-34158	28-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5010 FT	ACTUAL LATLONG	PRODUCING	40.114785000	-104.926223000
22	05-123-34159	27-30 OVERLOOK	KERR MCGEE OIL & GAS ONSHORE LP	5010 FT	ACTUAL LATLONG	SHUT IN	40.114785000	-104.926188000
23	05-123-08814	2 COLORADO NATL BANK TRUSTE	KP KAUFFMAN COMPANY INC	5030 FT	ACTUAL LATLONG	PRODUCING	40.107971000	-104.920962000
24	05-123-09499	2 TEETS UNIT	KP KAUFFMAN COMPANY INC	4995 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121954000	-104.921779000
25	05-123-08948	42-29 EMERSON	EXTRACTION OIL & GAS INC	5014 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.111078000	-104.907370000
26	05-123-09503	9 B.E. TEETS B	KP KAUFFMAN COMPANY INC	4993 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.118178000	-104.907549000
27	05-123-08781	33-29 EMERSON	EXTRACTION OIL & GAS INC	5030 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.107487000	-104.912057000
27	05-123-30588	33-29J EMERSON	SUNDANCE ENERGY INC	5031 FT	PLANNED LATLONG	ABANDONED LOCATION	40.107351000	-104.912057000
29	05-123-08816	2 TOM L. RUSSELL	KP KAUFFMAN COMPANY INC	5022 FT	ACTUAL LATLONG	PRODUCING	40.111533000	-104.926544000
30	05-123-09502	11 TEETS, BERNARD E B	KP KAUFFMAN COMPANY INC	4967 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121857000	-104.912332000
31	05-123-11009	2 BERNARD E. TEETS	KERR MCGEE OIL & GAS ONSHORE LP	4975 FT	ACTUAL LATLONG	SHUT IN	40.120692000	-104.909047000

Oil & Gas Pits Report

MAP ID	FACILITY #	PIT #	OPERATOR NAME	WELL # AND NAME	FIELD NAME	STATUS	LATITUDE	LONGITUDE
7	118682	PIT# 118682	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.118890000	-104.920691000
14	118238	PIT# 118238	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.110134000	-104.921840000
18	118515	PIT# 118515	CRESTONE PEAK RESOURCES OPERATING LLC	NOT REPORTED	WATTENBERG	CLOSED	40.109611000	-104.909977000
28	118494	PIT# 118494	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	NOT REPORTED	40.111136000	-104.926262000
28	118495	PIT# 118495	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	NOT REPORTED	40.111136000	-104.926262000

Environmental Records Definitions - STATE (CO)

OG Oil and Gas Well Locations

VERSION DATE: 09/18/20

The Colorado Oil and Gas Conservation Commission maintains this database of active and plugged wells, including active and expired well permits. Some permitted locations were never drilled but locations are still included in the data.

PITS Oil and Gas Pit Locations

VERSION DATE: 09/18/20

This Colorado Oil and Gas Conservation Commission (COGCC) database maintains this list of oil and gas pit locations within Colorado. This data contains over 10,000 oil and gas related pit locations. The Colorado Department of Natural Resources (DNR) is not responsible and shall not be liable to the user for damages of any kind arising out of the use of data or information provided by the DNR, including the installation of the data or information, its use, or the results obtained from its use. Any data or information provided by the DNR is provided "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Appendix D: Historical Aerial Photographs

Historical Aerial Photographs

NEW: *GeoLens by Geosearch*

Target Property:

Columbine

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 149072
Job #: 359305
Project #: 603-128
Date: 7/8/2020

Target Property Summary

Columbine

Longmont, Weld, Colorado 80504

USGS Quadrangle: ***Frederick***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.918344000, 40.115175000), (-104.914956000, 40.115146000), (-104.914969000, 40.113529000), (-104.918356000, 40.113549000)

Aerial Research Summary

Date	Source	Scale	Frame
2019	USDA	1" = 500'	N/A
2017	USDA	1" = 500'	N/A
2015	USDA	1" = 500'	N/A
2013	USDA	1" = 500'	N/A
2011	USDA	1" = 500'	N/A
2009	USDA	1" = 500'	N/A
2006	USDA	1" = 500'	N/A
2005	USDA	1" = 500'	N/A
2004	USDA	1" = 500'	N/A
10/04/1999	USGS	1" = 500'	N/A
10/13/1984	USGS	1" = 500'	17-72
08/16/1978	USGS	1" = 500'	3-44
06/11/1975	USGS	1" = 500'	5-105
03/04/1970	USGS	1" = 500'	2-6
09/03/1963	ASCS	1" = 500'	PI-14
09/10/1953	AMS	1" = 500'	4940
09/25/1948	USGS	1" = 500'	4-93
11/03/1937	ASCS	1" = 500'	85-33

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N
W E
S

Columbine
USDA
2019

GeoSearch

JOB #: 359305 - 07/08/2020



N
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S

Columbine
USDA
2017

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
S

Columbine
USDA
2015

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
S

Columbine
USDA
2013

GeoSearch

JOB #: 359305 - 07/08/2020



N
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Columbine
USDA
2011

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
S

Columbine
USDA
2009

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
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Columbine
USDA
2006

GeoSearch

JOB #: 359305 - 07/08/2020



N
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Columbine
USDA
2005

GeoSearch

JOB #: 359305 - 07/08/2020



N
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Columbine
USDA
2004

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
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Columbine
USGS
10/04/1999

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
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Columbine
USGS
10/13/1984

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
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Columbine
USGS
08/16/1978

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
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Columbine
USGS
06/11/1975

GeoSearch

JOB #: 359305 - 07/08/2020

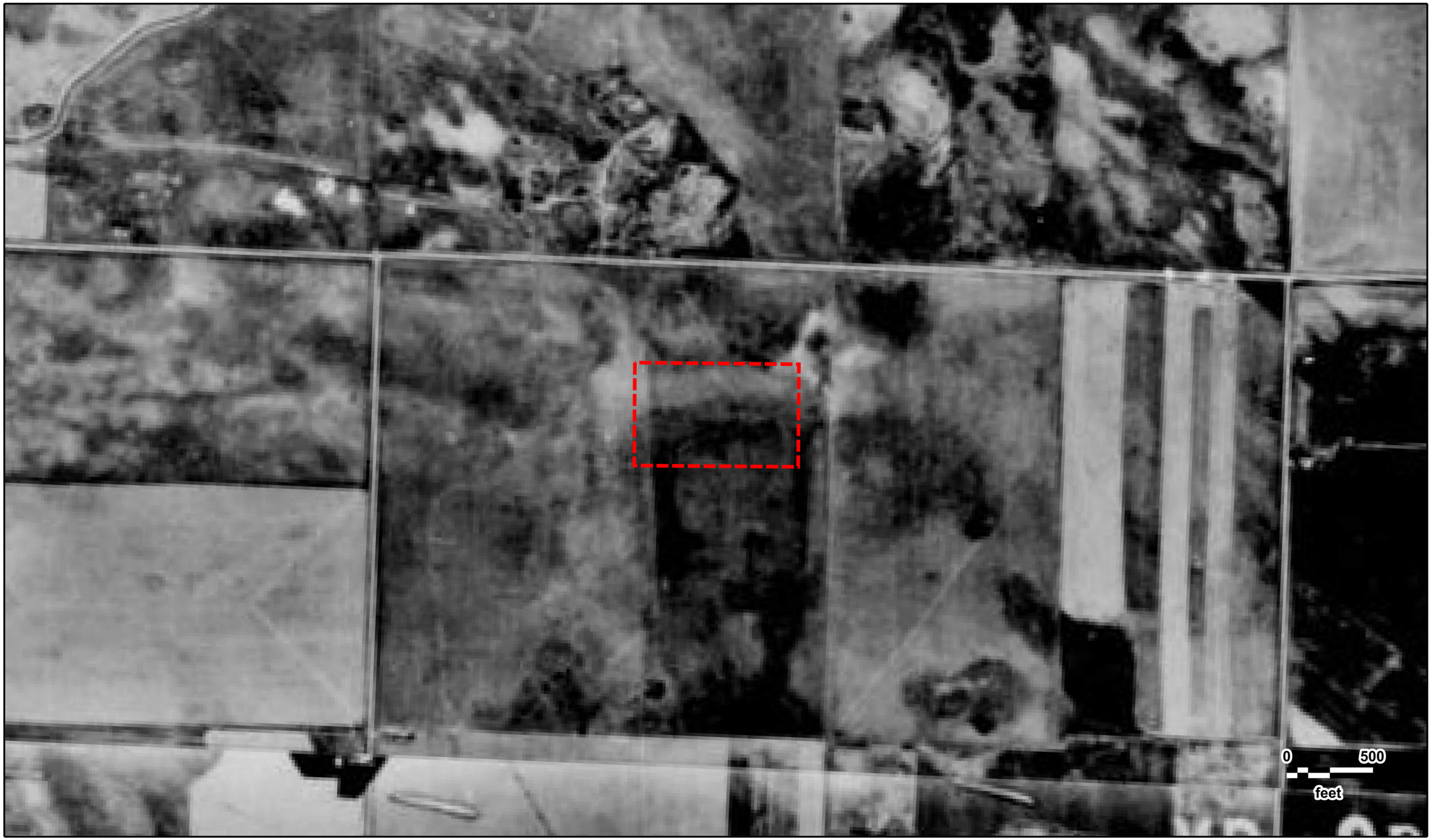


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Columbine
USGS
03/04/1970

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
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Columbine
ASCS
09/03/1963

GeoSearch

JOB #: 359305 - 07/08/2020



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W E
S

Columbine
AMS
09/10/1953

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
S

Columbine
USGS
09/25/1948

GeoSearch

JOB #: 359305 - 07/08/2020



N
W E
S

Columbine
ASCS
11/03/1937

GeoSearch

JOB #: 359305 - 07/08/2020

Appendix E: Historical Topographic Maps

Historical Topographic Maps

NEW: *GeoLens by Geosearch*

Target Property:

Columbine

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 149072
Job #: 359304
Project #: 603-128
Date: 7/8/2020

Target Property Summary

Columbine

Longmont, Weld, Colorado 80504

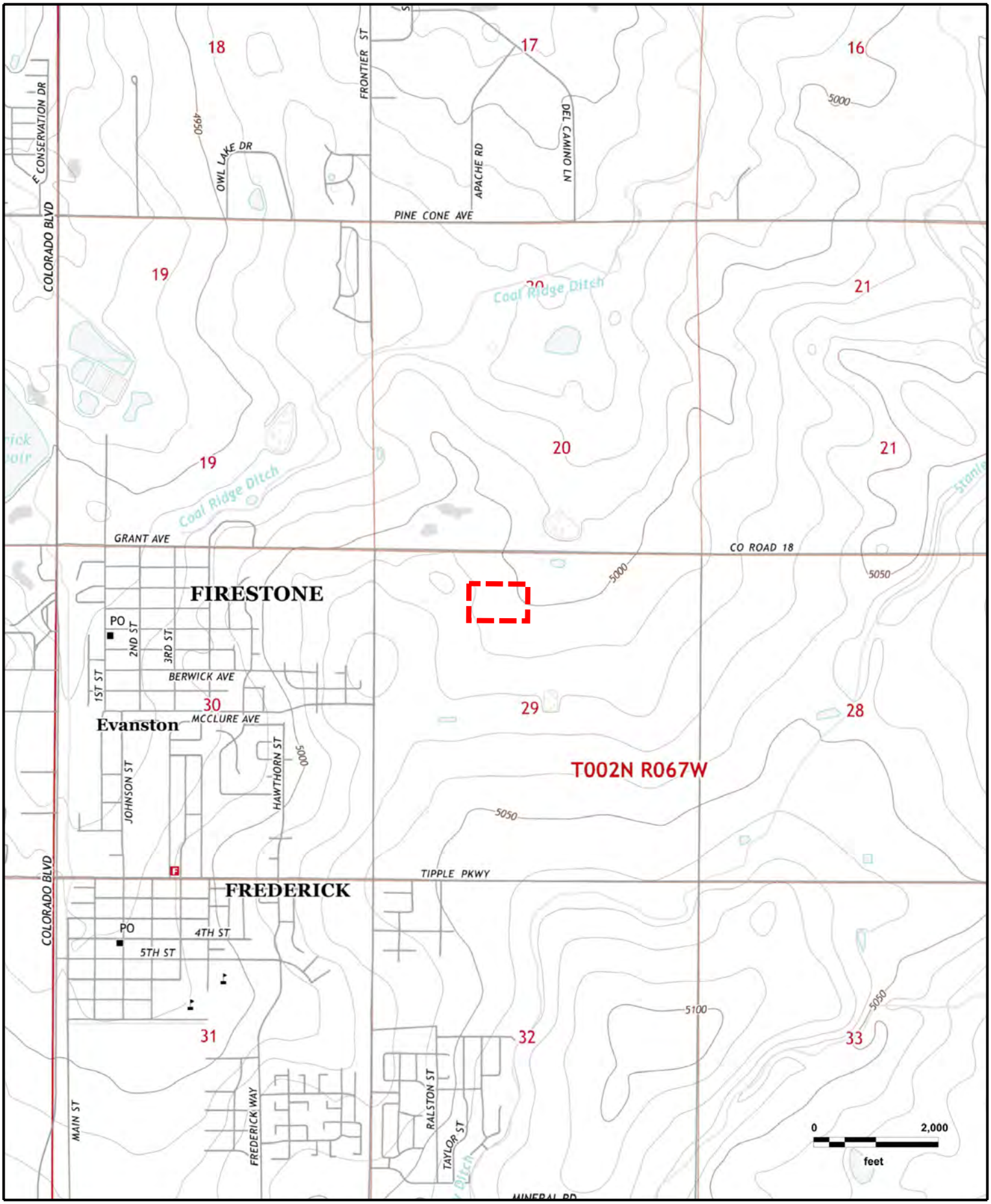
USGS Quadrangle: ***Frederick***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.918344000, 40.115175000), (-104.914956000, 40.115146000), (-104.914969000, 40.113529000), (-104.918356000, 40.113549000)

Topographic Map Summary

Date	Quadrangle	Scale
2013	FREDERICK, CO (2013) GOWANDA, CO (2013)	1" = 2000'
1950 REVISED 1994	FREDERICK, CO	1" = 2000'
1950 PHOTOREVISED 1979	FREDERICK, CO (1950) GOWANDA, CO (1949)	1" = 2000'
1950 PHOTOREVISED 1969	FREDERICK, CO (1950) GOWANDA, CO (1949)	1" = 2000'
1950	FREDERICK, CO (1950) GOWANDA, CO (1950)	1" = 2000'
1902	GREELEY, CO	1" = 10420'

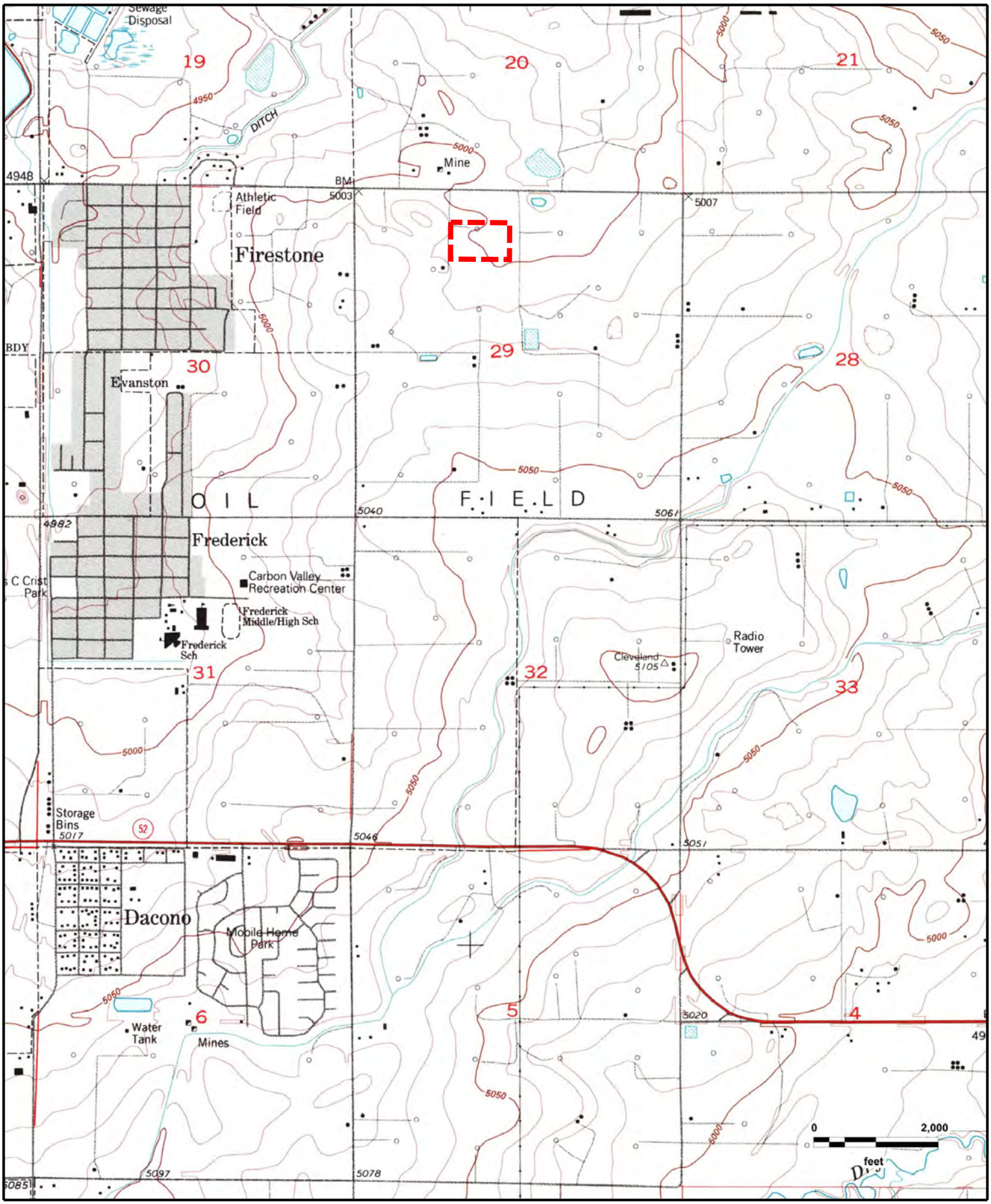
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Columbine
FREDERICK, CO (2013), GOWANDA, CO (2013)

GeoSearch

JOB #: 359304 - 07/08/2020

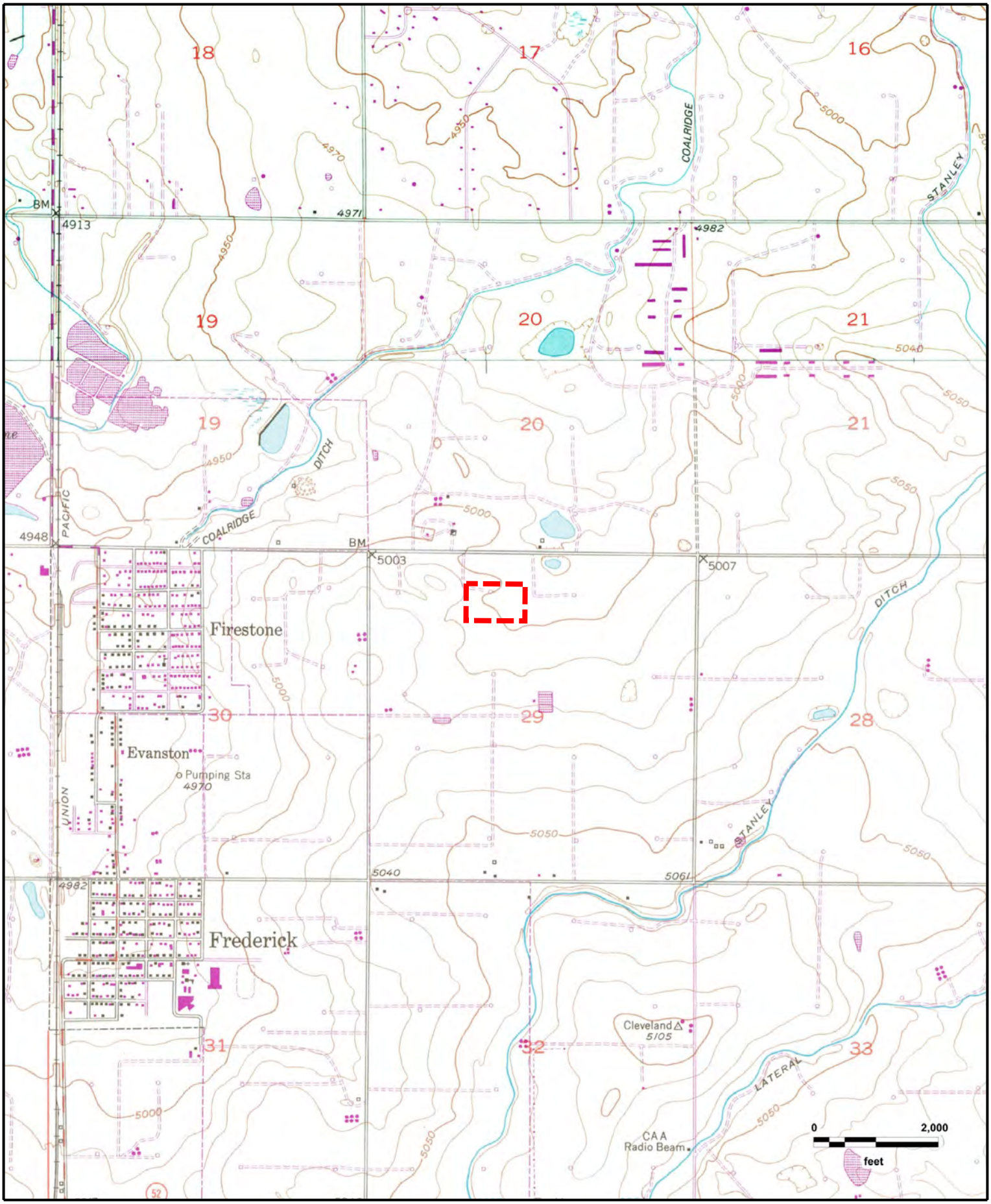


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Columbine
FREDERICK, CO (1994)

GeoSearch

JOB #: 359304 - 07/08/2020

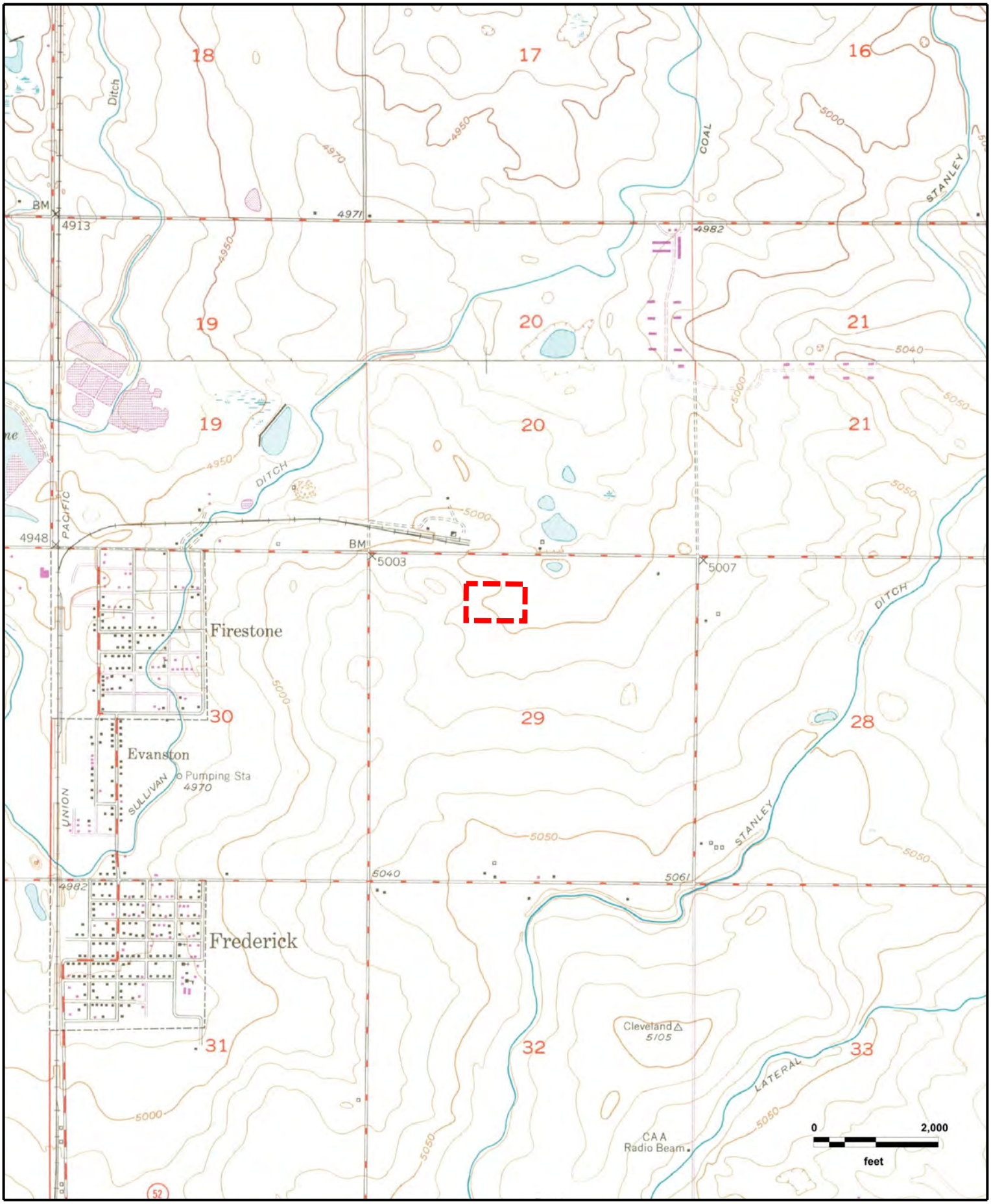


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1949)

GeoSearch

JOB #: 359304 - 07/08/2020

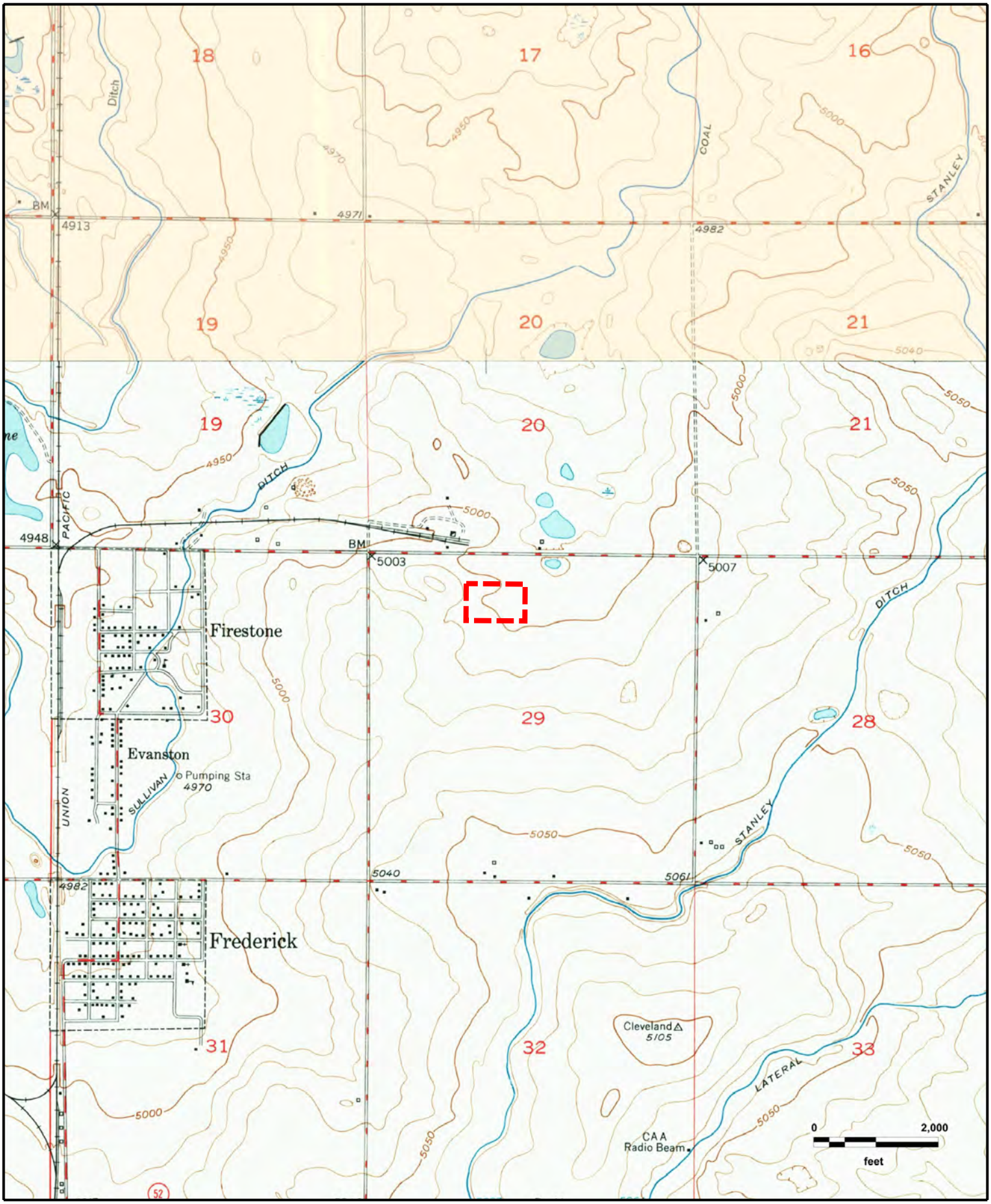


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1949)

GeoSearch

JOB #: 359304 - 07/08/2020

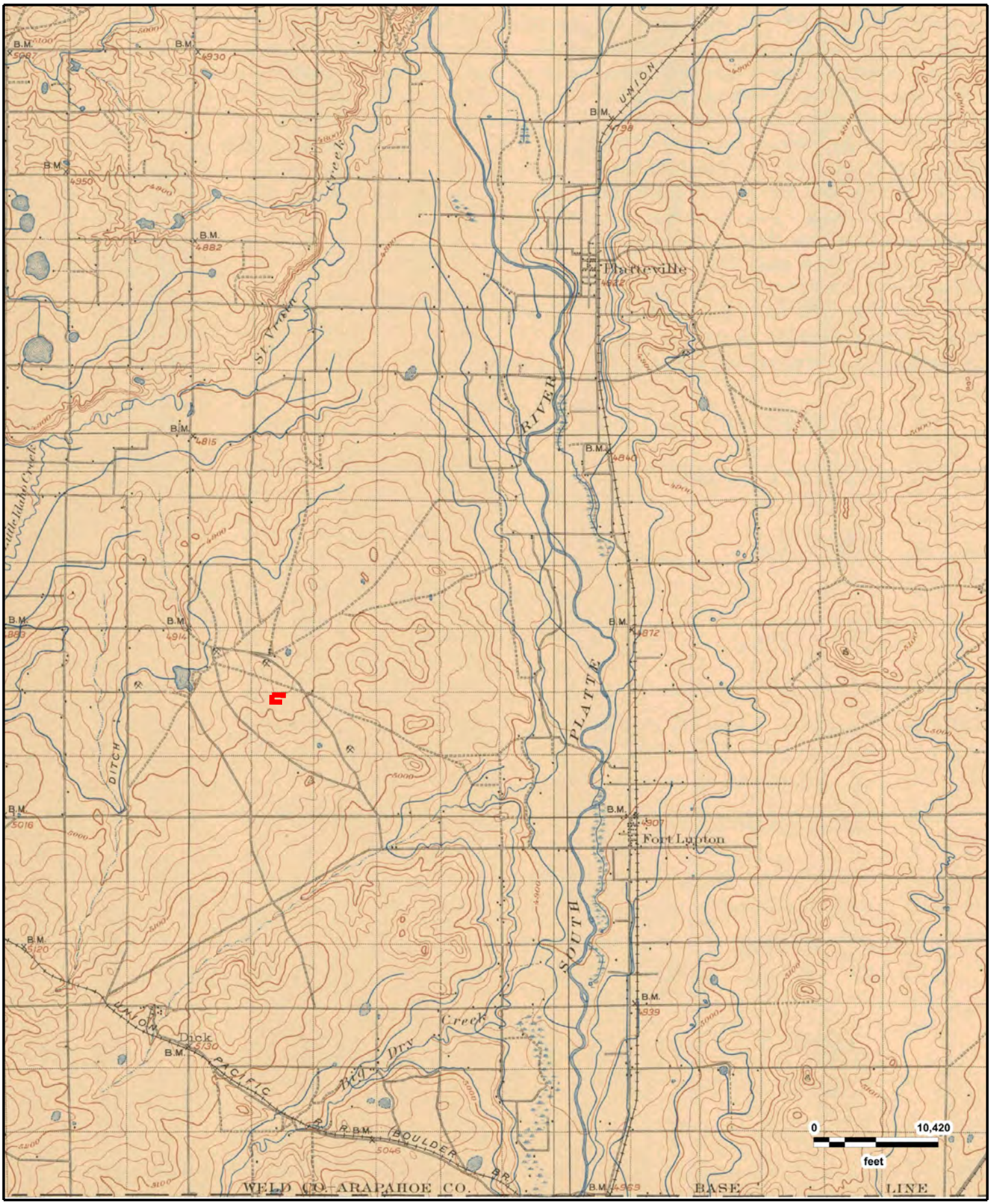


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Columbine
FREDERICK, CO (1950), GOWANDA, CO (1950)

GeoSearch

JOB #: 359304 - 07/08/2020



N
W E
S

Columbine
GREELEY, CO (1902)

GeoSearch

JOB #: 359304 - 07/08/2020

Appendix F: City Directory Report

City Directory Target Property Address

Target Property:

County Rd 15,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 149072

Project #: 603-128

Date: 7/2/2020

City Directory Target Property Address

County Rd 15, Longmont, CO 80504

1 COUNTY RD 15

2019	STREET BEGINS	INFOUSA	NORTH WEST
2014	STREET BEGINS	INFOUSA	NORTH WEST
2011	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 20 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 20 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS	COLE DIRECTORY	LONGMONT
2001	X [SIOUX CT INTS]	COLE DIRECTORY	LONGMONT
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT-BOULDER
1989-90	STREET NOT LISTED	US WEST	LONGMONT-BOULDER

9094 COUNTY RD 15

2019	NELSON KENNETH	INFOUSA	NORTH WEST
2014	NELSON KENNETH	INFOUSA	NORTH WEST
2011	KEN T NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	MERRI A NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	KEN T NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	MERRI A NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	KEN NELSON	COLE DIRECTORY	LONGMONT

9152 COUNTY RD 15

2019	MCCARTHY MICHAEL	INFOUSA	NORTH WEST
2011	FREEDY FREEDY MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAVID A GOSHEA	COLE DIRECTORY	LONGMONT-BOULDER
2001	SUSAN FERRIS	COLE DIRECTORY	LONGMONT
2001	MARK KIBLER	COLE DIRECTORY	LONGMONT

9216 COUNTY RD 15

2014	CLAPP ROBERT	INFOUSA	NORTH WEST

2011	LYNETTE F CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2011	ROBERT L CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2006	LYNETTE F CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2006	ROBERT L CLAPP	COLE DIRECTORY	LONGMONT-BOULDER
2001	ROBERT CLAPP	COLE DIRECTORY	LONGMONT

9385 COUNTY RD 15

2019	FARNSWORTH KIP	INFOUSA	NORTH WEST
2019	FINLEY TRACY	INFOUSA	NORTH WEST
2019	GARCIA DARIAN	INFOUSA	NORTH WEST
2019	JOHNSON SHARON	INFOUSA	NORTH WEST
2011	BRUCE D JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	SHARON A JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SIOUX CT INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	RAENA HENDRICKS	COLE DIRECTORY	LONGMONT
2001	X [SIERRA VISTA RD INTS]	COLE DIRECTORY	LONGMONT

9477 COUNTY RD 15

2019	OWEN JAMES	INFOUSA	NORTH WEST
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	ALAN K OWEN	COLE DIRECTORY	LONGMONT

9485 COUNTY RD 15

2014	FIGURELLI ARCHIE	INFOUSA	NORTH WEST
2014	WALSH SUSAN	INFOUSA	NORTH WEST
2014	WEAVER PAULA	INFOUSA	NORTH WEST
2011	JACQUELINE OWEN	COLE DIRECTORY	LONGMONT-BOULDER
2011	CAROLYN M WALSH	COLE DIRECTORY	LONGMONT-BOULDER
2011	SUSAN JOY WALSH	COLE DIRECTORY	LONGMONT-BOULDER
2011	MARY L WEAVER	COLE DIRECTORY	LONGMONT-BOULDER

2011	WILLIE WEAVER	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SHENANDOAH AVE INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	AL OWEN	COLE DIRECTORY	LONGMONT
10170 COUNTY RD 15			
2011	KATHY LARSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
2001	X [MAPLE ST INTS]	COLE DIRECTORY	LONGMONT
10182 COUNTY RD 15			
2019	DOBRAHNER JASLYN	INFOUSA	NORTH WEST
2019	HAUGHIAN JAMES	INFOUSA	NORTH WEST
2014	DOBRAHNER JASLYN	INFOUSA	NORTH WEST
2014	HAUGHIAN JAMES	INFOUSA	NORTH WEST
2011	JAMES MICHEAL HAUGHIAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JAMES M HAUGHIAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
10230 COUNTY RD 15			
2019	WILTS WENDELL	INFOUSA	NORTH WEST
2011	DAVID M FELIX SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAVID M FELIX SR	COLE DIRECTORY	LONGMONT-BOULDER
2001	D & D AUTO REPAIR	COLE DIRECTORY	LONGMONT
10286 COUNTY RD 15			
2019	MAAS STEVEN	INFOUSA	NORTH WEST
2014	MAAS STEVEN	INFOUSA	NORTH WEST
2011	BAMBI LYNN MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2011	STEVEN PETER MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [ELM STREET ENCHANTED HILL INTS]	COLE DIRECTORY	LONGMONT-BOULDER

2011	Y [ST VRAIN RANCH BLVD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	BAMBI LYNN MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEVEN PETER MAAS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [ST VRAIN RANCH BLVD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STEVE MAAS	COLE DIRECTORY	LONGMONT

10450 COUNTY RD 15

2019	POST NICOLAS	INFOUSA	NORTH WEST
2014	BOYSEN JOHN	INFOUSA	NORTH WEST
2011	JOHN MARTIN BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN M BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	THELMA K BOYSEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

10500 COUNTY RD 15

2011	CRAIG A OWEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	CRAIG OWEN	COLE DIRECTORY	LONGMONT

10510 COUNTY RD 15

2014	GRIESCH JOHN	INFOUSA	NORTH WEST
2011	GAIL LEA GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2011	JOHN K GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN K GRISCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	TODD GRIESCH	COLE DIRECTORY	LONGMONT-BOULDER
2001	V GUMSEY	COLE DIRECTORY	LONGMONT

10514 COUNTY RD 15

2011	VIRGINIA L GURNSEY	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [SUMMERSET AVE INTS]	COLE DIRECTORY	LONGMONT-BOULDER

2006	VIRGINIA L GUMSEY	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

10558 COUNTY RD 15

2011	0 A A A 24 HR LOCKSMITH	COLE DIRECTORY	LONGMONT-BOULDER

10606 COUNTY RD 15

2019	GARCES JOSE	INFOUSA	NORTH WEST
2019	MENDEZ LEONEL	INFOUSA	NORTH WEST
2019	TREJO HEIDI	INFOUSA	NORTH WEST
2014	MENDEZ LEONEL	INFOUSA	NORTH WEST
2011	JOEL MENDEZ	COLE DIRECTORY	LONGMONT-BOULDER
2011	LEONEL MENDEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	ARMONDO LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	LUPE GARCIA	COLE DIRECTORY	LONGMONT

10652 COUNTY RD 15

2019	TRUITT JOE	INFOUSA	NORTH WEST
2014	HAISLIP DWAIN	INFOUSA	NORTH WEST
2014	WOOLF DEBBRA	INFOUSA	NORTH WEST
2011	DEBBRA CHRISTINE WOOLF	COLE DIRECTORY	LONGMONT-BOULDER
2006	DWAIN ELTON HAISLIP	COLE DIRECTORY	LONGMONT-BOULDER
2001	DWAIN HAISLIP	COLE DIRECTORY	LONGMONT

10698 COUNTY RD 15

2019	POPICK CLAYTON	INFOUSA	NORTH WEST
2019	RYAN COLLEEN	INFOUSA	NORTH WEST
2014	RYAN COLLEEN	INFOUSA	NORTH WEST
2011	BRYAN J ALLEN	COLE DIRECTORY	LONGMONT-BOULDER
2011	DENNIS P ALLEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	COLLEEN D RYAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAN E RYAN	COLE DIRECTORY	LONGMONT-BOULDER

2001	VERN WEST	COLE DIRECTORY	LONGMONT
10750 COUNTY RD 15			
2019	TODD JERRY	INFOUSA	NORTH WEST
2014	TODD JERRY	INFOUSA	NORTH WEST
2011	JERRY LEON TODD JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	JERRY LEON TODD JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	JERRY L TOOD	COLE DIRECTORY	LONGMONT
10810 COUNTY RD 15			
2019	FARMER GREGORY	INFOUSA	NORTH WEST
2014	FARMER GREGORY	INFOUSA	NORTH WEST
2011	GREG SCOTT FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2011	SHERI LYN FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2006	GREG SCOTT FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2006	SHERI LYN FARMER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
10820 COUNTY RD 15			
2006	ROBERT L STEEN SR	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
10900 COUNTY RD 15			
2014	SCHRANZ ERNEST	INFOUSA	NORTH WEST
2011	ERNEST GOTTHOLD SCHRANZ	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2011	Y [WELD COUNTY RD 15 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	ERNEST GOTTHOLD SCHRANZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	ERNEST G SCHRANZ	COLE DIRECTORY	LONGMONT

10950 COUNTY RD 15

2019	KACIK BARBARA	INFOUSA	NORTH WEST
2019	SIMPSON DIANA	INFOUSA	NORTH WEST
2006	EUNICE M HAMILTON	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT

11359 COUNTY RD 15

2019	KRUISE DARREL	INFOUSA	NORTH WEST
2011	JULEE SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

11409 COUNTY RD 15

2006	CARLOS G GALLEGOS	COLE DIRECTORY	LONGMONT-BOULDER
2006	LISA GALLEGOS	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT

11455 COUNTY RD 15

2006	CRAIG MULLENAX	COLE DIRECTORY	LONGMONT-BOULDER

11755 COUNTY RD 15

2019	LOZINSKI MICHAEL	INFOUSA	NORTH WEST
2014	LOZINSKI MICHAEL	INFOUSA	NORTH WEST
2011	MICHAEL A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2011	TAMMY A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	MICHAEL A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMARA A LOZINSKI	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [COUNTY ROAD 26 INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL LOZINSKI	COLE DIRECTORY	LONGMONT

11829 COUNTY RD 15

2019	LEFORGE DONALD		INFOUSA	NORTH WEST
2014	LEFORGE DONALD		INFOUSA	NORTH WEST
2011	DONALD MILTON LEFORGE		COLE DIRECTORY	LONGMONT-BOULDER
2006	DONALD MILTON LEFORGE		COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING		COLE DIRECTORY	LONGMONT

11843 COUNTY RD 15

2011	HANNAH OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SCOTT H OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	HANNAH OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	SCOTT OLIVER		COLE DIRECTORY	LONGMONT-BOULDER
2001	SCOTT OLIVER		COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 26 INTS]		COLE DIRECTORY	LONGMONT

11955 COUNTY RD 15

2019	MONTIERTH SALLY		INFOUSA	NORTH WEST
2019	NELSON HAROLD		INFOUSA	NORTH WEST
2019	SHULL BRETT		INFOUSA	NORTH WEST
2014	NELSON HAROLD		INFOUSA	NORTH WEST
2014	SHULL BRETT		INFOUSA	NORTH WEST
2014	H & J NELSON MANAGEMENT LLC	# 15	INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2011	HAROLD EDWARD NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2011	LAVEMA JUNE NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2011	X [COUNTY ROAD 26 INTS]		COLE DIRECTORY	LONGMONT-BOULDER
2006	H & J NELSON MANAGEMENT LLC		COLE DIRECTORY	LONGMONT-BOULDER
2006	HAROLD EDWARD NELSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	LAVERNA JUNE NELSON		COLE DIRECTORY	LONGMONT-BOULDER

2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 26 3/4 INTS]	COLE DIRECTORY	LONGMONT

12071 COUNTY RD 15

2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	BLAKE NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMMY SUE NELSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	NELSONS ARENA INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

12248 COUNTY RD 15

2019	L G EVERIST	INFOUSA	NORTH WEST
2019	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2001	M ARAGONEZ	COLE DIRECTORY	LONGMONT
2001	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT

Comment:

City Directory Target Property Address

Target Property:

County Rd 18,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 149072

Project #: 603-128

Date: 7/2/2020

City Directory Target Property Address

County Rd 18, Longmont, CO 80504

1 COUNTY RD 18

2019	STREET BEGINS	INFOUSA	NORTH WEST
2014	STREET BEGINS	INFOUSA	NORTH WEST
2011	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [OXFORD RD INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS	COLE DIRECTORY	LONGMONT
2001	X [OXFORD RD INTS]	COLE DIRECTORY	LONGMONT
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT-BOULDER
1989-90	STREET NOT LISTED	US WEST	LONGMONT-BOULDER

390 COUNTY RD 18

2006	EMPIRE WAREHOUSE INC	COLE DIRECTORY	LONGMONT-BOULDER

517 COUNTY RD 18

2019	DELTUFO CARL	INFOUSA	NORTH WEST
2019	HARPER AMANDA	INFOUSA	NORTH WEST
2011	AMANDA ANNE HARPER	COLE DIRECTORY	LONGMONT-BOULDER
2011	FRANK R HARPER JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	DAWN MARIE MOSHER	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN ADEN MOSHER	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOHN MOSHER	COLE DIRECTORY	LONGMONT

520 COUNTY RD 18

2019	SCHNEIDER DALLAS	INFOUSA	NORTH WEST
2014	SCHNEIDER DALLAS	INFOUSA	NORTH WEST
2011	DALLAS L SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER
2011	MARGE A SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER
2006	DALLAS L SCHNEIDER	COLE DIRECTORY	LONGMONT-BOULDER

2006	MARGE A SCHNEIDER		COLE DIRECTORY	LONGMONT-BOULDER
2001	DALLAS SCHNEIDER		COLE DIRECTORY	LONGMONT

547 COUNTY RD 18

2019	KRAFFT TERRY		INFOUSA	NORTH WEST
2019	AQUATIC & FITNESS PRO INTL	# 18	INFOUSA	NORTH WEST
2014	KRAFFT TERRY		INFOUSA	NORTH WEST
2014	AQUATIC & FITNESS PRO INTL	# 18	INFOUSA	NORTH WEST
2011	AQUATIC AND FITNESS PROFESSIONAL INT		COLE DIRECTORY	LONGMONT-BOULDER
2011	RACHEL ELIZABETH KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2011	TERY EDWARD KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2006	R KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2006	TERRY EDWARD KRAFFT		COLE DIRECTORY	LONGMONT-BOULDER
2001	TERRY KRAFFT		COLE DIRECTORY	LONGMONT
2001	AMRCN ENG&SPLY		COLE DIRECTORY	LONGMONT

603 COUNTY RD 18

2019	SANDSTEAD DEAN		INFOUSA	NORTH WEST
2014	SANDSTEAD DEAN		INFOUSA	NORTH WEST
2011	CHARKEN CONSTRUCTION INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	CHARKEN CONSTRUCTION INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN A KENYON SR		COLE DIRECTORY	LONGMONT-BOULDER
2006	TANYA MICHELLE KENYON		COLE DIRECTORY	LONGMONT-BOULDER
2001	TANYA M KENYON		COLE DIRECTORY	LONGMONT

677 COUNTY RD 18

2019	WADDLE CINDY		INFOUSA	NORTH WEST
2019	FLYING PIGLET RANCH	# 18	INFOUSA	NORTH WEST
2014	WADDLE CINDY		INFOUSA	NORTH WEST
2014	FLYING PIGLET RANCH	# 18	INFOUSA	NORTH WEST
2011	CINDY A HEWITT		COLE DIRECTORY	LONGMONT-BOULDER

2011	WADDLE BOBBY & CINDY	COLE DIRECTORY	LONGMONT-BOULDER
2006	FLYING PIGLEY RANCH	COLE DIRECTORY	LONGMONT-BOULDER
2006	CINDY A HEWITT	COLE DIRECTORY	LONGMONT-BOULDER
2001	FLYING PIGLET RNCH	COLE DIRECTORY	LONGMONT
757 COUNTY RD 18			
2019	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2019	FOSTER RICK	INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]	INFOUSA	NORTH WEST
2014	FOSTER RICK	INFOUSA	NORTH WEST
2011	CHRISTINE R FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2011	RCK J FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2006	CHRISTINE R FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2006	RICK J FOSTER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2507 COUNTY RD 18			
2006	DAVID M BOETTCHER	COLE DIRECTORY	LONGMONT-BOULDER
2006	RHONDA K BOETTCHER	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2877 COUNTY RD 18			
2006	CHARLA JIL RICHARDSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
2880 COUNTY RD 18			
2006	HUMAN RESOURCE SOLUTIONS & DES	COLE DIRECTORY	LONGMONT-BOULDER
2006	SHARON ROSE SCHELLER	COLE DIRECTORY	LONGMONT-BOULDER
2001	SHARON SCHELLER	COLE DIRECTORY	LONGMONT
2001	HUMAN RESRC SLTNS	COLE DIRECTORY	LONGMONT

3601 COUNTY RD 18			
2001	RICHARD P WYATT	COLE DIRECTORY	LONGMONT
3801 COUNTY RD 18			
2001	CHLDRNS HSE WLD	COLE DIRECTORY	LONGMONT
3991 COUNTY RD 18			
2011	STEINBACHER TOOL	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEINBACHER STEIN	COLE DIRECTORY	LONGMONT-BOULDER
2006	X [MILLER DR INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2001	MID AMER TL&MACH	COLE DIRECTORY	LONGMONT
2001	X [COUNTY ROAD 11 INTS]	COLE DIRECTORY	LONGMONT
4300 COUNTY RD 18			
2006	DELPHI MEDICAL SYSTEMS	COLE DIRECTORY	LONGMONT-BOULDER
2001	PEAK INDSTRS INC	COLE DIRECTORY	LONGMONT
4967 COUNTY RD 18			
2006	CURTIS G HEDGE	COLE DIRECTORY	LONGMONT-BOULDER
5096 COUNTY RD 18			
2006	LAWRENCE D LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2006	LINDA LOPEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	L D LOPEZ	COLE DIRECTORY	LONGMONT
5099 COUNTY RD 18			
2006	FRED D SCHLEGEL JR	COLE DIRECTORY	LONGMONT-BOULDER
5105 COUNTY RD 18			
2006	KEITH G FILLOON	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUZANNE H HARRIS	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT

5106 COUNTY RD 18			
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5136 COUNTY RD 18			
2006	BARBARA GOLDENE CROW	COLE DIRECTORY	LONGMONT-BOULDER
2006	KELLY CHARIS CROW	COLE DIRECTORY	LONGMONT-BOULDER
2001	WIT SYSTEMS	COLE DIRECTORY	LONGMONT
5151 COUNTY RD 18			
2006	BETHANY A BRADY	COLE DIRECTORY	LONGMONT-BOULDER
2006	THOMAS PATRICK BRADY SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	EQUINE ENERGY WORKS LLC	COLE DIRECTORY	LONGMONT-BOULDER
2001	THOMAS P BRADY	COLE DIRECTORY	LONGMONT
5166 COUNTY RD 18			
2006	AMY M VIGIL	COLE DIRECTORY	LONGMONT-BOULDER
2006	DARLING B VIRGIL	COLE DIRECTORY	LONGMONT-BOULDER
2001	DARLING VIGIL	COLE DIRECTORY	LONGMONT
5206 COUNTY RD 18			
2006	CHRISTY GILBERT	COLE DIRECTORY	LONGMONT-BOULDER
2001	CHRISTY GILBERT	COLE DIRECTORY	LONGMONT
5227 COUNTY RD 18			
2006	DEANNA L MORA	COLE DIRECTORY	LONGMONT-BOULDER
2006	FAUSTINO MORA	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5236 COUNTY RD 18			
2006	FRANK J GARCIA JR	COLE DIRECTORY	LONGMONT-BOULDER
2001	FRANK GARCIA	COLE DIRECTORY	LONGMONT

5246 COUNTY RD 18

2006	ARNOLD MEYERS	COLE DIRECTORY	LONGMONT-BOULDER
2006	DALE A MEYERS	COLE DIRECTORY	LONGMONT-BOULDER
2001	DALE MEYERS	COLE DIRECTORY	LONGMONT

5257 COUNTY RD 18

2006	KIRK ALLEN STOOTHOFF	COLE DIRECTORY	LONGMONT-BOULDER
2006	MARY B STOOTHOFF	COLE DIRECTORY	LONGMONT-BOULDER
2001	P VANDEWALKER	COLE DIRECTORY	LONGMONT

5261 COUNTY RD 18

2006	CHARLES WILKERSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	JEAN ALICE WILKERSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	CHARLES WILKERSON	COLE DIRECTORY	LONGMONT

5266 COUNTY RD 18

2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

5306 COUNTY RD 18

2006	VIRGINIA E COWAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	COWAN FAMILY PROPERTIES LLC	COLE DIRECTORY	LONGMONT-BOULDER
2006	EDS ELECTRIC	COLE DIRECTORY	LONGMONT-BOULDER
2006	2 ASH COURT LLC	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL E COWAN	COLE DIRECTORY	LONGMONT

5327 COUNTY RD 18

2006	DOUG A HOBBS	COLE DIRECTORY	LONGMONT-BOULDER
2006	KJERSTEN L HOBBS	COLE DIRECTORY	LONGMONT-BOULDER
2006	MEDICINE HAT FARRIERS	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOE MARES	COLE DIRECTORY	LONGMONT

5336 COUNTY RD 18			
2006	ROSE MAXINE CONNER	COLE DIRECTORY	LONGMONT-BOULDER
2006	TAMRA M CONNER	COLE DIRECTORY	LONGMONT-BOULDER
2001	JEFFERY W HELSLEY	COLE DIRECTORY	LONGMONT
5357 COUNTY RD 18			
2006	LORI J YOHO	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEVE M YOHO	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5366 COUNTY RD 18			
2006	DOUBLE EAGLE SERVICES	COLE DIRECTORY	LONGMONT-BOULDER
2006	ARTHUR T WILLDEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	JODI L WILLDEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5406 COUNTY RD 18			
2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2001	DAVID W HEUSSMANN	COLE DIRECTORY	LONGMONT
5436 COUNTY RD 18			
2006	CANDICE ELIZABETH ROBERTSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	MARK EARL ROBERTSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	MARK ROBERTSON	COLE DIRECTORY	LONGMONT
5466 COUNTY RD 18			
2006	DAVID L JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	VALLEE JOHNSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	MATT RIESKE	COLE DIRECTORY	LONGMONT
5500 COUNTY RD 18			
2006	MICHAEL A MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER

2006	YOLANDA K MARTINEZ	COLE DIRECTORY	LONGMONT-BOULDER
2001	MICHAEL MARTINEZ	COLE DIRECTORY	LONGMONT
5558 COUNTY RD 18			
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT
5601 COUNTY RD 18			
2006	KASEY ELIZABETH LLOYD	COLE DIRECTORY	LONGMONT-BOULDER
2001	KASEY E LLOYD	COLE DIRECTORY	LONGMONT
5656 COUNTY RD 18			
2006	DWIGHT N SANDIN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT
5728 COUNTY RD 18			
2006	KATHLEEN LYNN SANDIN	COLE DIRECTORY	LONGMONT-BOULDER
2006	MIKE JAY WAITMAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	K L SANDIN	COLE DIRECTORY	LONGMONT
5806 COUNTY RD 18			
2006	VERA J SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2001	DONALD B SMITH	COLE DIRECTORY	LONGMONT
5830 COUNTY RD 18			
2001	J FINLEY	COLE DIRECTORY	LONGMONT
5846 COUNTY RD 18			
2006	DONNA H SMITH	COLE DIRECTORY	LONGMONT-BOULDER
2006	DOUGLAS MALCOLM SMITH	COLE DIRECTORY	LONGMONT-BOULDER
5876 COUNTY RD 18			
2006	DAVID DEAN HONSTIEN	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUSAN A HONSTIEN	COLE DIRECTORY	LONGMONT-BOULDER
2001	DAVID HONSTIEN	COLE DIRECTORY	LONGMONT

5906 COUNTY RD 18				
2006	BRIAN E KING		COLE DIRECTORY	LONGMONT-BOULDER
2006	LISA M KING		COLE DIRECTORY	LONGMONT-BOULDER
2001	BRIAN KING		COLE DIRECTORY	LONGMONT
5916 COUNTY RD 18				
2006	DENISE M THOMPSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	TRAYMOND SCOTT THOMPSON		COLE DIRECTORY	LONGMONT-BOULDER
2006	X [END OF LISTINGS]		COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS		COLE DIRECTORY	LONGMONT
5976 COUNTY RD 18				
2001	GWEN J RUNGE		COLE DIRECTORY	LONGMONT
2001	C VANDEVENTER	18	COLE DIRECTORY	LONGMONT
2001	TRI TOWN NRSY LLC		COLE DIRECTORY	LONGMONT
2001	X [END OF LISTINGS]		COLE DIRECTORY	LONGMONT

Comment:

Appendix G: Site Photographs



Photograph 1. Center of the Project.



Photograph 2. Center of the Project.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Proposed wellhead locations within the Project.

Section 10

Cultural Assessment

The cultural assessment is included in the Phase I Environmental Study in Section 9

Section 11

Lighting Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Lighting Mitigation Plan

For



Kerr McGee Oil & Gas Onshore LP

Columbine 4 -29 HZ

Project Number: 21010

Originators:	D. Nowicki / L. Ohl	Date	6-8-21
Project Engineer Approval:	D. Nowicki	Date	6-8-21
Project Manager Approval:	B. Primeaux	Date	6-8-21
Client Approval:		Date	

Rev. No.	By	Revisions	Approval	Date
0	DN/LO	ISSUED FOR ATTACHMENT FOR PERMIT	BP	6-8-21
1	DN/LO	ISSUED FOR ATTACHMENT FOR PERMIT	BP	6-14-21

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1.0 EXECUTIVE SUMMARY

Kerr McGee Oil & Gas Onshore LP commissioned Samuel Engineering to develop a lighting mitigation plan for the Columbine 4 -29 HZ pad site. The purpose of this report is to demonstrate compliance with the various State and Local lighting regulations, predict lighting impacts for the different development phases, and to detail the various lighting mitigation techniques used to limit light pollution.

Specifically, the key points of the study are:

- Demonstrate compliance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 424.
- Identify the light level impacts associated with each phase of the facility operations on surrounding buildings.
- Demonstrate compliance with the total lighting used based on site working surfaces.
- Demonstrate the various lighting mitigation techniques that were implemented.

Site specific three-dimensional lighting models were developed for each of the phases to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems.

The following Table 1.0 summarizes the calculated maximum values compared to the regulatory limits:

Calculated Lighting Values and Regulatory Limits Summary			
	Calculated Value	**Regulatory Limit**	**Code Reference**
Max. Light Impact on Surrounding Building	0.34 lux	≤ 4.0 lux	*COGCC 424.f*
Pre-Production – Drilling Phase (Lumens / Hardscape)	11.2 lm/ft²	≤ 12 lm/ft²	
Pre-Production – Completions Phase (Lumens / Hardscape)	11.5 lm/ft²	≤ 12 lm/ft²	
Production (Lumens / Hardscape)	0.1 lm/ft²	≤ 2.5 lm/ft²	*COGCCC Rule 424.d.(2) for Agricultural/Commercial*

Table 1.0 - Calculated Lighting Values and Regulatory Limits

All calculated values are within prescribed regulatory limits.

2.0 INTRODUCTION AND DEFINITION OF TECHNICAL TERMS

2.1 INTRODUCTION

Light mitigation plans seek to quantify and prescribe methods to address the negative effects of multiple forms of light pollution. Effective lighting mitigation plans address light pollution by limiting the impacts on the surrounding communities, preserving the overall night-sky aesthetics, and maintaining existing ecosystems, all while maintaining a safe work environment.

There are a number of standards, best practices, and regulations which are used as guidelines when developing lighting plans for reducing the negative effects of artificial lighting. The applicable regulation used for this report is COGCC Rule 424.

2.2 DEFINITION OF TECHNICAL TERMS

A number of technical terms are used throughout this report and, as an aid to the reader, are defined below.

Illuminance (lx)

Illuminance is defined as the amount of light falling on a surface area. It is measured in Lux (lx). One lux is equal to one lumen per square meter. As an example, the photo in Figure 2.2 shows the lux levels decreasing on the sidewalk, as the distance from the light source increases.

Illuminance is often associated with values for lighting levels for safe operation in various standard codes. In addition, photometric plans are used to predict the illuminance on surfaces of an area to provide minimum lighting levels and for mitigation of light trespass into adjoining properties or areas. Most lighting meter units used today are in lux and used to measure these values at a given distance. It should be noted that the measured value is dependent on angle, sensitivity, and optics.

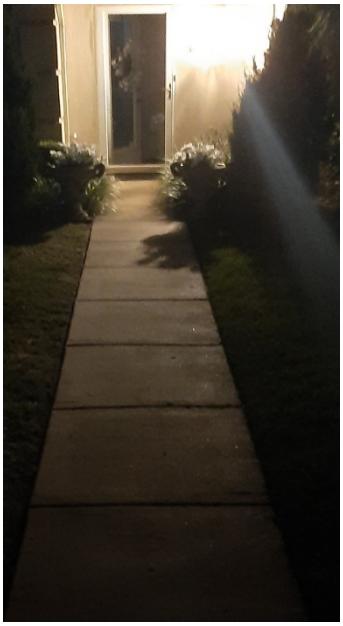


Figure 2.2–Illuminance (lx) level decreasing with distance from light source.

Table 2.2 below provides examples of typical Lux values.

Typical Lux Values	
Clear night, no moon:	0.002 lx
Clear night, full Moon:	0.27 to 1 lx
Family Living Room	50 lx
Sunrise/sunset	300-500 lx
Overcast day:	1000 lx
Daylight:	10,000-25,000 lx
Direct sunlight:	32,000-130,000 lx

Table 2.2 – Typical Lux Values

Luminous Flux(lm)

Luminous Flux is defined as the amount of light energy produced per unit time and is measured in Lumens (lm). It is a physical property of light and, in general terms, is a measurement of the total amount of light emanating from a source. It is important to note that the luminous flux value of a given source is independent of where a measurement is taken.

For example, a 60-watt light bulb produces approximately 800 lumens, regardless of if the measurement is taken at 1 foot, 10 miles, or 10,000 miles away from the source.

3.0 MODEL AND ANALYSIS DEVELOPMENT

Site-specific three-dimensional models were developed for each of the major project development phases. These phases being Pre-Production Drilling, Pre-Production Completions, and final Production. Elements incorporated into the models, among others, were the local site topographical information, major lighting obstructions (sound wall, large equipment, etc), individual luminaire lighting qualities, lighting mounting characteristics and surrounding building units.

The site geographical information was obtained using USGS topographical information to model the surrounding 1-mile landscape.

To determine the lighting impacts on local building units, a 25-foot vertical walls were modeled at the unit's locations, at the USGS identified elevations.

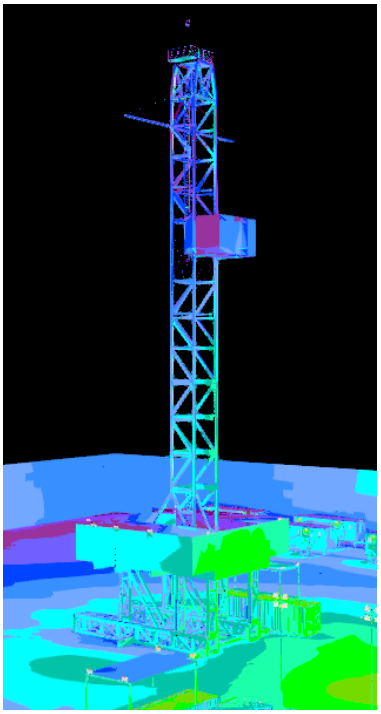


Figure 3.0–Screenshot from a representative 3-D model showing a false color rendering

Modeling of site-specific information (including large equipment, type of luminaire, and sound wall locations) were based on inspections of operational representative sites, provided vendor information, and research into various available lighting systems. The major pieces of equipment modeled included:

- Drilling: Drill rig floor, derrick, substructure, temporary lighting, sound barriers, backyard, and trailers.
- Completions: Temporary lighting, sound barriers, completion fleet equipment, and trailers.
- Production: LACT skids, separators, large tanks, and associated equipment.

Once site-specific topographical information and equipment were modeled, lighting characteristics were placed within the model. These characteristics were obtained from the various manufacturers and were specific to the make/model of the light to be used. The luminaires information included in the model were the type, quantity, mounting height, orientation, and tilt angle.

Models for each of the various project phases were developed in a similar manner and the resulting calculated lighting impacts were tabulated. An Excel spreadsheet was used to total the site lumens for each fixture and compared it to the site working pad surface (hardscape).

In the Pre-Production phases, temporary lighting fixtures were based on currently available rental units and on observations from representative sites. The temporary lighting system that will be used might vary based on rental availability at the time of procurement but is expected to be representative of the lumens values used in this analysis.

4.0 LIGHTING ANALYSIS RESULTS

4.1 CUMULATIVE LIGHTING IMPACTS

Applicable Code Reference: COGCC Rule 424.f:
"Operators will develop site lighting to reduce cumulative nighttime light intensity from all Oil and Gas Facilities to 4 lux at any Residential Building Unit or High Occupancy Building Unit within 1 mile of any Oil and Gas Facility, measured at 5.5 feet above grade in a direct line of sight to the brightest light fixture onsite."

Due to the large number of buildings units located within the 1-mile radius of the site, buildings were grouped into clusters and a representative "wall" location was selected for analysis. These analyzed "wall" locations were selected to determine an upper cumulative light impact limit for that clustered group, considering the local topography, orientation, and distance to the site.

Figure 4.1 shows the building units that are located within a 1-mile radius of the Columbine 4 -29 HZ site.

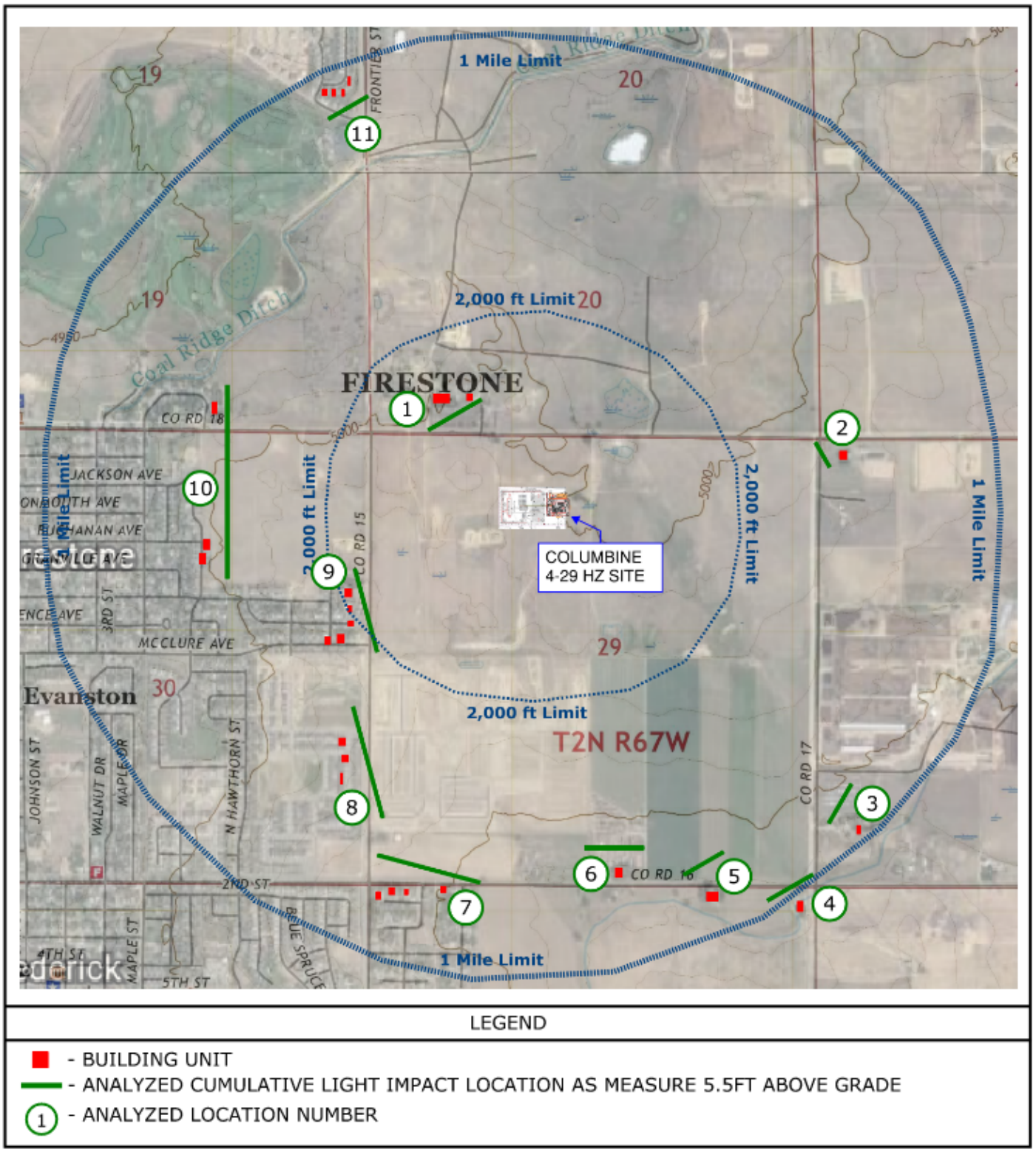


Figure 4.1 –Building Units Within a 1-Mile Radius of Columbine 4 -29 HZ

Calculated Lighting Impact Results Building Units				
Location Unit No.	Pre-Production Drilling	Pre-Production Completions	Production	Regulatory Limit
1	0.34 lux	< 0.1 lux	< 0.1 lux	4 lux
2	0.34 lux	0.14 lux	< 0.1 lux	4 lux
3	0.34 lux	0.28 lux	< 0.1 lux	4 lux
4	0.1 lux	0.14 lux	< 0.1 lux	4 lux
5	0.1 lux	0.14 lux	< 0.1 lux	4 lux
6	< 0.1 lux	0.14 lux	< 0.1 lux	4 lux
7	< 0.1 lux	0.28 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	0.14 lux	< 0.1 lux	4 lux
10	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
11	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux

Table 4.1 –Calculated Lighting Impact Results Building Units

Table 4.1 demonstrates compliance with COGCC Rule 424.f.

4.2 HARDSCAPE AND LUMEN LEVEL RESULTS

Lumens per Hardscape calculations were performed based on the number of exterior fixtures light output (lumens) and the working pad surface (hardscape).

4.2.1 PRE-PRODUCTION DRILLING LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Drilling Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	206,910 ft²	
Site Hardscape Acres:	4.75 Acres	
Site Total Lumens:	2,322,753 lm	See Section 5.2
Site Allowance Initial Lumens Total:	2,482,920 lm	
Calculated Site (Lumens / ft²):	11.2 lm/(ft²)	Construction Site is Verified

Table 4.2.1 –Pre-Production Drilling Operation Compliance Calculation

Based on the calculation shown in Table 4.2.1, the estimated site lighting during the Pre-Production Drilling operation phase is 11.2 lumens per square foot.

4.2.2 PRE-PRODUCTION COMPLETIONS LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Completions Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	206,910 ft²	
Site Hardscape Acres:	4.75 Acres	
Site Total Lumens:	2,373,328 lm	See Section 5.5
Site Allowance Initial Lumens Total:	2,482,920 lm	
Calculated Site (Lumens / ft²):	11.5 lm/(ft²)	Construction Site is Verified

Table 4.2.2 –Pre-Production Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.2, the estimated site lighting during the Pre-Production Completions operation phase is 11.5 lumens per square foot.

4.2.3 PRODUCTION LUMENS PER HARDSCAPE COMPLIANCE

Production Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	59,677 ft²	
Site Hardscape Acres:	1.37 Acres	
Site Total Lumens:	3,032 lm	See Section 5.6
Calculated Site Value:	0.1 lm/(ft²)	Production Site is Verified
Regulatory Allowed Limit:	2.5 lm/(ft²)	COGCC Rule 424.d.(2)

Table 4.2.3 –Pre-Production / Construction Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.3, the estimated site lighting during the Production operation phase is less than the regulatory maximum value and in compliance with COGCC Rule 424.d.(2) for Commercial/Agricultural.

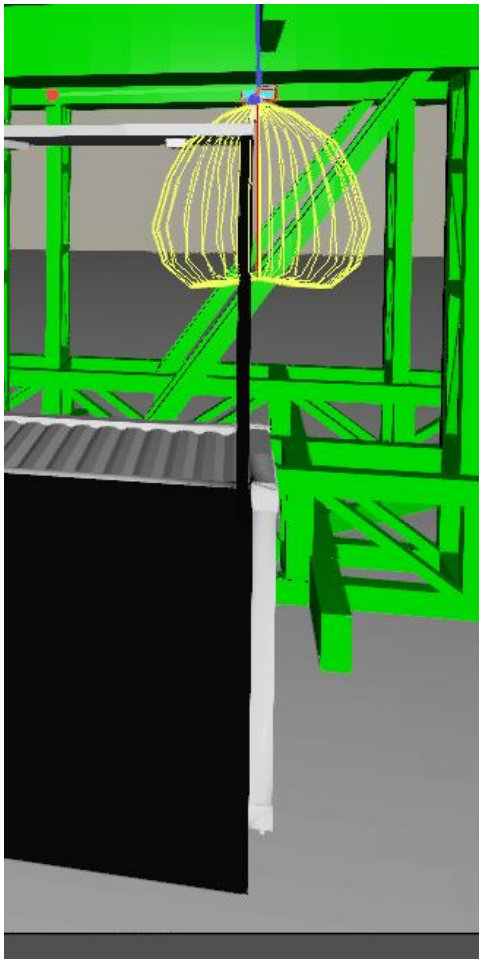
5.0 SITE LIGHTING POSITIONS AND ORIENTATION

5.1 SITE LIGHTING NOTES

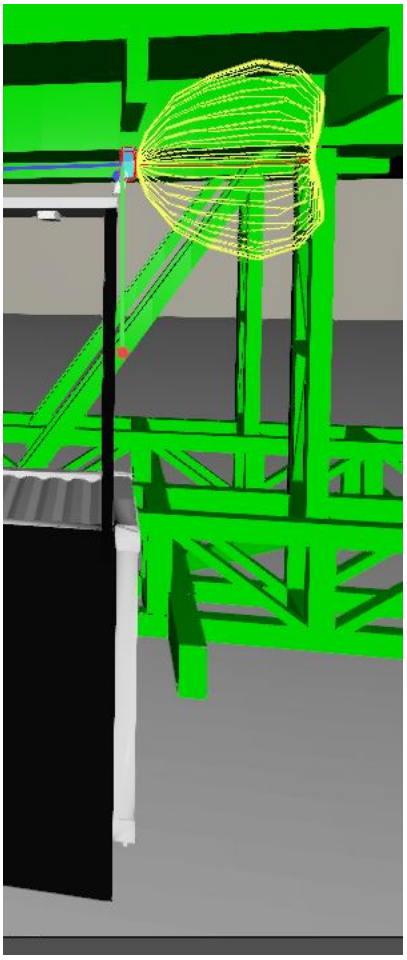
Applicable Code Reference: COGCC Rule 424(a)(2)(A)(ii)
Pertaining to Pre-Production activities: *"The proposed anticipated location, mounting, height, and orientation of all outdoor lighting fixtures on the site during pre-production activities"*

The following figures and tables in this section show the lighting location, mounting, height, and orientations for the Pre-Production Drilling, Completions, and Production Operations, in accordance with COGCC Rule 424(a)(2)(A)(ii). The following notes apply:

1) Stated tilt at zero (0) degrees represents a luminaire facing directly downward.



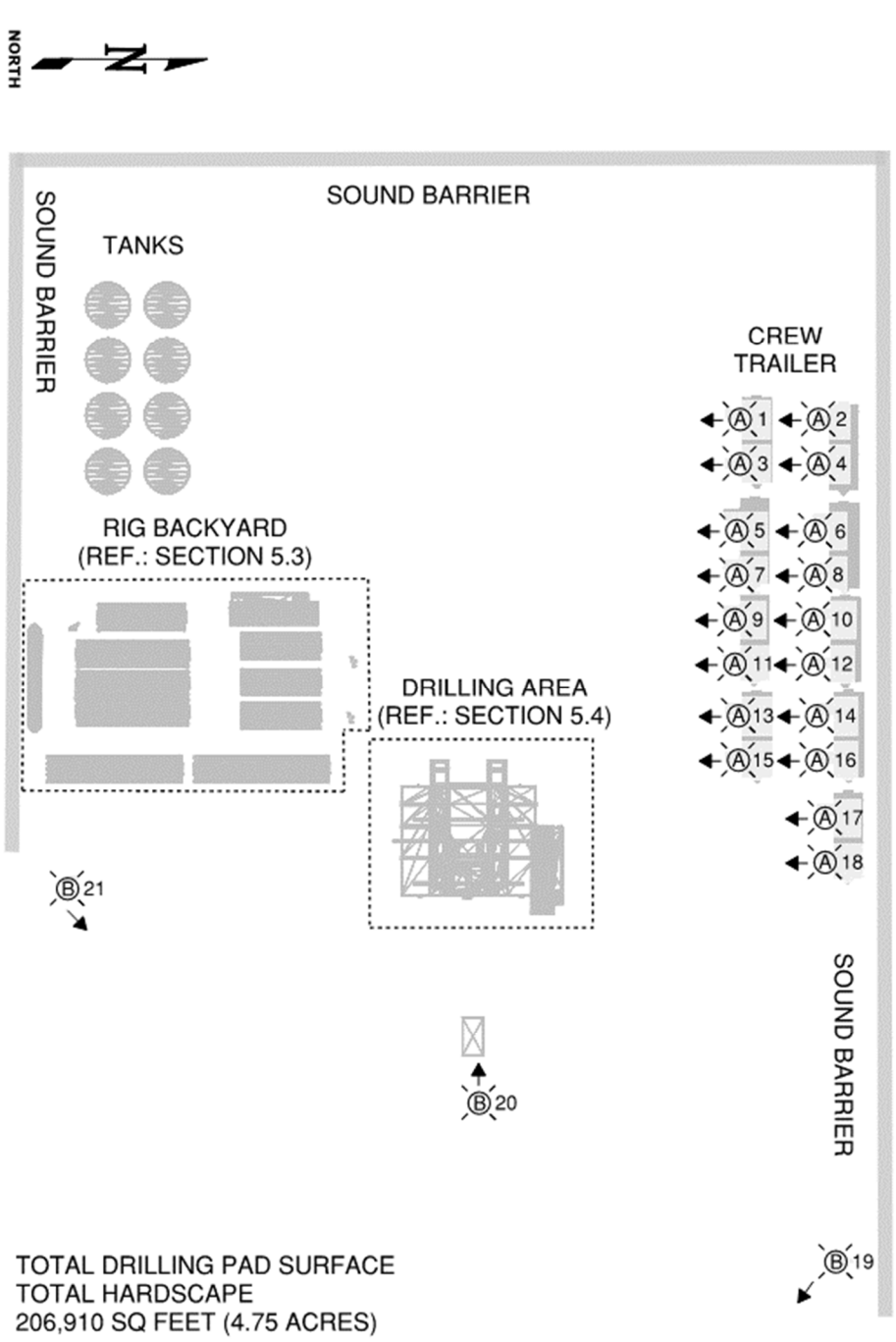
Example 0 degrees



Example 90 degrees

2) Intermittent sources of lights such as glow from on-site combustor and alarm lights are not included in this analysis.
3) Temporary lighting where necessary for safety reasons per COGCC 424.a.2.A.iii have not been modeled or accounted for in this analysis.
4) The quantity of lights and calculated values shown represents an estimated upper limit to the actual values that will be present on-site.
5) Refer to Attachment A for further lighting fixture information.

5.2 PRE-PRODUCTION - DRILLING SITE LAYOUT AND LUMINAIRE SCHEDULE



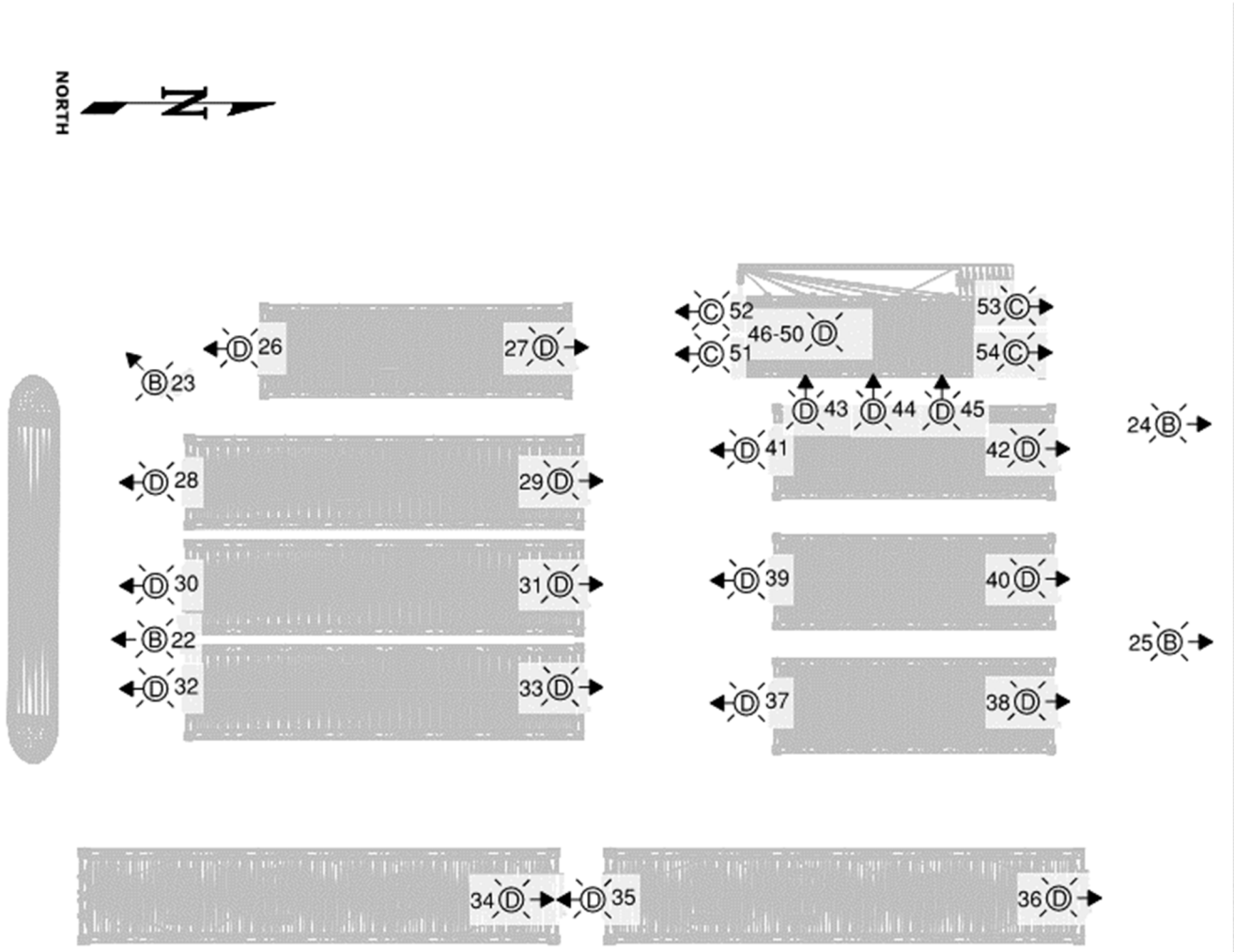
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – OVERALL PRE-PRODUCTION
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
1	11	90	A	5,800 lm
2	11	90	A	5,800 lm
3	11	90	A	5,800 lm
4	11	90	A	5,800 lm
5	11	90	A	5,800 lm
6	11	90	A	5,800 lm
7	11	90	A	5,800 lm
8	11	90	A	5,800 lm
9	11	90	A	5,800 lm
10	11	90	A	5,800 lm
11	11	90	A	5,800 lm
12	11	90	A	5,800 lm
13	11	90	A	5,800 lm
14	11	90	A	5,800 lm
15	11	90	A	5,800 lm
16	11	90	A	5,800 lm
17	11	90	A	5,800 lm
18	11	90	A	5,800 lm
19	30	75	B	213,648 lm
20	30	75	B	213,648 lm
21	30	75	B	213,648 lm

Total Lumens Calculation	
Subtotal Area Calculation:	745,344 lm
Total Section 5.3 Lumens:	1,141,431 lm
Total Section 5.4 Lumens:	435,978 lm
Total Area Lumens:	**2,322,753 lm**

5.3 PRE-PRODUCTION - DRILLING –RIG BACKYARD- SITE LAYOUT AND LUMINAIRE SCHEDULE



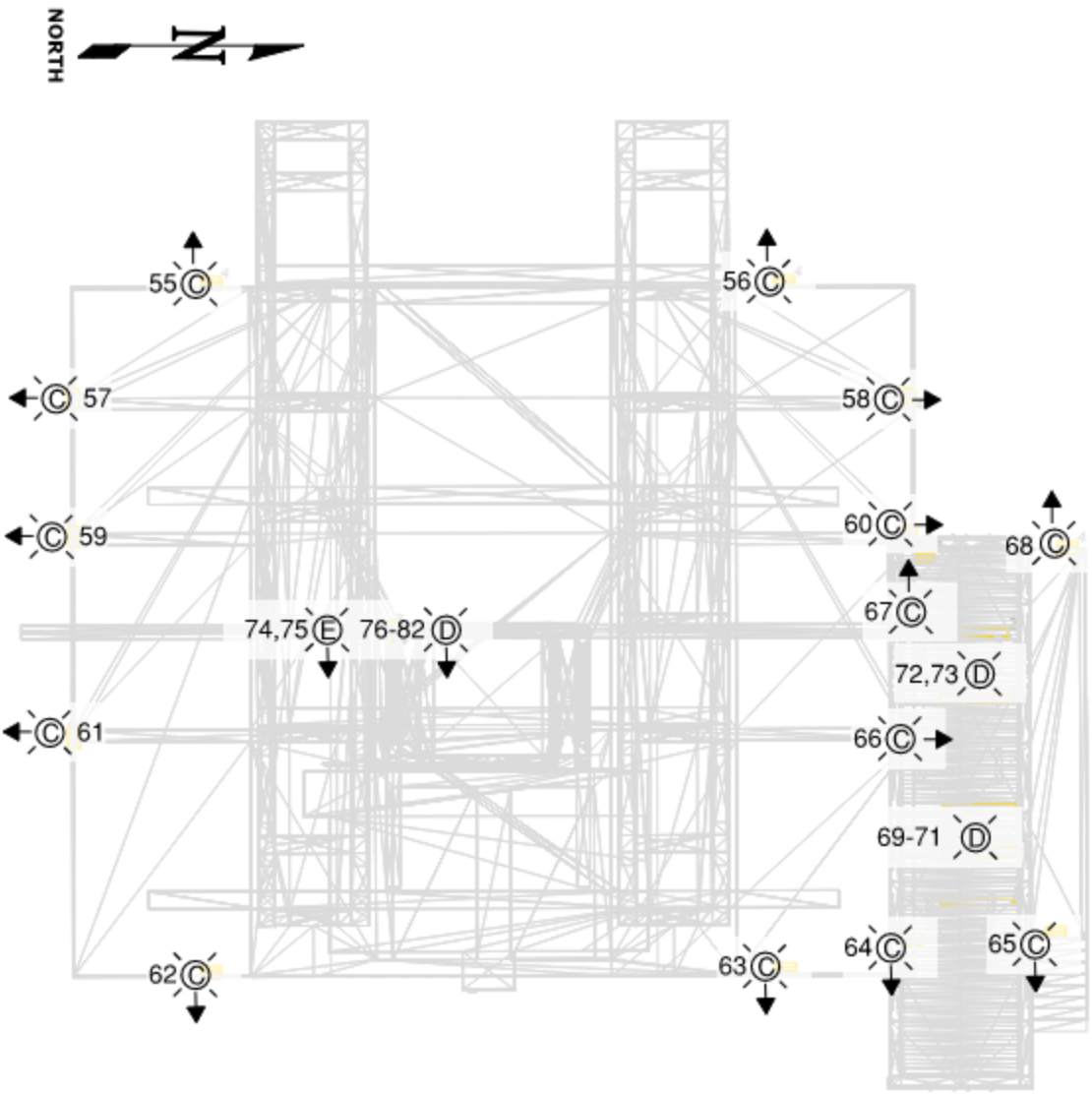
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – RIG BACKYARD
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091 lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
22	30	75	B	213,648 lm
23	30	75	B	213,648 lm
24	30	75	B	213,648 lm
25	30	75	B	213,648 lm
26	9	75	D	7,619 lm
27	9	75	D	7,619 lm
28	9	75	D	7,619 lm
29	9	75	D	7,619 lm
30	9	75	D	7,619 lm
31	9	75	D	7,619 lm
32	9	75	D	7,619 lm
33	9	75	D	7,619 lm
34	9	75	D	7,619 lm
35	9	75	D	7,619 lm
36	9	75	D	7,619 lm
37	9	75	D	7,619 lm
38	9	75	D	7,619 lm
39	9	75	D	7,619 lm
40	9	75	D	7,619 lm
41	9	75	D	7,619 lm
42	9	75	D	7,619 lm
43	14	75	D	7,619 lm
44	14	75	D	7,619 lm
45	14	75	D	7,619 lm
46	19	0	D	7,619 lm
47	19	0	D	7,619 lm
48	19	0	D	7,619 lm
49	19	0	D	7,619 lm
50	19	0	D	7,619 lm
51	20	75	C	24,091 lm
52	20	75	C	24,091 lm
53	20	75	C	24,091 lm
54	20	75	C	24,091 lm

Subtotal Lumens Calculation Section 5.3	
Subtotal Area Lumens:	**1,141,431 lm**

5.4 PRE-PRODUCTION - DRILLING –DRILL AREA - SITE LAYOUT AND LUMINAIRE SCHEDULE



LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – DRILL AREA
DRILLING OPERATIONS

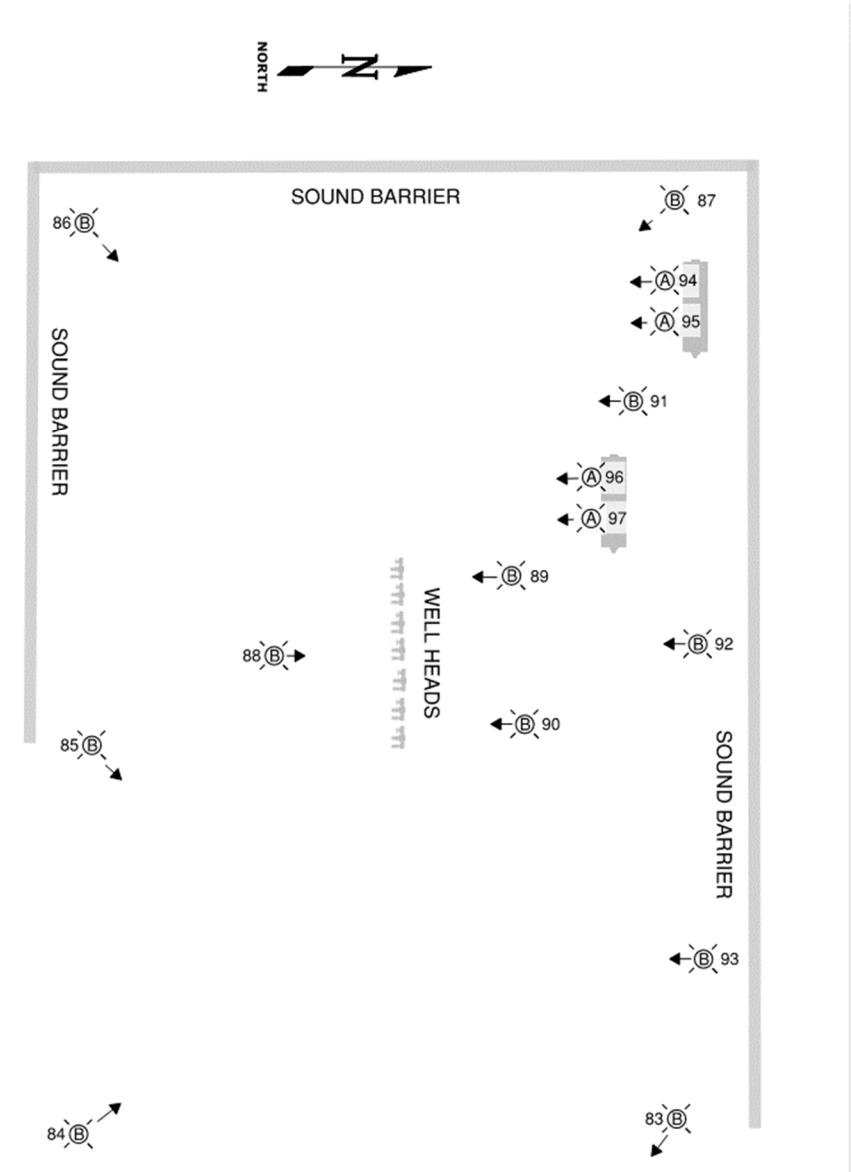
Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm
E	EATON – COOPER CROUSE HINDS	DLL2/UNV1S903	LED – 2FT LINEAR POLYCARBONATE	32 W	3,958 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
55	36	75	C	24,091 lm
56	36	75	C	24,091 lm
57	36	75	C	24,091 lm
58	36	75	C	24,091 lm
59	36	75	C	24,091 lm
60	36	75	C	24,091 lm
61	36	75	C	24,091 lm
62	36	75	C	24,091 lm
63	36	75	C	24,091 lm
64	36	75	C	24,091 lm
65	20	75	C	24,091 lm
66	20	75	C	24,091 lm
67	36	75	C	24,091 lm
68	20	75	C	24,091 lm
69	19	0	D	7,619 lm
70	19	0	D	7,619 lm
71	19	0	D	7,619 lm
72	19	0	D	7,619 lm
73	19	0	D	7,619 lm
74	40	90	E	3,958 lm
75	167	90	E	3,958 lm
76	52	90	D	7,619 lm
77	61	90	D	7,619 lm
78	73	90	D	7,619 lm
79	82	90	D	7,619 lm

Luminaire Position and Tilt *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
80	92	90	D	7,619 lm
81	149	90	D	7,619 lm
82	158	90	D	7,619 lm

Subtotal Lumens Calculation Section 5.4	
Subtotal Area Lumens:	435,978 lm

5.5 PRE-PRODUCTION - COMPLETIONS - SITE LAYOUT AND LUMINAIRE SCHEDULE



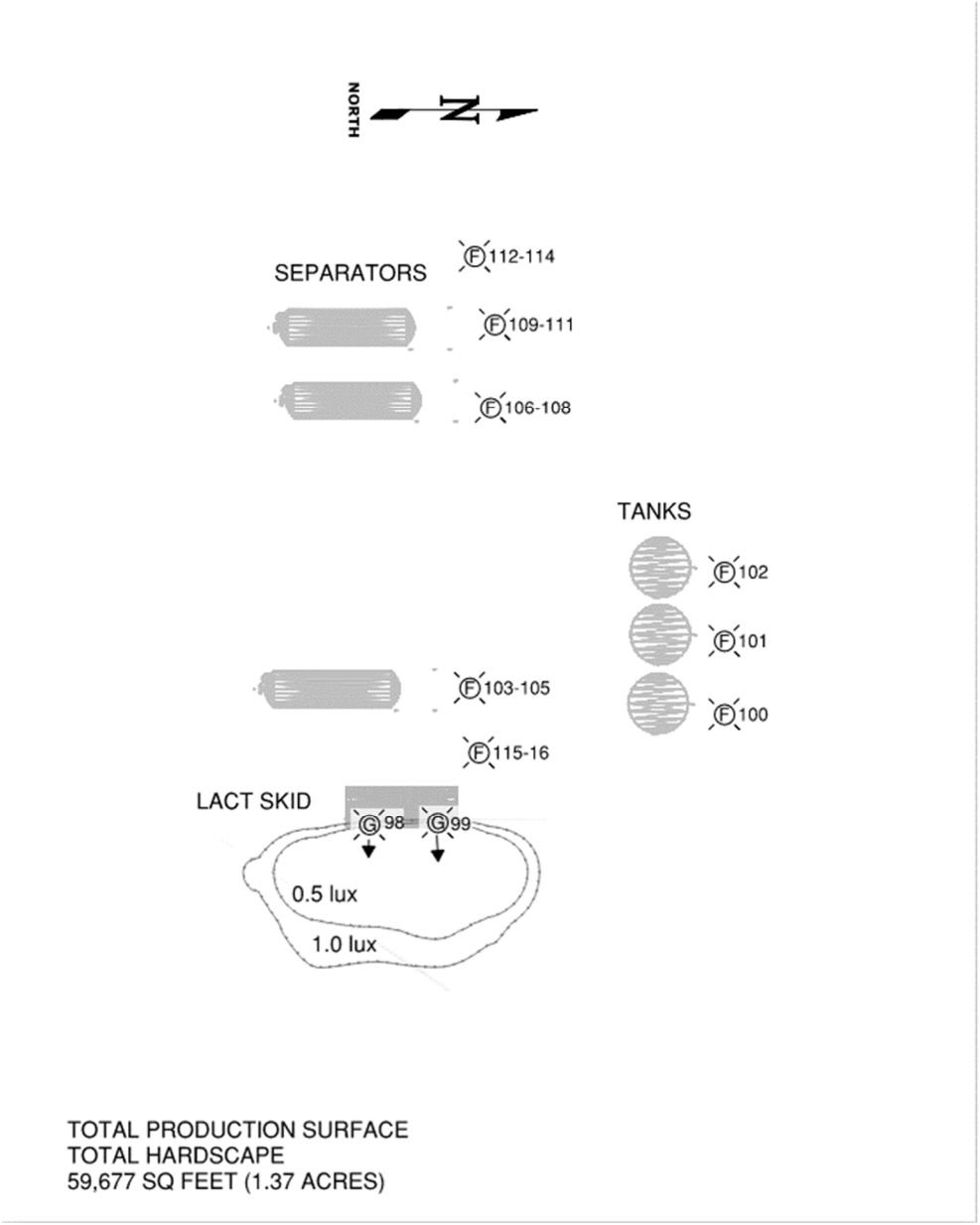
LUMINAIRE LAYOUT
COLUMBINE 4 -29 HZ – COMPLETIONS AREA
COMPLETIONS OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800 lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
83	30	75	B	213,648 lm
84	30	75	B	213,648 lm
85	30	75	B	213,648 lm
86	30	75	B	213,648 lm
87	30	75	B	213,648 lm
88	30	75	B	213,648 lm
89	30	75	B	213,648 lm
90	30	75	B	213,648 lm
91	30	75	B	213,648 lm
92	30	75	B	213,648 lm
93	30	75	B	213,648 lm
94	11	90	A	5,800 lm
95	11	90	A	5,800 lm
96	11	90	A	5,800 lm
97	11	90	A	5,800 lm

Total Lumens Calculation	
Total Area Lumens:	2,373,328 lm

5.6 PRODUCTION - SITE LAYOUT, LUMINAIRE SCHEDULE, AND PHOTOMETIC



LUMINAIRE LAYOUT& PHOTOMETRIC
COLUMBINE 4 -29 HZ – PRODUCTION AREA
PRODUCTION OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
F	RAYCHEM	E-100	LED HEAT TRACE END SEAL KIT	2 W	60 lm
G	PHOENIX	CL	LED CUBE LIGHT	13 W	1006 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
98	9	0	G	1,006 lm
99	9	0	G	1,006 lm
100	4.5	180	F	60 lm
101	4.5	180	F	60 lm
102	4.5	180	F	60 lm
103	4.5	180	F	60 lm
104	4.5	180	F	60 lm
105	4.5	180	F	60 lm
106	4.5	180	F	60 lm
107	4.5	180	F	60 lm
108	4.5	180	F	60 lm
109	4.5	180	F	60 lm
110	4.5	180	F	60 lm
111	4.5	180	F	60 lm
112	4.5	180	F	60 lm
113	4.5	180	F	60 lm
114	4.5	180	F	60 lm
115	4.5	180	F	60 lm
116	4.5	180	F	60 lm
		Total Lumens Calculation		
		Total Area Lumens:		3,032 lm

6.0 SITE MITIGATION NOTES AND BEST MANAGEMENT PRACTICES

The following mitigation notes and techniques apply:

1) To the extent possible, LED fixtures are used to reduce skyglow. This is based on the calculated results of the relative impact versus traditional lighting methods using DOE Skyglow comparison tool PNNL-SA-138348.

2) All lights have been positioned to point in a downward direction where vertical lighting is not required. Where it is required, lights are angled in a vertical direction to provide task lighting for safety and operations involving personnel.

3) Luminaire Type E and D used on the Derrick mast in Section 5.4 are facing horizontally to provide adequate lighting for safe operations.

4) To the extent possible, design considerations have been made regarding the type of light fixtures used, quantity, and positioning to reduce various forms of lighting pollution. Examples include:

   - Lighting is angled away from surrounding off site buildings.
   - Lighting within the Production area has been reduced to provide a minimum acceptable value for safe operations.
   - Light masts are automatically switched off/on based on lighting sensors.
   - Lights are switched off when not required.
   - Lights are directed to task areas only.
   - Low power (63W) LED lights are used for the drill rig.
   - Sound barriers are positioned to reduce lighting trespass to surrounding off-site buildings.
   - The calculated cumulative light impacts, as indicated in Section 4.1, on surrounding buildings within a one-mile radius area below 4 lux when measured 5.5 feet above grade.

5) Lighting Cut Sheet Notes for Attachment A

   1. Type A Fixtures
      - Type A fixtures are construction trailer lights. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. Lights varied significantly during site inspections. A representative model was selected based on a lumen output for a trailer.

   2. Type B fixtures
      - Type B fixtures are portable construction light towers with vertical masts. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. HP Winner M4 Model was selected for this analysis based on site inspections and current available units; however specific site units may vary based on time of construction. The model for these portable light towers consisted of a LED light source with 4 fixtures. Each of these fixtures were comprised of 4 LED modules mounted in a rectangular arrangement. The attached cut sheet for HP Winner represents 1 LED module. 16 total modules were modeled for each light mast.

- The typical light pole center of fixtures is raised approximately 30 feet from grade and pointed downward toward work area.

- The fixture mounting for portable light towers are articulated mountings which allows for both vertical and horizontal plane adjustments. For this analysis, the light mast fixtures were modeled at indicated angles.

3. Type F Fixtures
    - Type F Fixtures is an estimation of heat trace end kits. Photometric data from the manufacturer is not available. These lights are low power LED's mounted on the pipe where heat trace is installed. Mounting height, and location vary based on final design and installation.

7.0 ATTACHMENT

Attachment A – 21010 Columbine 4 -29 HZ Lighting Fixture Cut Sheets Attachment

END OF REPORT

SAMUEL ENGINEERING
WE PROVIDE SOLUTIONS

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Greenwood Village, Colorado 80111

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Fax: 303-714-4800

ATTACHMENT A

FIXTURE CUT SHEETS TYPES A,B,C,D,E,F,G

LIGHTING MITIGATION PLAN

FOR

KERR MCGEE OIL & GAS ONSHORE LP

COLUMBINE 4-29 HZ

Project Number: 21010

Fixture Cut Sheet
Type A

STANPRO

Project: _____ Type: _____

Drawn by: _____ Catalogue #: _____ Date: _____

Series Spec Sheet

WPS GEN 4

CLASSIC WALL PACK

Selectable color temperature (3 000 K / 4 000 K / 5 000 K)[1]
Power selectable[1]
Integrated photocell[1]
Multi-Voltage (120-347 V)[1]

This wall pack series is a classic and familiar design integrated with modern LED technology to promote better energy efficiency and long life. Certain configurations come with integrated photocell, selectable power and/or selectable color temperature. It is best suited for entrances, underpasses or anywhere controlled security lighting is required, the series luminaire is a great addition to any commercial or industrial outdoor wall mount application. The tough die cast aluminum housing is moisture and dustproof. [1]



FEATURES AND SPECIFICATIONS

- **Construction**

  Housing
  - This luminaire is made of aluminum die cast and comes standard in a bronze powder coat finish.
  - The housing has four conduit entries of 1/2" on each sides and some of the configurations comes with a button type photocell that can be turned off by using the internal switch if needed.[1]

  Lens

  Prismatic tempered glass lens is standard in this product series.

- **Electrical**
  - The drivers allows an input voltage from 120-277 V or 120-347 V AC 50/60 Hz and are 0-10 V dimmable. They are coming with an onboard surge protection:
    - NS29: 2.5kV standard
    - NS40, NS60, NS80, PS40, PS100: 2kV standard
    - NS120: 4kV standard
  - This wall pack series is suitable for ambient temperature range of -40°C to +50°C. Available in color temperatures of 4 000 K, 5 000 K or 3CCT selectable (3 000/4 000/5 000 K) with a lumen per watt ratio of 140 lm/W to 152 lm/W depending on the lumen package.
  - The color temperature of the fixture is set by default at 4 000 K and can be changed on the field.

- **Compliances**
  - Wet location
  - IP65
  - Meets requirements of ICES-005 issue 5 for class B products
  - cULus
  - IK06
  - BC Hydro

OVERVIEW

Light source	LED
Watts (W)	25/30/40, 60/80/100 30, 40, 60, 80, 120
Lumens output (lm)	3 625 - 17 885
Efficiency (lm/W)	140 - 152
Color temperature (K)	3CCT (3 000/4 000/5 000) 4 000, 5 000
CRI	> 80

[1] Integrated photocell, multi-volt driver, CCT and Power selectable on some configurations. Consult Quick ship and technical specification table for more details.

5 yrs warranty

quick ship

LED fixture

power selectable [1]

3 CCT TCC [1]
3000 K / 4000 K / 5000 K

dimmable fixture

wet location

IP 65

ICES 005

IK06

DLC QPL LISTED PREMIUM

cULus

Not all products are qualified on the DLC QPL. To view our DLC qualified products, please consult the DLC Qualified Products List at www.designlights.org/search.

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STANPRO

QUICK SHIP AND TECHNICAL SPECIFICATION TABLE [1]

Order code	Model number	DLC unique ID	Watts (W)	Volts (V)	Color temp. (K)[2]	Lumen output (lm)[3]	Effi-ciency (lm/W)	Photo-cell[6]	CRI	Life L70 (hrs)[5]	Tested hours LM-80 (hrs)[5]	Calculated TM21 (hrs)[5]	Finish	Dim-ming	B.U.G.	LED current (mA)	Power factor	THD (%)	Case qty (master)
Power Select, CCT Select and Integrated Photocell[6]																			
68314	WPS-PS40-Q-3C	PLW61NEJG50K	25/30/40	120-347	3000/4000/5000	3875/4500/5800[4]	141	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	850	≥0.9	≤20	1
68315	WPS-PS100-Q-3C	PLE7PYF9LCSH	60/80/100	120-347	3000/4000/5000	9300/12000/14500[4]	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	2 100	≥0.9	≤20	1
Single Power, Single CCT and Integrated Photocell[6]																			
68524	WPS-NS30-W-40K/P127		29	120-277	4 000	4 200	150	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
68525	WPS-NS30-W-50K/P127		29	120-277	5 000	4 300	148	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
Single Power and Single CCT																			
68490	WPS-NS40-W-40K	PLVM09BUX07G	40	120-277	4 000	6 004	142	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68491	WPS-NS40-W-50K	PL3ULW7TEV5H	40	120-277	5 000	6 034	144	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68492	WPS-NS60-W-40K	PL6EFOUTBPWB	60	120-277	4 000	8 458	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68493	WPS-NS60-W-50K	PL01JETYSQ80	60	120-277	5 000	8 611	147	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68497	WPS-NS80-W-40K	PLVXL8TOP2UF	80	120-277	4 000	11 242	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
68498	WPS-NS80-W-50K	PL2AZJG3L0RQ	80	120-277	5 000	11 446	148	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
Single Power, CCT Select and Integrated Photocell[6]																			
68316	WPS-NS120-Q-3C	PLYRMZYS3AY3	120	120-277	3000/4000/5000	16 943	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B2U4G5	2 600	≥0.9	≤20	1

[1] **QUICK SHIP:** Product availability is subject to change without notice. Please contact your Stanpro customer service representative to confirm inventory levels at time of order.
[2] Typical color temperature range: +/- 5 %.
[3] Lumen values are derived from photometric testing. Initial lumens range: +/- 10 %.
[4] Lumen values are based on 4 000 K default settings. Please refer to Quick ship Technical Specification Table for more details on other color temperatures.
[5] Life hours are derived from IESNA LM-80-08 testing report and projected per IESNA TM-21-11 extrapolations.
[6] Integrated ON/OFF photocell that can be easily disabled.

ACCESSORIES (order separately)

Order code	Description
68370	18'' Bronze metal backplate
68371	Bronze glareshield
68372	Stainless Steel wireguard





ORDERING GUIDE

WPS — ____ — ____ — ____ — ____ / ____

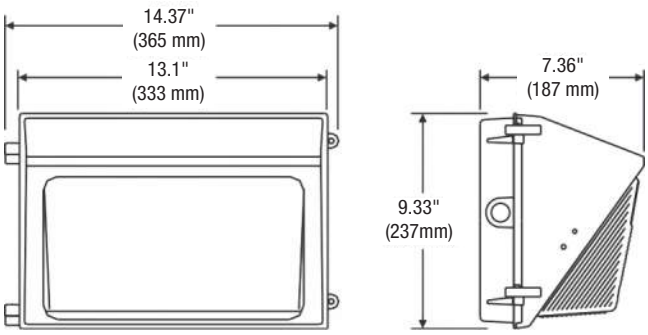
Series	Lumen package (W)	Volts (V)	Color temp. (K)	Casting color	Options
WPS	**PS40 -** 25/30/40 **PS100 -** 60/80/100 **NS120 -** 120	**Q -** 120-347	**3C -** 3 000/4 000/5 000	**BR -** Bronze (standard) **BK -** Black **WH -** White **SP-** Special color	**KV -** 10 kV surge Protection **PC -** Polycarbonate lens
	NS30 [1] **-** 29 **NS40 -** 40 **NS60 -** 60 **NS80 -** 80	**W -** 120-277	**40K -** 4 000 **50K -** 5 000		**KV -** 10 kV surge Protection **P127** [1] **-** Button type photocell 120-277 V **PC -** Polycarbonate lens

[1] Button type photocell 120-277 V comes standard with the ''NS30'' lumen package.

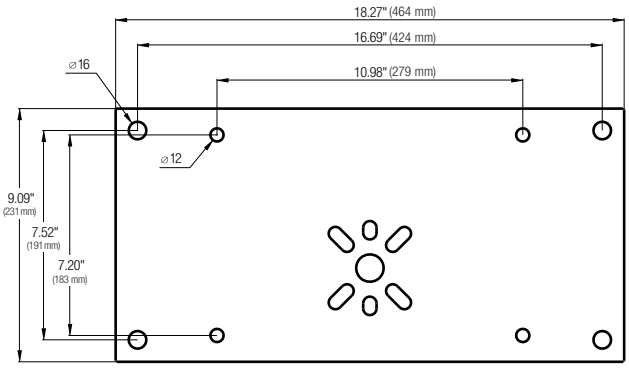
Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
All products are subject to change or may be discontinued any time without notice.

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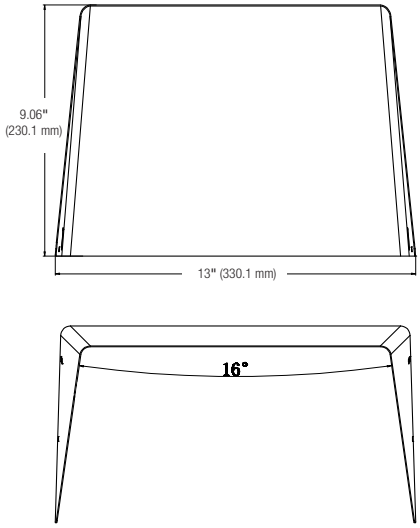
DIMENSIONS



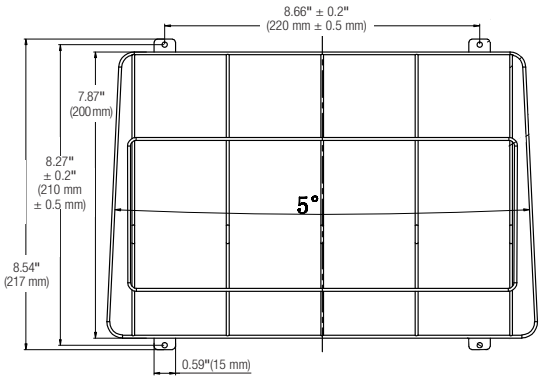
BACKPLATE



GLARESHIELD



WIREGUARD

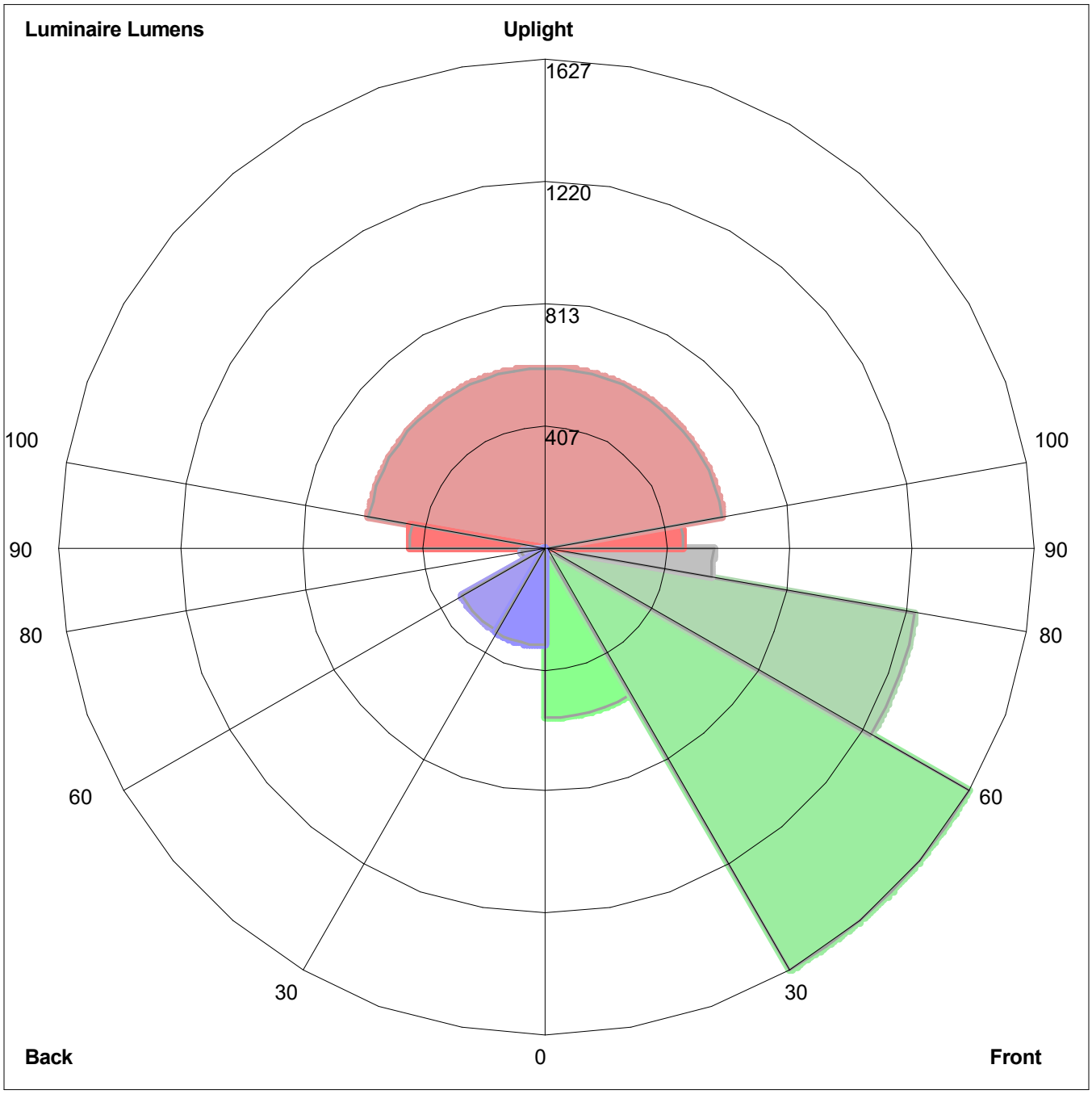


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IES ROAD REPORT
PHOTOMETRIC FILENAME : WPS-PS40-Q-3C-40W-40K-68314.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=566.0, Medium=1626.5, High=1251.8, Very High=558.0
Back: Low=327.7, Medium=323.2, High=79.4, Very High=11.6
Uplight: Low=456.3, High=599.7

BUG Rating : B1-U4-G4

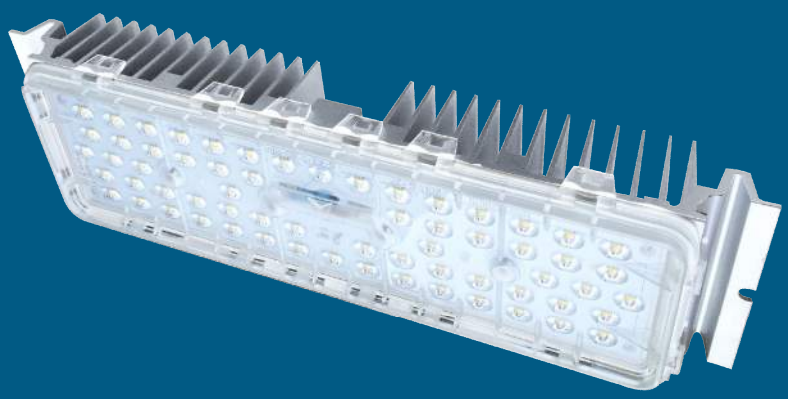
Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type B

Example Used



LED Module
M8B
Series



Specification

Working Environment: -40℃~+50℃

Storage Temperature: -40℃~+50℃

Relative humidity: 10%~90%RH

Typical value of pad temperature[1]: 70℃

IP Rating of LED Light Engine: IP68

Impact Protection Level: IK09

Color Temperature (CCT)[2]: 3000K, 4000K, 5000K, 5700K

Main Material: Aluminum 6063

Module N.W.: 0.67±0.04 kg

Note :

[1] Typical values of pad temperature is obtained based on 60W with a ambient temperature of 25℃.

[2] Efficacy of 3000K is 5% lower than other CCTs.

Features

- Lumileds Luxeon 3030;
- Super long lifetime(Lumen maintenance);
- Multiple lighting distributions available;
- Wide applicability for complex situations;
- High versatility apply for all sorts of lamps retrofit.

Application

- Street lighting retrofit and application;
- Factory lighting retrofit and application;
- Tunnel lighting retrofit and application;
- Sports lighting retrofit and application.

Ordering Information

For example: M8B-VCA-63 -1321-7040-LU

Module Model	Interface	Dimension of LEDS	Wire Material	LED Qty	Lens Model		Ra & CCT	LED Brand
M8B	**V:** V-shape Groove	**C:** 3030	**A:** CCC+VDE	**49** 49PCS	**1324** Type II Short	**1325** 25 DEG	**7030:** Ra≥70, 3000K	**LU:** Lumileds
			C: PSE	**63** 63PCS	**2322** Type II Short (V)	**2360** 60 DEG	**8040:** Ra≥80, 4000K	**SN:** Sanan
			H: UL		**5321** Type II Short	**5340** 40 DEG	...	**XX:** Others
			X: Others		**2321** Type II Short	**5390** 90 DEG		
					1321 Type III Medium	**1310** Lambert Type		
						1390 Tunnel Lighting		

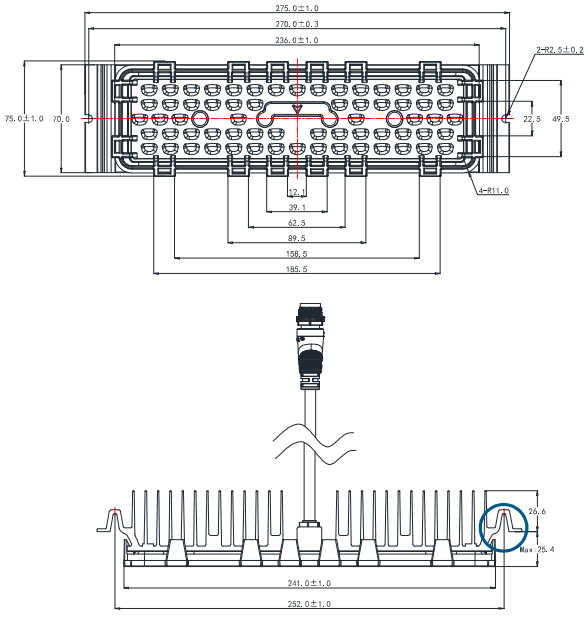
Performance

Model	Power (W)	Driving current (mA)	Input voltage (Vdc)	Efficacy (lm/W)	Lumens (lm)
M8B-VCA-63	40	700	48~61	140	5600
M8B-VCA-49	50	1050	38~48	127	6350
M8B-VCA-63	50	860	48~61	135	6750
M8B-VCA-63	60	1050	48~61	127	7620

Note : Values shown are subject to ±5%~±8% tolerance; Cable default A type;

Efficacy above is based on calculated @92% power efficiency ; Light efficacy of 3000K is 5% lower than other CCTs.

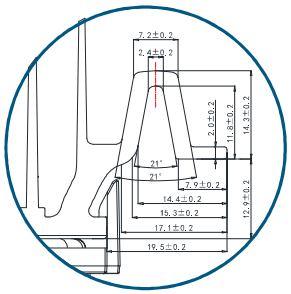
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

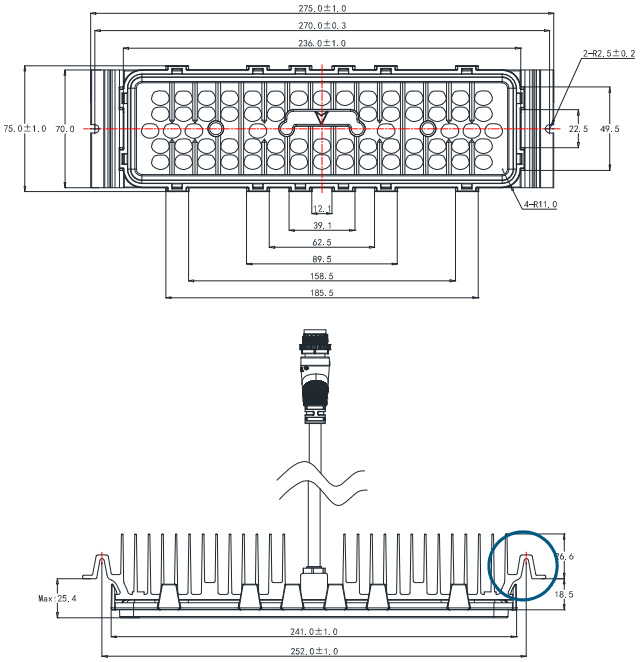
Tolerance: ±0.5mm



Available Lens Model

1321	1324	1390
1232	2322	5321

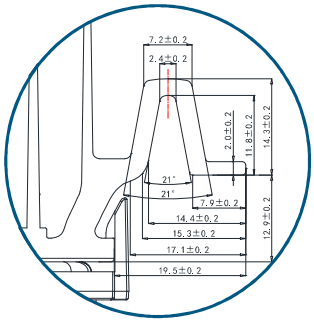
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

Tolerance: ±0.5mm



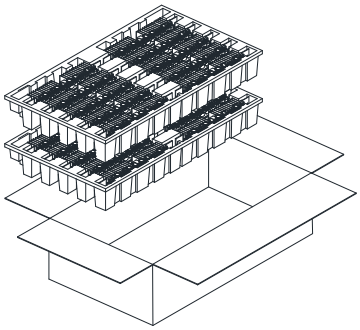
Available Lens Model

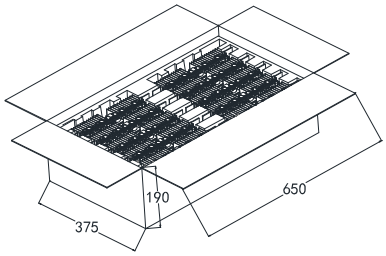
1310	1325	5340	2360
5390			

Package Information

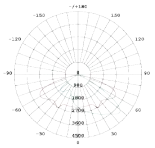
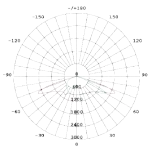
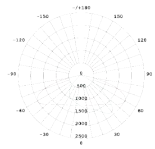
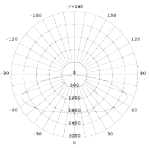
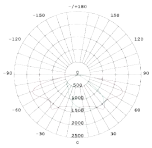
L (mm)	W (mm)	H (mm)	Module pcs/carton (PCS)	Package weight (kg)
650	375	190	20	14.9

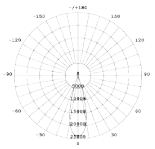
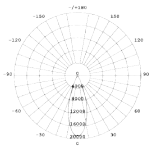
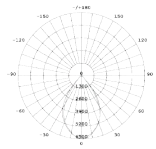
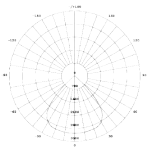
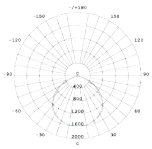
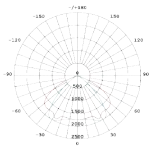
Values shown are subject to ±5% tolerance.





Lighting distributions

T2S1324	T2S(V)2322	T2S5321	T2S2321	T3M1321
				

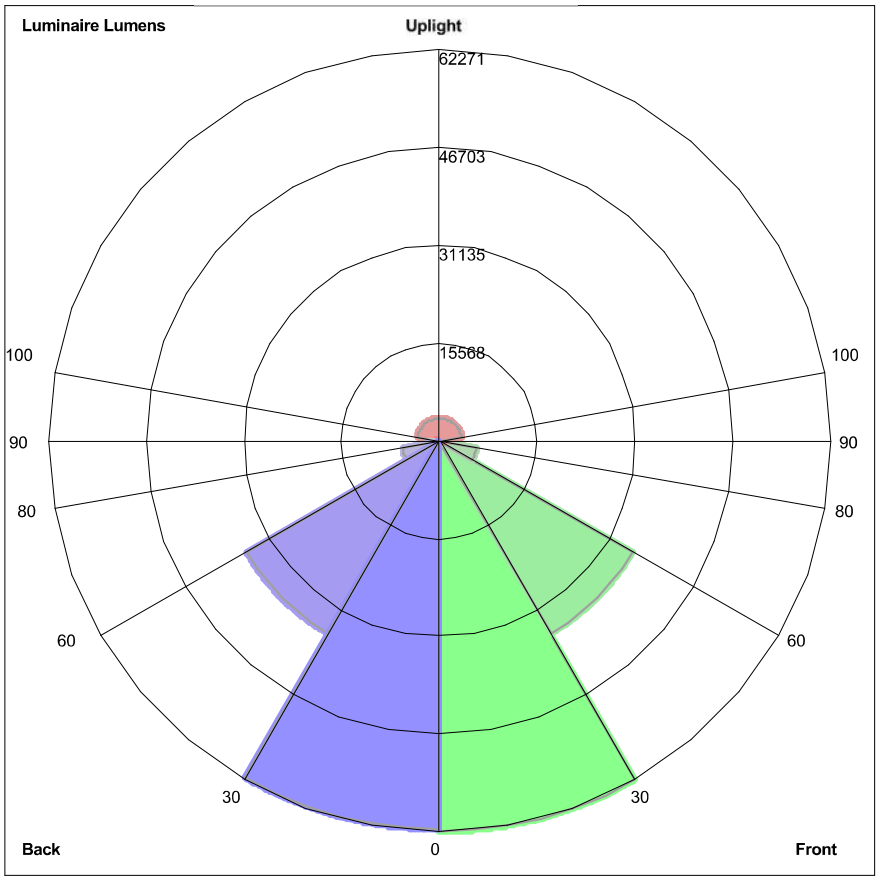
25D1325	40D5340	60D2360	90D5390	LBN1310	Tunnel lighting 1390
					

Version History

Change Date	Version	Description of Change		
		Item	From	To
20190905	Ver2.0	Data sheets release (new version)		
		Update of luminous efficacy		
		Optimized G.W of Module package	16.2kgs	14.9kgs

IES ROAD REPORT
PHOTOMETRIC FILENAME : 3560-400W 16 BANKS ESTIMATE.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=62270.6, Medium=35421.7, High=5946.3, Very High= 1328.0
Back: Low= 61920.0, Medium=35466.8, High=5958.8, Very High=1320.7
Uplight: Low=493.0, High=3564.5

BUG Rating : B5-U5-G5

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type C

Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Applications:

- Onshore drilling and exploration
- Pipeline compressor and storage
- Corrosive environments
- Façade security lighting

Features:

- 150-400W high pressure sodium or 175-400W metal halide
- AEx nR, Ex nR restricted breathing rating is standard – restricted breathing offers cooler T-numbers for increased hazardous locations suitability
- NEMA 7x6 butterfly beam floodlight pattern – wide, uniform and far reaching to provide excellent efficiency and more light where you need it
- NEMA Type 4X and IP66 heavy duty, die cast copper-free aluminum construction is designed for use indoors and outdoors in marine and wet locations with stainless steel external hardware suitable for saltwater and corrosive applications
- 40°C, 55°C and 65°C ambient suitability – addresses high ambient common at industrial facilities
- Low ambient capability to -40°C – perfect for colder climates
- Hinged door frame assembly – has captive cover screws for ease of relamping
- Yoke mount design – standard construction provides the greatest mounting flexibility; can be mounted vertically (wall), horizontally (rooftop or floor) or any angle in between
- 3-axis resonance withstand and UL844 vibration compliant – can stand up to the tough jobs
- Precision formed aluminum reflector – superior beam control, distribution and efficiency
- High light output with a low cost of operation – cost-effectiveness in a high wattage floodlight
- Slipfitter adapter for pole mounting and wall mounting bracket available

Certifications and compliances:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx nR II
- Class II, Division 1, Groups F, G (250W maximum)
- Ex nR II
- UL/cUL844 – Hazardous Locations
- UL/cUL1598 – Luminaires
- UL/cUL1598A – Supplemental Requirements for Luminaires for Installation on Marine Vessels
- 60079-15
- NEMA Type 4X
- IP66
- Marine and wet locations
- ABS



Standard materials and finishes:

- Housing and lens frame – heavy duty die cast copper-free aluminum with Corro-free epoxy powder coat finish
- Lens – heat- and impact-resistant tempered glass
- Gasket – one-piece silicone
- Mounting brackets – aluminum with Corro-free epoxy powder coat finish
- Reflector – precision formed aluminum
- Lamp holder – porcelain
- Hardware – stainless steel

Technical specifications:

- Entries – one ¾" AEx/Ex gland
- Wind rating – EPA: 2.90 at vertical
- Lamp type – high pressure sodium; probe start metal halide[A]; pulse start metal halide (lamps not provided)
- Lamp holder – mogul base
- Ballast – multi-tap 120/208/240/277V, 60 Hz (standard); 220-240V, 50 Hz (optional); tri-tap 120/277/347V (optional); 480V (optional)

Mounting option:

- Yoke mount

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

[A] Not available in the U.S.

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Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Options:

Description	Suffix
• Lamps included	L[B]
• 480V	480
Replace /MT in catalog number with /480	
• 230V	230
Replace /220 ONLY in catalog number with /230	

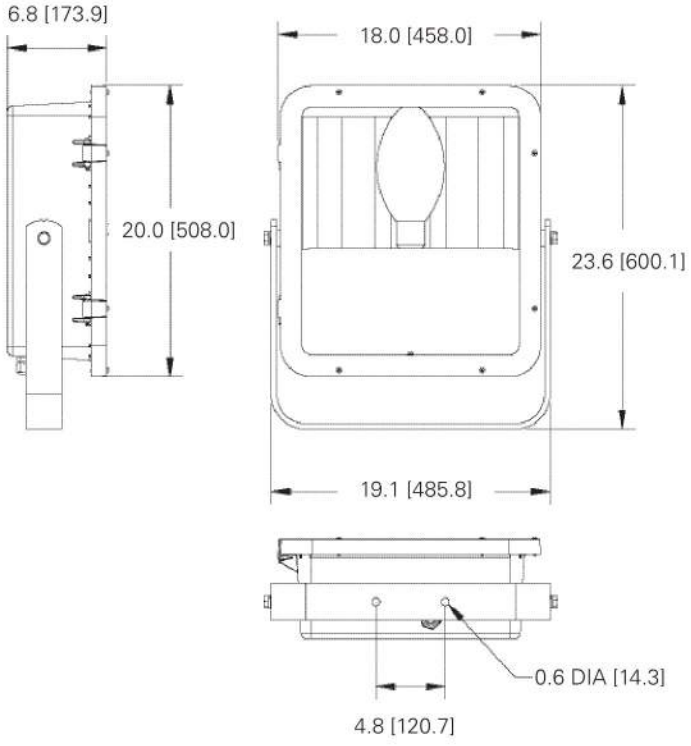
Accessories (ordered separately):

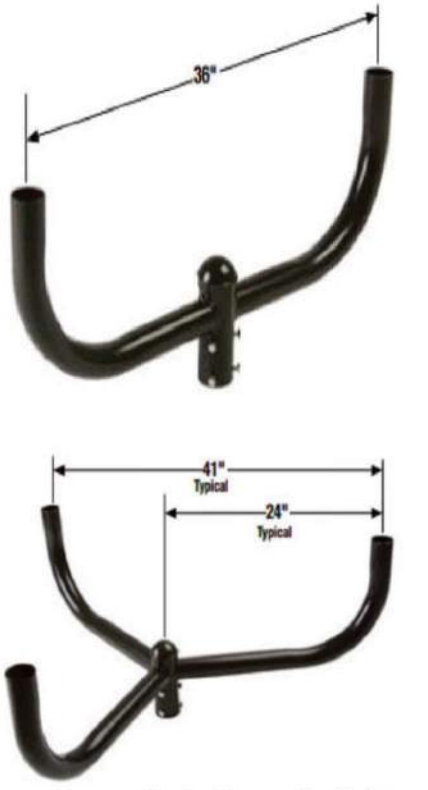
Description	Cat. #
• Pole mount slipfitter adapter	SFA6
• Wall mount bracket adapter	SWB6
• Bull horn, 2 tenon, gray	BLHN2
• Bull horn, 3 tenon, gray	BLHN3

Ordering information:

Cat. #	Lamp type	Watts	Weight (lbs.)	ANSI lamp type	Zone T-code	Division T-code	Ambient temperature °C	Supply wire °C
DFLMY250/MT 76 S828	Pulse start metal halide	250	42.0	M153	T3	T1	40/55/65	90/90/105
DFLMY400/MT 76 S828	Pulse start metal halide	400	44.0	M155	T3	T1	40/55	105/105
DFLMY320/MT 76 S828	Pulse start metal halide	320	44.0	M154	T3	T1	40/55	105/105
DFLMY250/TT 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/TT 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLMY250/220 50 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/220 50 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLSY250/MT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/MT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/TT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/TT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/220 50 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/220 50 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105

Dimensions (in inches):





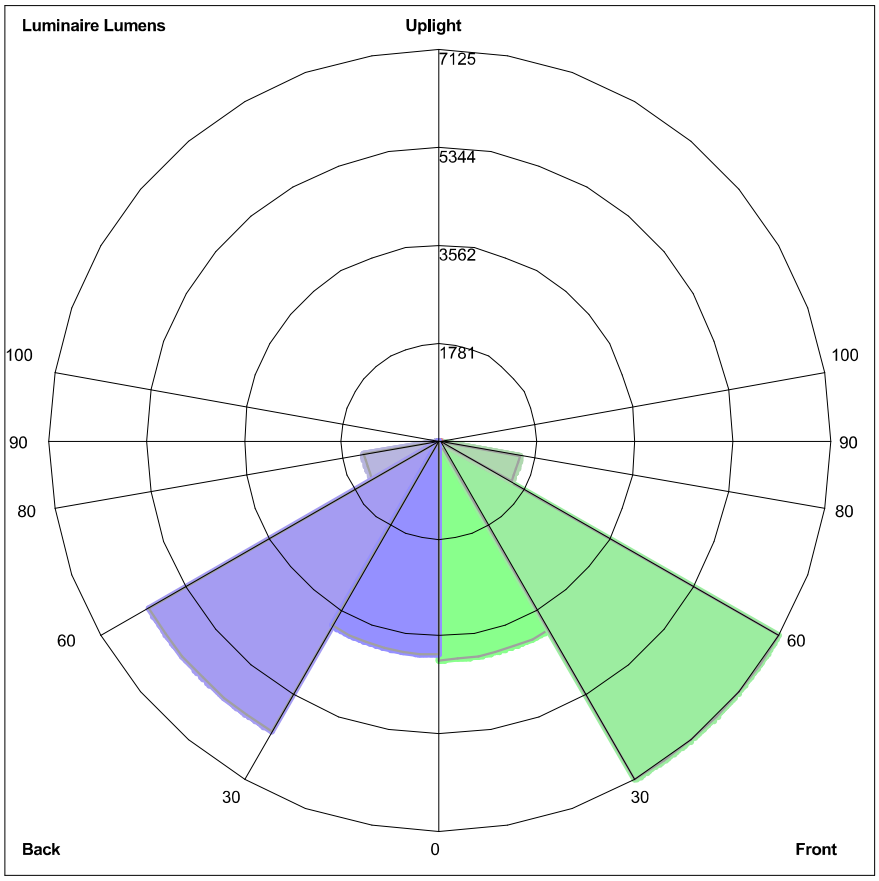
Bull horns – provided with 2 3/8" pole tenon

[B] Lamp is not included unless option 'L' is selected.
[C] Not available in the U.S.

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IES ROAD REPORT
PHOTOMETRIC FILENAME : DFLMYM400.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=3985.6, Medium= 7125.0, High=1500.3, Very High=28.6
Back: Low=3894.8, Medium=6102.1, High=1404.5, Very High=40.2
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G3

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type D

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%



Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5

Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

Ⓐ One year warranty.

Ⓑ Refer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

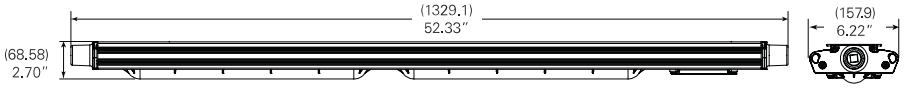
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

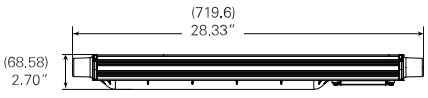
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

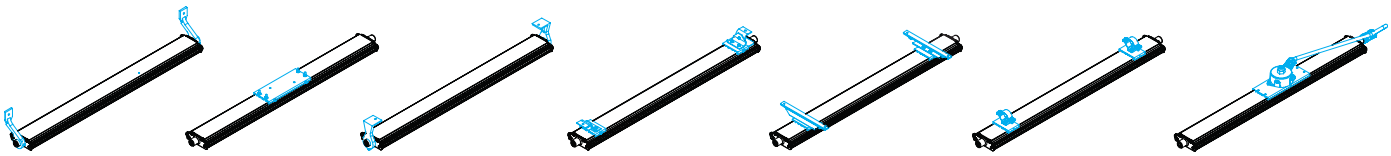
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

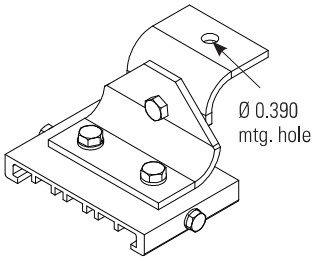
For land-based drilling

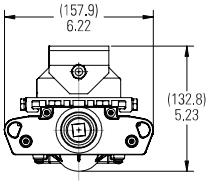
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

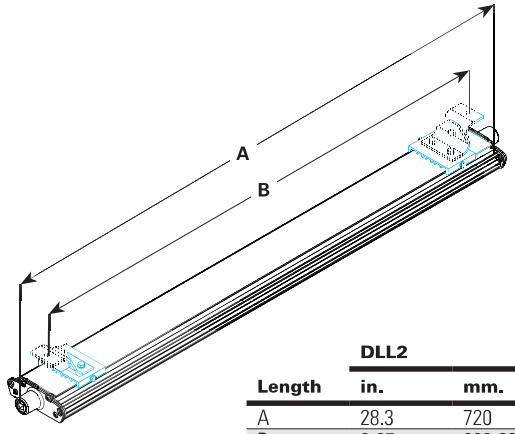
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

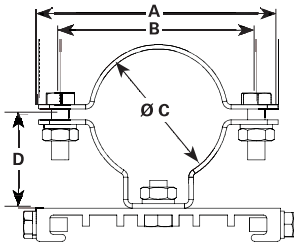




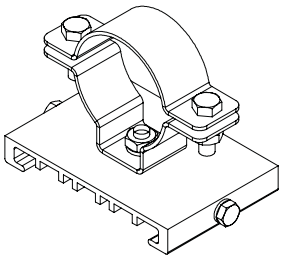


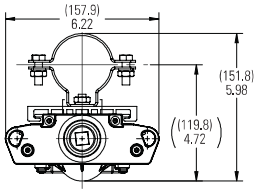
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

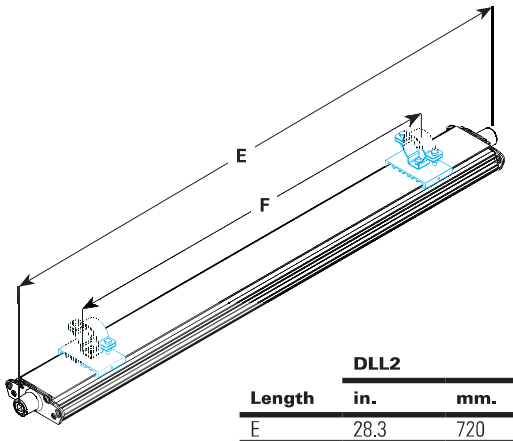
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

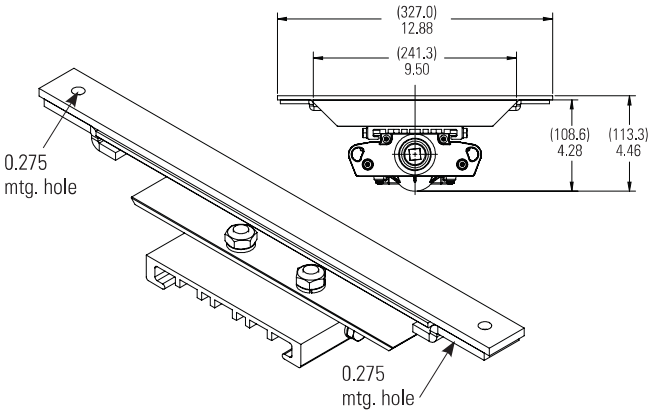


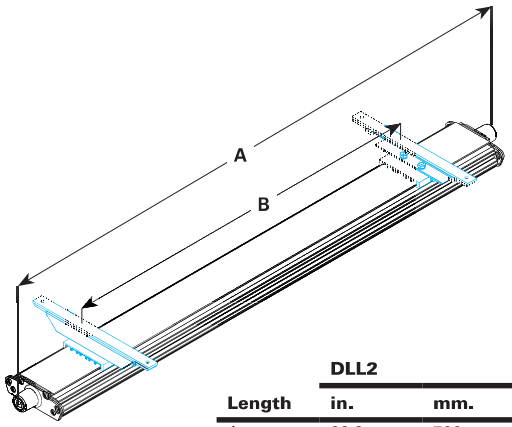




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



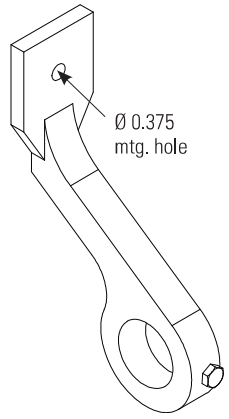


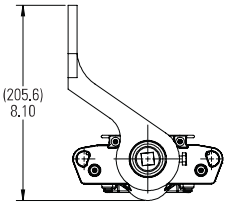
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

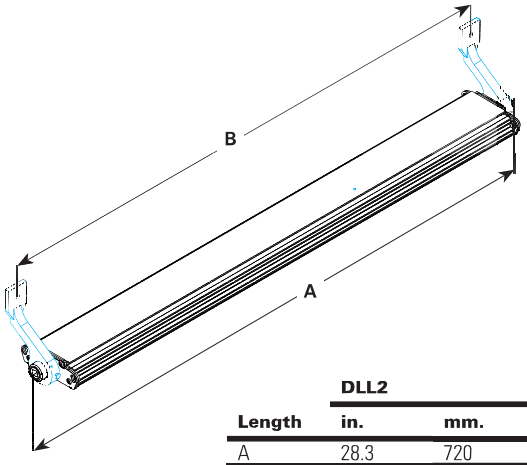
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Mounting options (continued):

Offset wall
DP1052MTK

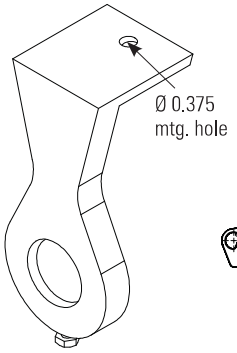


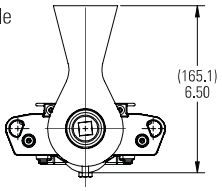


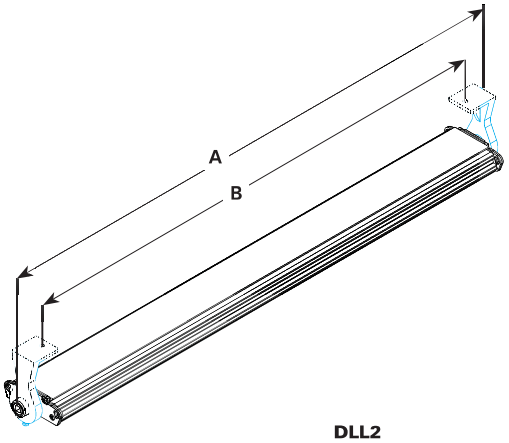


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

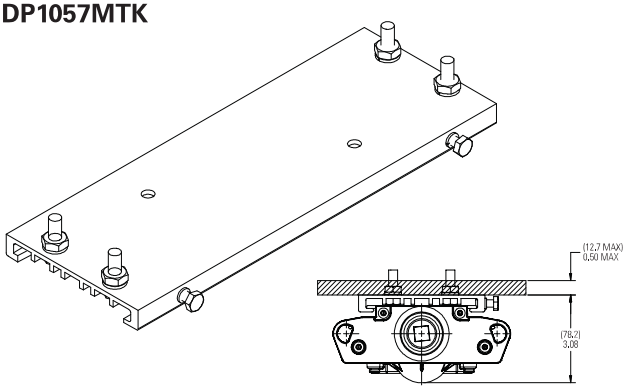


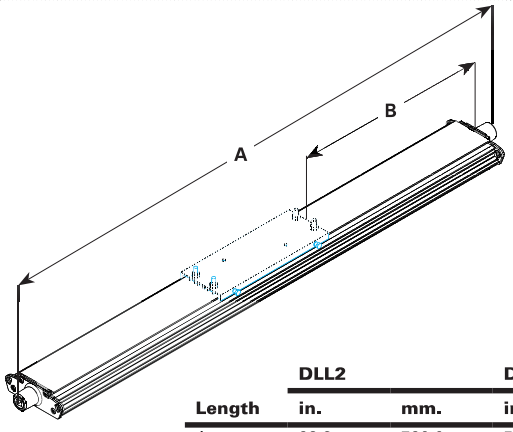




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



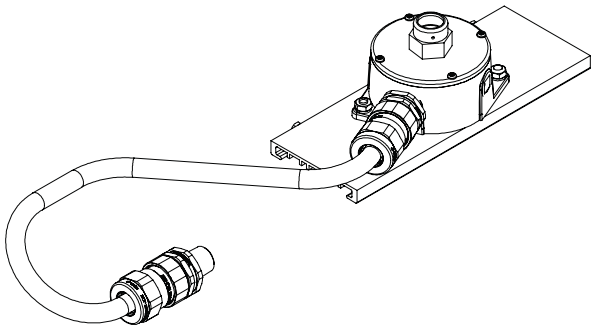


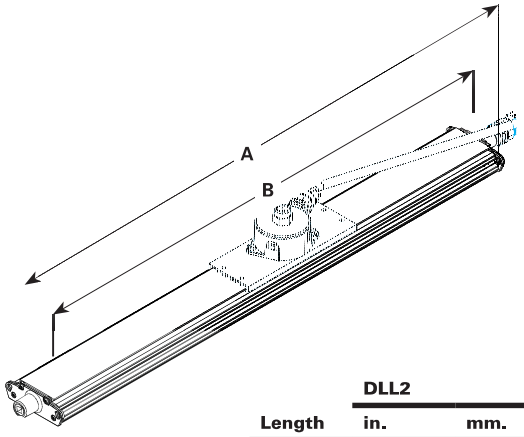
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

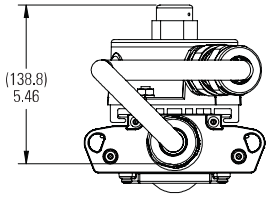
www.crouse-hinds.com US: 1-866-764-5454 CAN: 1-800-265-0502 Copyright® 2019 Eaton

Mounting options (continued):

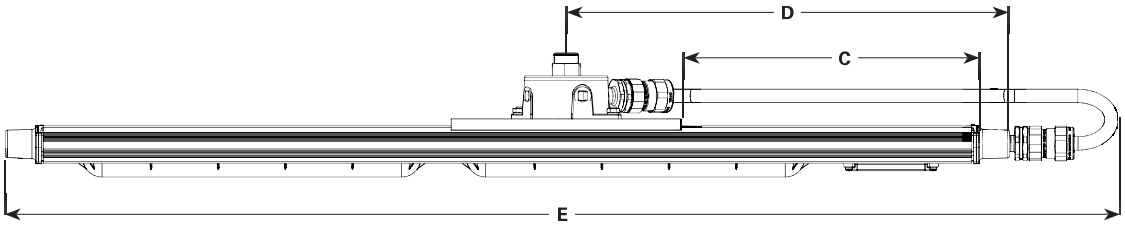
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

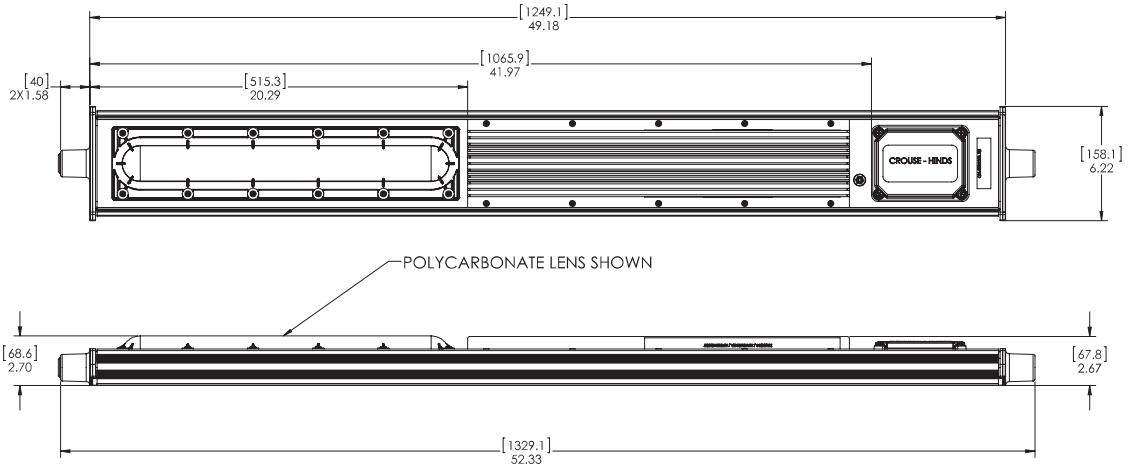
Temperature performance data:

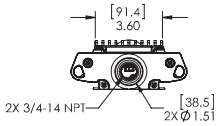
				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Dimensions:

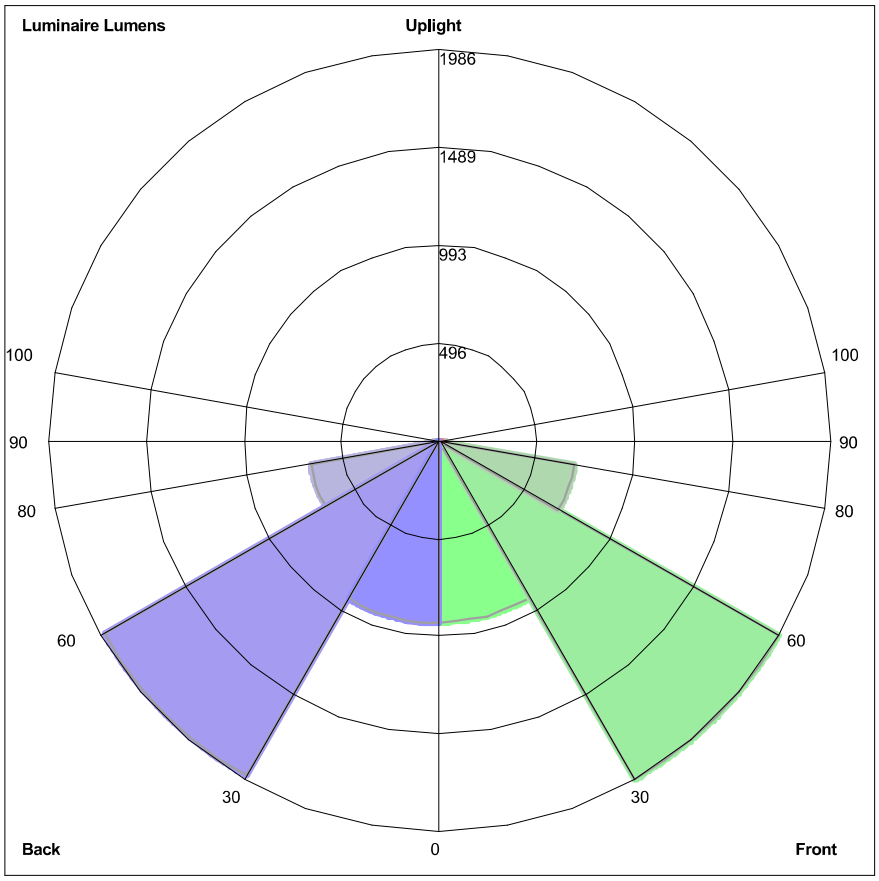




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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL4 UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=921.0, Medium=1985.6, High=698.7, Very High=29.2
Back: Low=925.1, Medium=1963.4, High=664.7, Very High=26.5
Uplight: Low=4.7, High=1.2

BUG Rating : B2-U1-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type E

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%

Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5



Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

ⒶOne year warranty.

ⒷRefer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

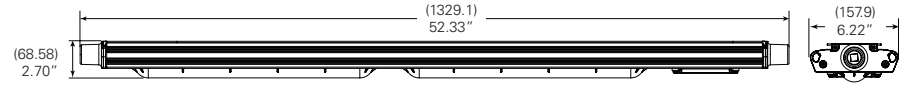
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

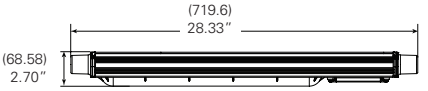
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

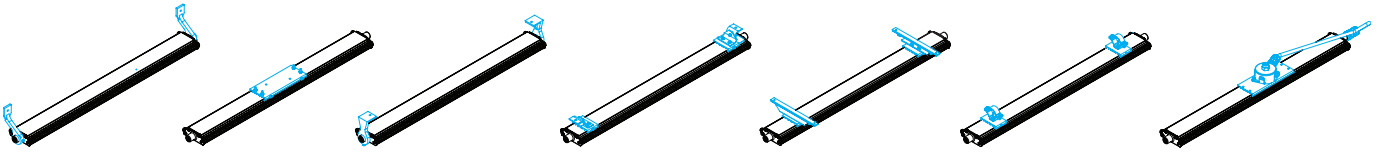
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

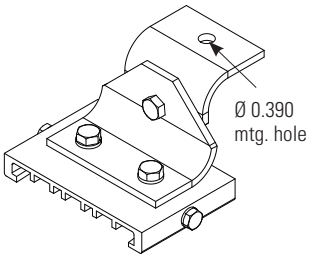
For land-based drilling

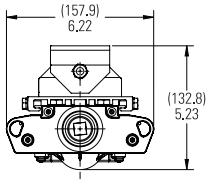
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

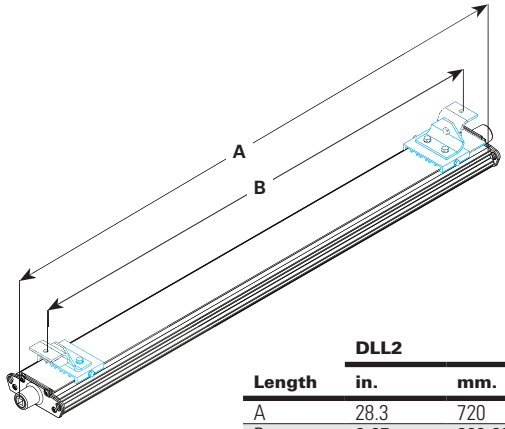
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

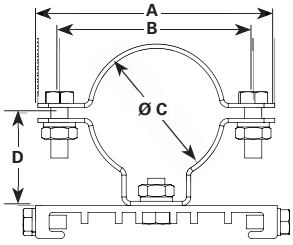




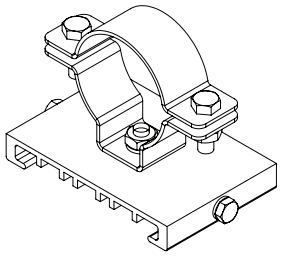


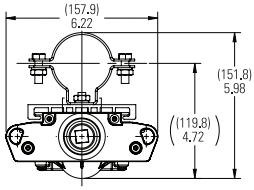
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

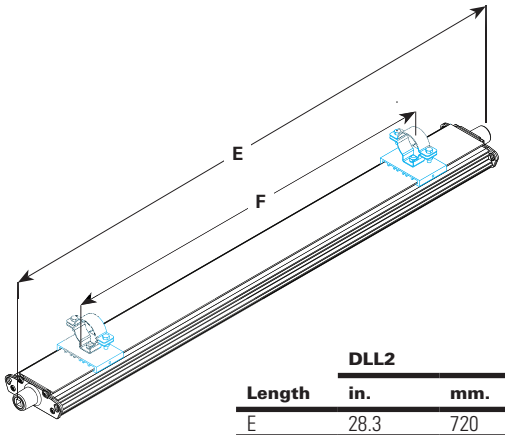
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

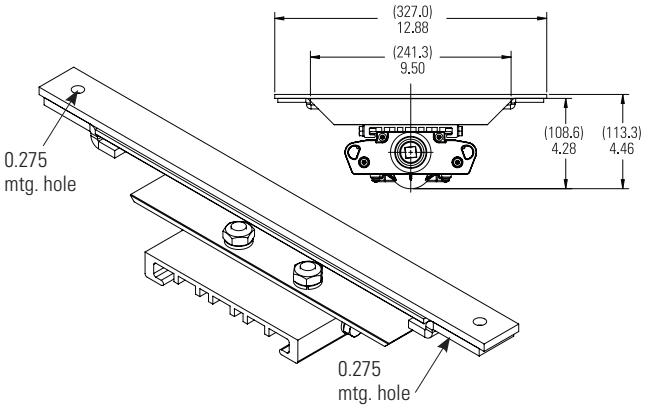


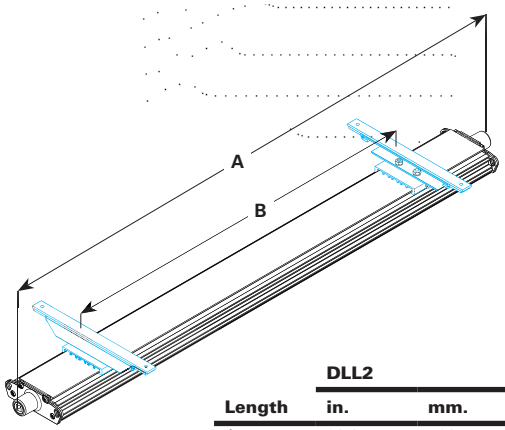




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



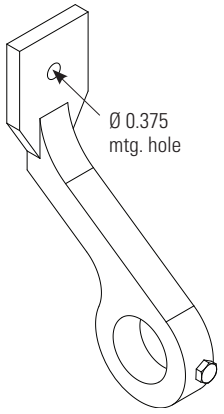


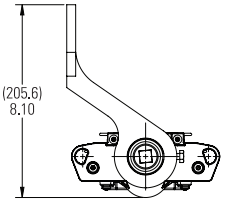
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

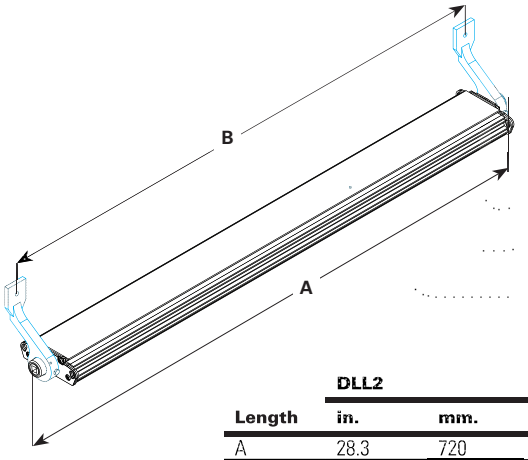
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Mounting options (continued):

Offset wall
DP1052MTK

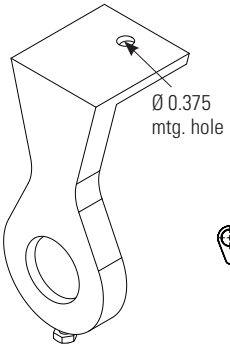


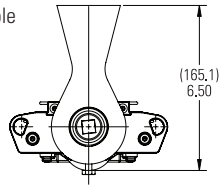


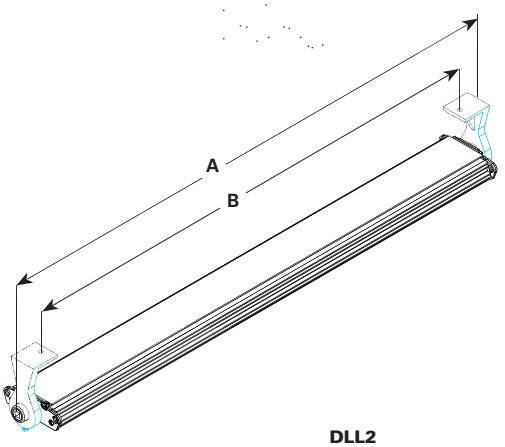


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

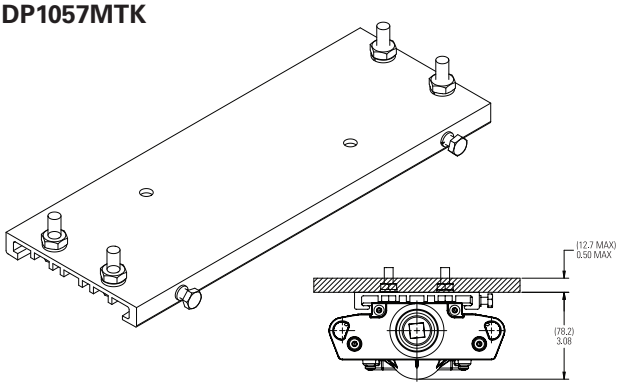


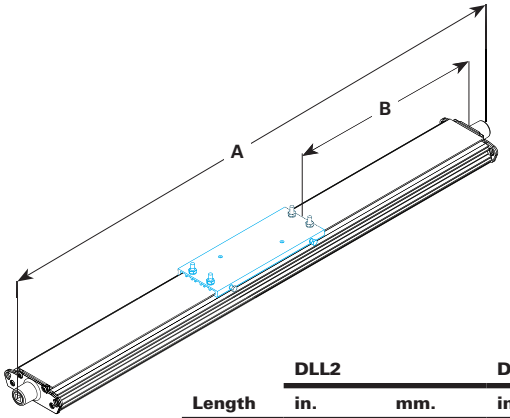




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



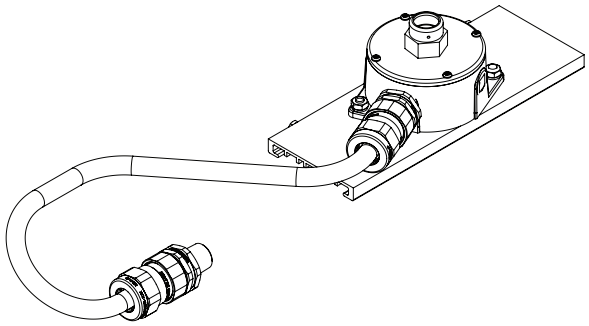


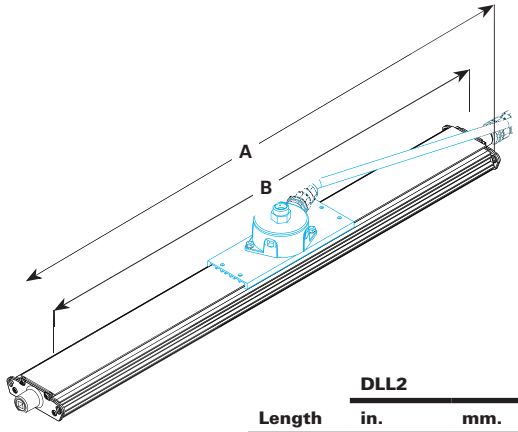
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

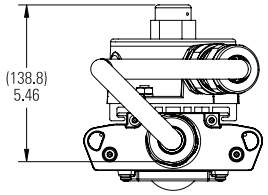
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Mounting options (continued):

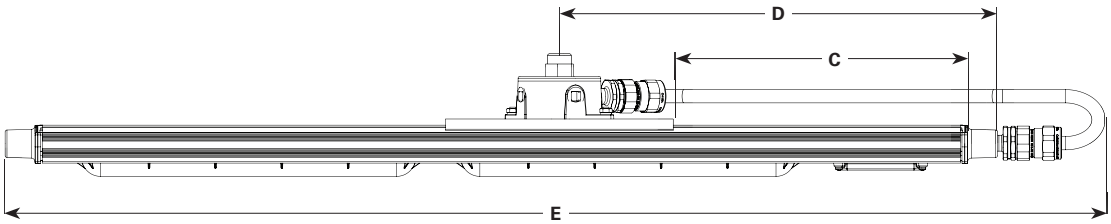
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

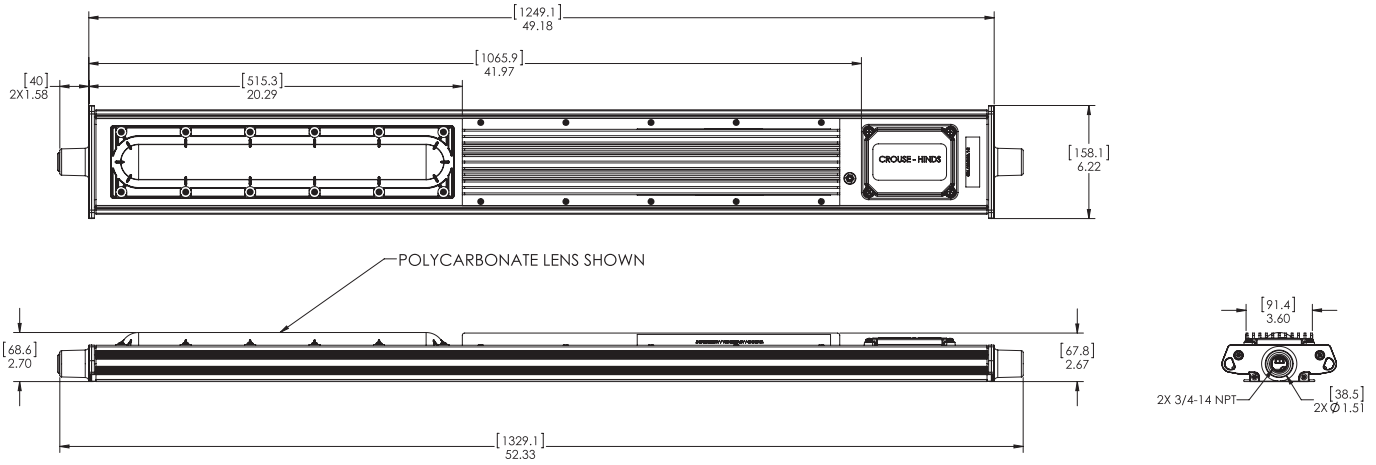
Temperature performance data:

				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

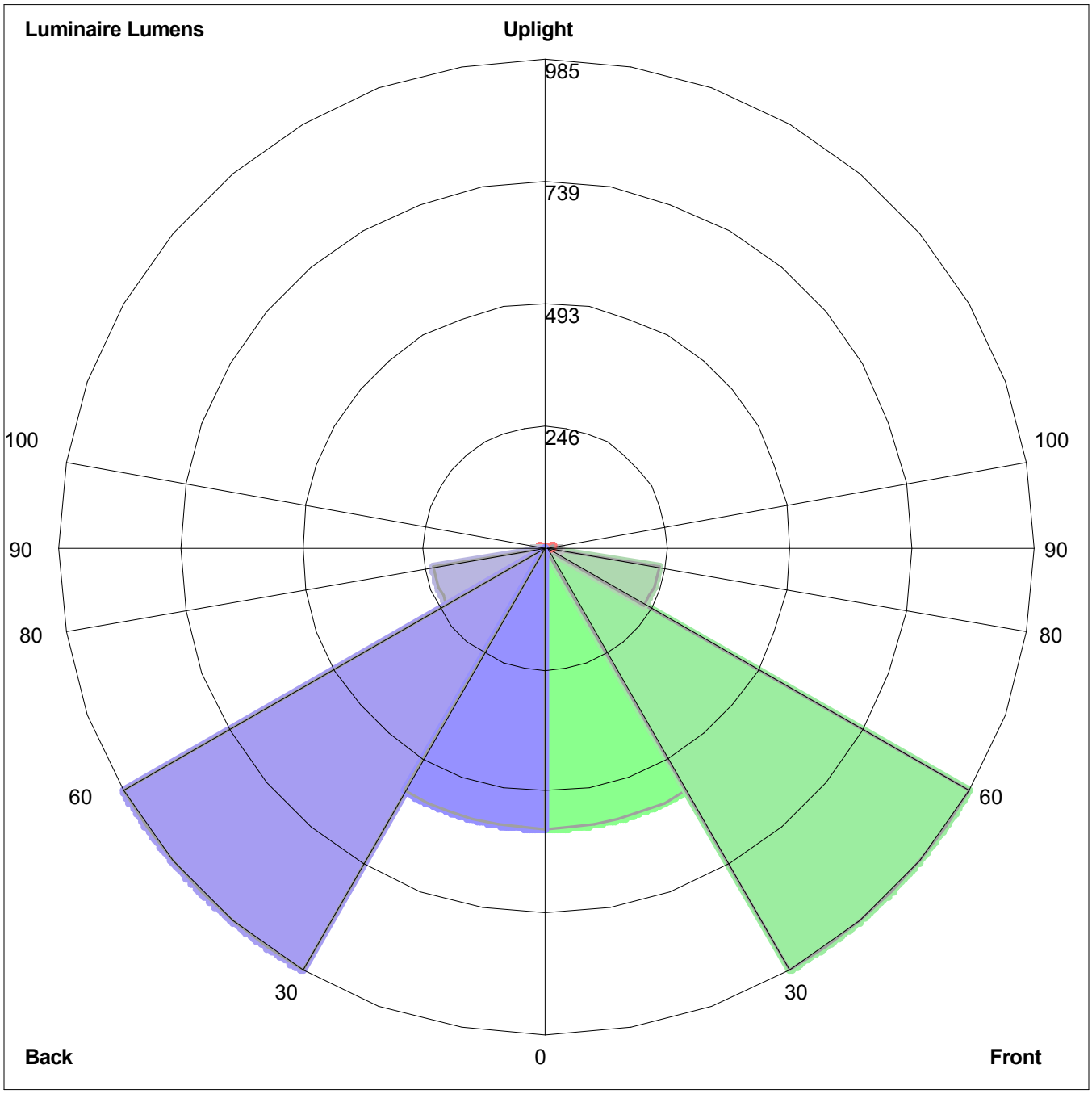
Dimensions:



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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL2-UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Back: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Uplight: Low=12.8, High=0.3

BUG Rating : B2-U2-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type F



Mounting: Vertical Green LED Heat Trace End Seal Kit

Mounting Height: Piping Height Varies.

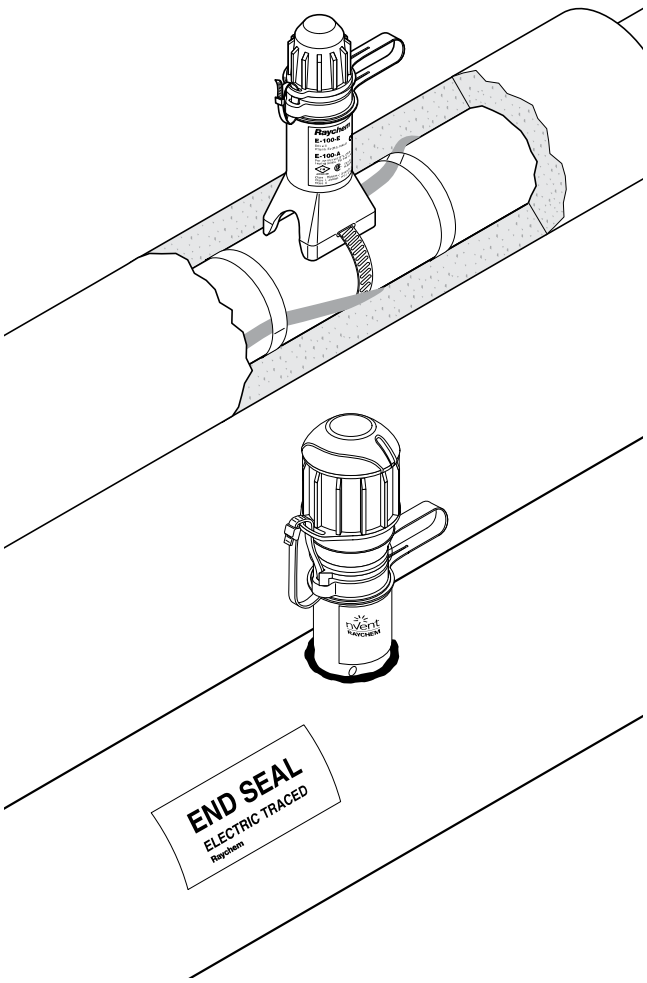
Part Number: E-100-L-A

Manufacturer: Raychem

Wattage: 2 watts at 60 Lumens/watt LED. 120 Lumens per end seal

E-100-E AND E-100-L-E

END SEAL AND LIGHTED END SEAL



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTV, KTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

KIT CONTENTS

	E-100-E	E-100-L-E
	1 end seal 1 cable tie 1 polywater sachet 1 installation instruction	1 end seal with indicator light 1 cable tie 1 polywater sachet 2 insulated parallel crimps 1 core sealer 1 installation instruction

APPROVAL DATA

Area of use	Hazardous or ordinary (indoors and outdoors)

APPROVALS

E-100-E	E-100-L-E
PTB 09 ATEX 1060 U Ⓔx II 2G Ex e II II 2D Ex tD A21 IP66 IECEx PTB 09.0038U Ex e II Ex tD A21 IP66 SP Ex e II T*	Sira 14ATEX3015X Ⓔx II 2GD Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C IECEx SIR 14.0007X Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C FM CLI, ZN1, AEx e mb IIC T* Gb (1) ZN21 AEx tb IIIC T* SP Ex e mb IIC T* Gb Ex tb IIIC T***°C Db

DNV Certificate No. E-11564 and E-11565
*For T-rating, see heating cable or design documentation
(1) Except VPL

EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"
EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"

PRODUCT SPECIFICATIONS

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	480 V*	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	−50°C to +56°C*	−40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the summary the certificate or installation instructions for full details.	
Min. installation temperature	−50°C	−40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

LIGHT SOURCE

Type	Green LEDs
Voltage rating range	110-277 Vac, 50/60 Hz
Power consumption	< 2 W
Electromagnetic immunity/emissions	Complies with IEC61000-6 and IEC61000-4

INSTALLATION DATA

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers

ORDERING DETAILS

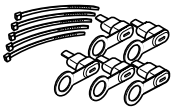
End seal		
Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied) PTB, DNV and EAC approved product

ACCESSORIES

Small pipe adaptor	JBS- SPA, required for pipes ≤ 1" (DN 25), E 90515-000 (bag of 5 adaptors)

SPARE PART

Boot pack for E-100-E



Part description	E-100-BOOT-5-PACK
PN (Weight)	281053-000 (140 g)
Pack size	5 sealant filled boots and 5 cable ties

Replacement indicator light for E-100-L

Part description:	E-100-LR-E
PN	P000001586

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Fax +1.713.868.2333
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nVent

nVent.com

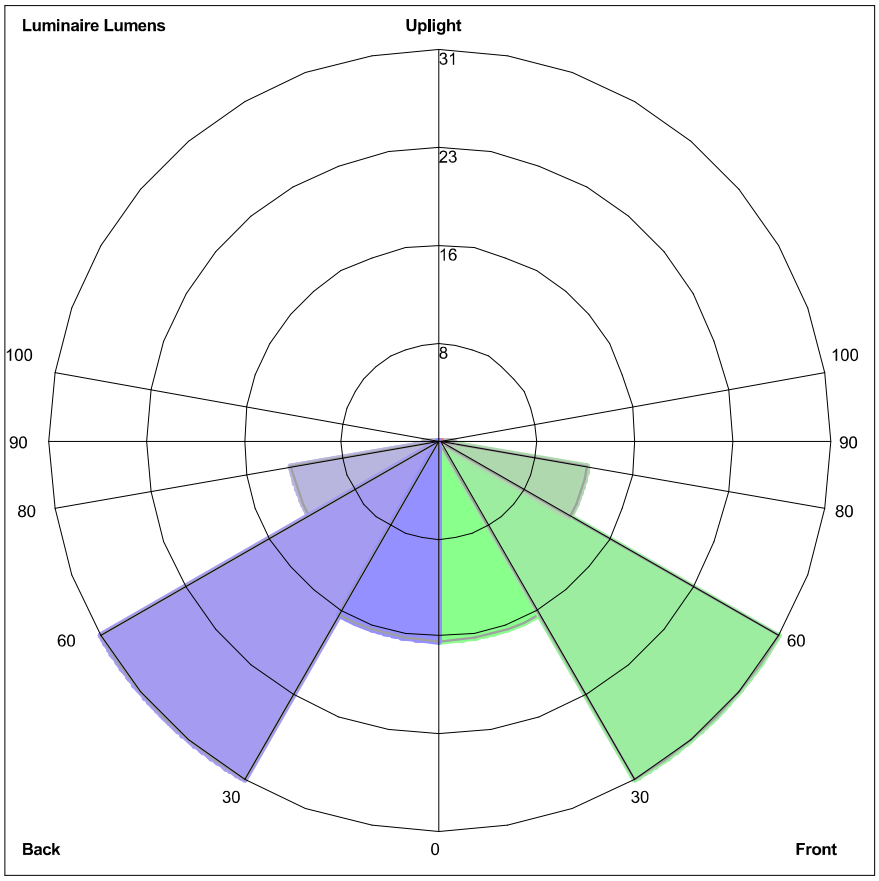
Our powerful portfolio of brands:
CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER

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RAYCHEM-DS-EU1421-E100EE100LE-EN-1911

IES ROAD REPORT
PHOTOMETRIC FILENAME : APPROXIMATION RAYCHEM END KITS.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH

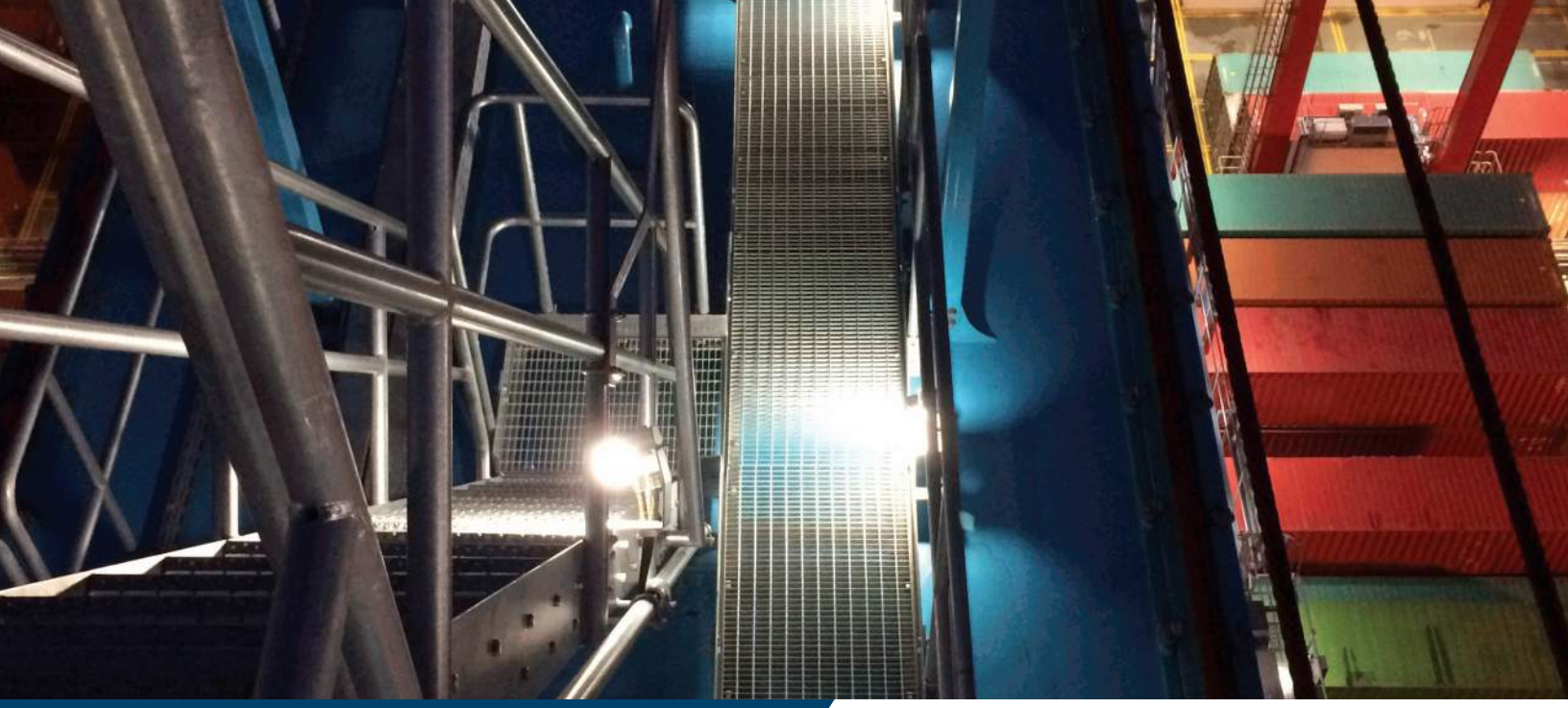


Luminaire Lumens:
Front: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Back: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type G



PHOENIX®
DURABILITY X DESIGN™

Cube-Light

Compact LED Area Light



Australian Design No. 359170
US Patent No. D762,321 S

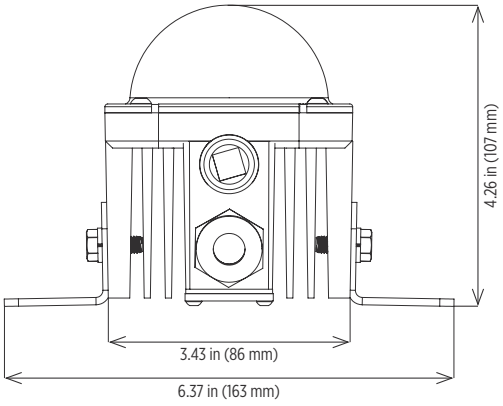
Delivers up to 1000 lumens to doorways, walkways, cabins or other small areas

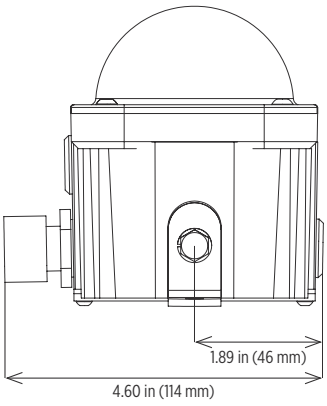
Competitive pricing with short lead times

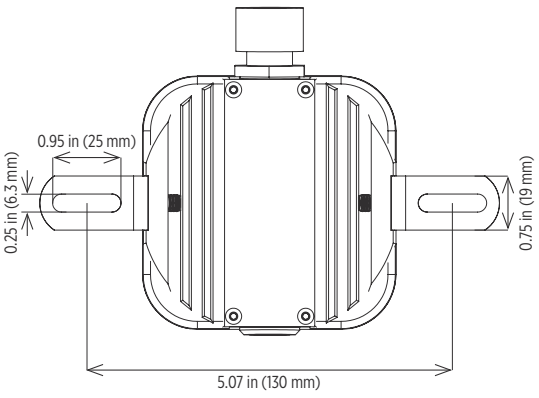
Various mounting options for maximum versatility

LED technology increases efficiency, eliminates maintenance and supports green initiatives

Dimensions







Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Cube-Light

Compact LED Area Light

Specifications

Construction	Cast aluminum housing
Finish	White thermoset powder coat
Hardware	Marine grade (316) stainless steel
Lens	Impact-resistant, diffuse polycarbonate Diffuse red, green, blue and amber lens accessories available (AMB-CL, BLU-CL, GRN-CL, RED-CL)
Light source	13W, up to 1000 lumens Conformal coated CRI ≥ 70 CCT 5000K 50,000 hour rated life
Power source	120-240V, 50/60Hz 240V, 50/60Hz 13-27V DC
Wiring	Stranded wires Cord not included - standard 72.00 inch (1829 mm) cord with pigtail option (CD) NEMA 5-15 plug (120V only) sold separately (PLG-515)
Through wiring	Continuous row mounting option (TW)
Ambient operating temperature	-30°C to +50°C
Mounting	Flush mount brackets - standard Harp mount available Rail mount available - 2.00 inch overall diameter Fixture can be mounted in any orientation
Weight	2.0 lb (0.9 kg)
Warranty	3 years

For IES files, see website or contact factory

Compliances

ETL/cETL Listed to:

- UL 1598 Suitable for Wet Locations
- UL 1598A Marine Outside Type (Saltwater)
- CSA C22.2 No. 250.0

CE
ABS
IP66 rated
LM79 and LM80 reports available



The Cube-Light on an STS crane

Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Ordering Information

Example: CL-13LED-120-240

Fixture	Wattage/Type	Voltage	Options
CL	13LED	120-240 [1,2]	CD
		240 [2]	TW
		DC [3]	

Wattage/Type

13LED	13W, up to 1000 lumens

Voltage

120-240 [1,2]	120-240V, 50/60Hz
240 [2]	240V, 50/60Hz
DC [3]	13-27V DC

Options

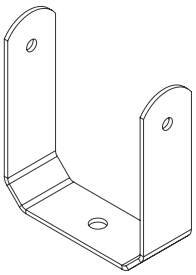
CD	72.00 inch (1829 mm) cord with pigtail option
TW	Continuous row mounting

Notes

1	ETL/cETL listed
2	CE
3	No certifications

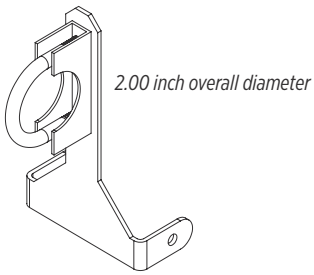
Special Projects: We may be able to accommodate your special projects, so please don't hesitate to ask about additional options. Minimum order quantities and/or extended lead times will apply. Contact your Phoenix representative with specific inquiries.

Mounting (order separately)



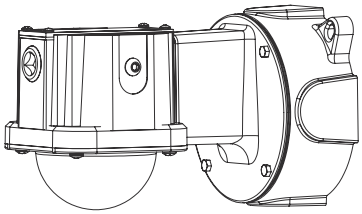
Harp Mount

HRP-CL



Rail Mount

RLMT-CL
Contact factory

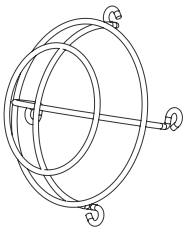


Wall Mount

Complete fixture sold separately
Refer to Cube-Light Wall Mount spec sheet

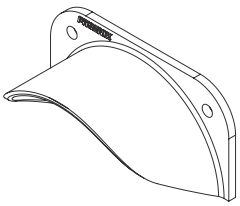
Flush mount comes standard with fixture

Accessories (order separately)



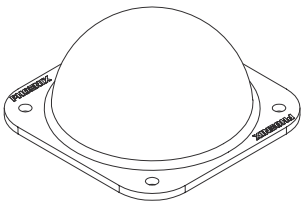
Wire Guard Kit

WG-CL



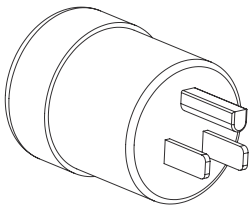
Visor Kit

VSR-CL



Color Lens Kits

AMB-CL	amber lens kit
BLU-CL	blue lens kit
GRN-CL	green lens kit
RED-CL	red lens kit

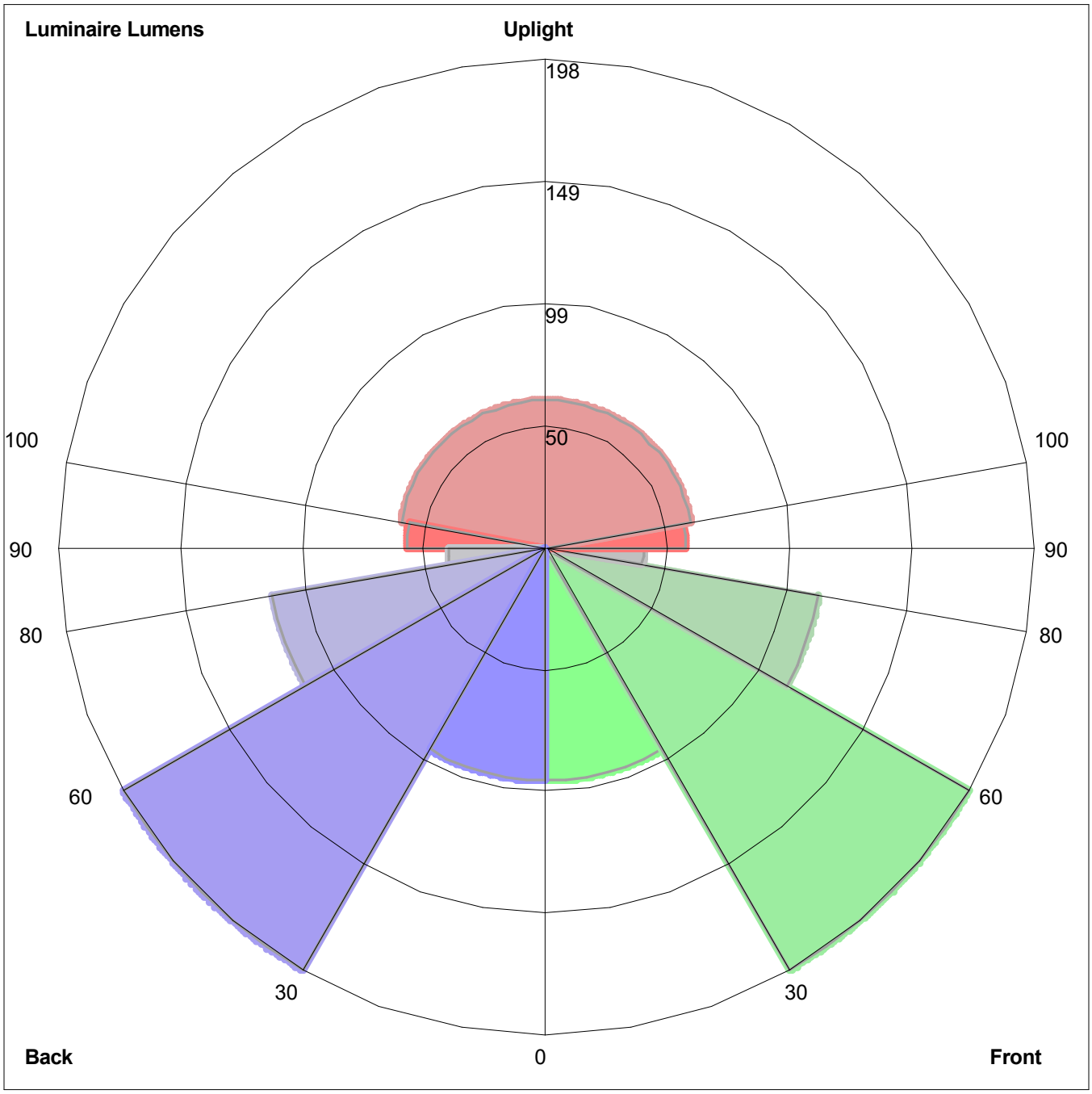


NEMA 5-15 plug (120V only)

PLG-515

IES ROAD REPORT
PHOTOMETRIC FILENAME : CL-13LED (CUBE 120V ITL TESTED).IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Back: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Uplight: Low=56.4, High=59.7

BUG Rating : B1-U3-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Section 12

Noise Mitigation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Columbine 4-29HZ Pad - Noise Mitigation and Monitoring Plan

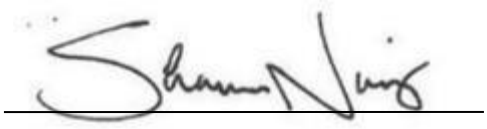
June 28, 2021

Prepared for:

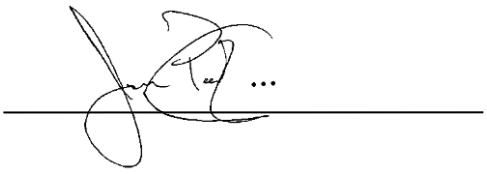
Kerr-McGee Oil & Gas Onshore, LP
1099 18th Street
Denver, CO 80202

Prepared by:

Behrens and Associates, Inc.
9536 E. I-25 Frontage Rd.
Longmont, CO 80504



Shaun Norris
Staff Acoustical Engineer



Jason Peetz
Engineering Manager

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1. Executive Summary

The following Noise Mitigation and Monitoring Plan (NMP) was prepared by Behrens and Associates Environmental Noise Control (BAENC) for the planned operations associated with the proposed Columbine 4-29HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG). Predictive noise models representing the planned operations for the site were developed and assessed against the maximum permissible noise levels described in Rule 423 of the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The following tasks were completed during development of the NMP:

- Completion of a 4-location, 72-hour ambient sound level survey at the site
- Development of a site-specific drilling noise model representing the Precision 461 rig
- Development of a site-specific completions noise model representing a Haliburton Quiet Fleet crew
- Development of a site-specific production noise model

The ambient sound level survey was conducted to document the existing ambient sound levels at the site and determine if an increase in maximum permissible sound levels was appropriate per Rule 423.d.(2).

The site-specific noise models were developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the COGCC and CDA maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, buildings, barriers, and ground cover. Both A-weighted (dBA) and C-weighted (dBC) noise levels were measured during the ambient survey and considered during the noise modeling assessment.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

Additionally, the area surrounding the site was evaluated to establish noise points of compliance per Rule 423.a.(5). The need for continuous noise monitoring was also evaluated per Rule 423.c.(1) and the CDA. Table 1-1 below summarizes the analysis and mitigation findings in the noise mitigation and monitoring plan and presents them in the form of best management practices.

Table 1-1 Site Mitigation and Best Management Practices

Task	Result of Analysis/Recommended Action
Ambient Survey	• Ambient survey conducted to document noise levels in area around the site (May 2021) • Max permissible noise levels adjusted

Drilling Noise Model	• Developed noise model representing drilling to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Optional perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad
Completions Noise Model	• Developed noise model representing completions to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad
Production Noise Model	• Developed noise model representing production to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Noise mitigation not recommended
Land Use Evaluation	• Residential building units located within 2,000 ft • Planned Unit Development zoning (Firestone)
Continuous Monitoring Evaluation	• Noise points of compliance proposed (where applicable) • Continuous monitoring proposed at 3 locations

Based on the noise modeling analysis, with the implementation of the best management practices outlined in Table 1-1, the drilling, completions, and production operations are predicted to comply with the COGCC dBA and dBC noise limits and associated requirements of the Firestone CDA.

2. Introduction

The following report provides a noise modeling assessment of the proposed activities at the Columbine 4-29HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG) in relation to the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The assessment includes a modeling analysis of the Precision 461 production rig, Halliburton Quiet Fleet completion crew and Columbine 4-29HZ production facility. The Columbine 4-29HZ pad (40.114122, -104.917317) is located approximately 0.3 miles southeast of the intersection of County Road 18 and County Road 15, Colorado as shown in Figure 2-1. The Weld County GIS portal indicates that the parcel in question, parcel # 131129200002, has been assigned a zoning designation of Planned Unit Development (PUD) by Firestone, and an image depicting the parcel as defined by Weld County is shown in Figure 2-2 below.

To assess the operational noise levels of the proposed Columbine 4-29HZ pad, file noise level data previously measured and typical of the Precision 461 production rig, and Halliburton Quiet Fleet completion crew and production facility equipment were utilized in the noise modeling. The noise models were developed using SoundPLAN 8.1 software.

PD 461 drilling operations are scheduled to occur for 75 days, Haliburton completions operations are scheduled to occur for 45 days, flowback operations are scheduled to occur for 48 days and production operations are scheduled to occur for 360 months.

The following is provided in this report:

- Documentation of ambient sound level survey results
- A review of applicable COGCC noise standards and the CDA with the Town of Firestone
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to the COGCC noise limits
- Proposed continuous noise monitoring procedure

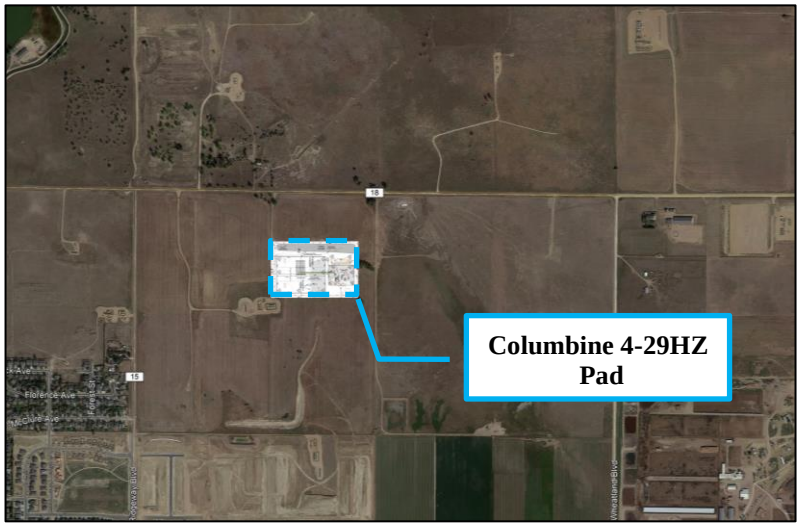


Figure 2-1 Columbine 4-29HZ Pad Location

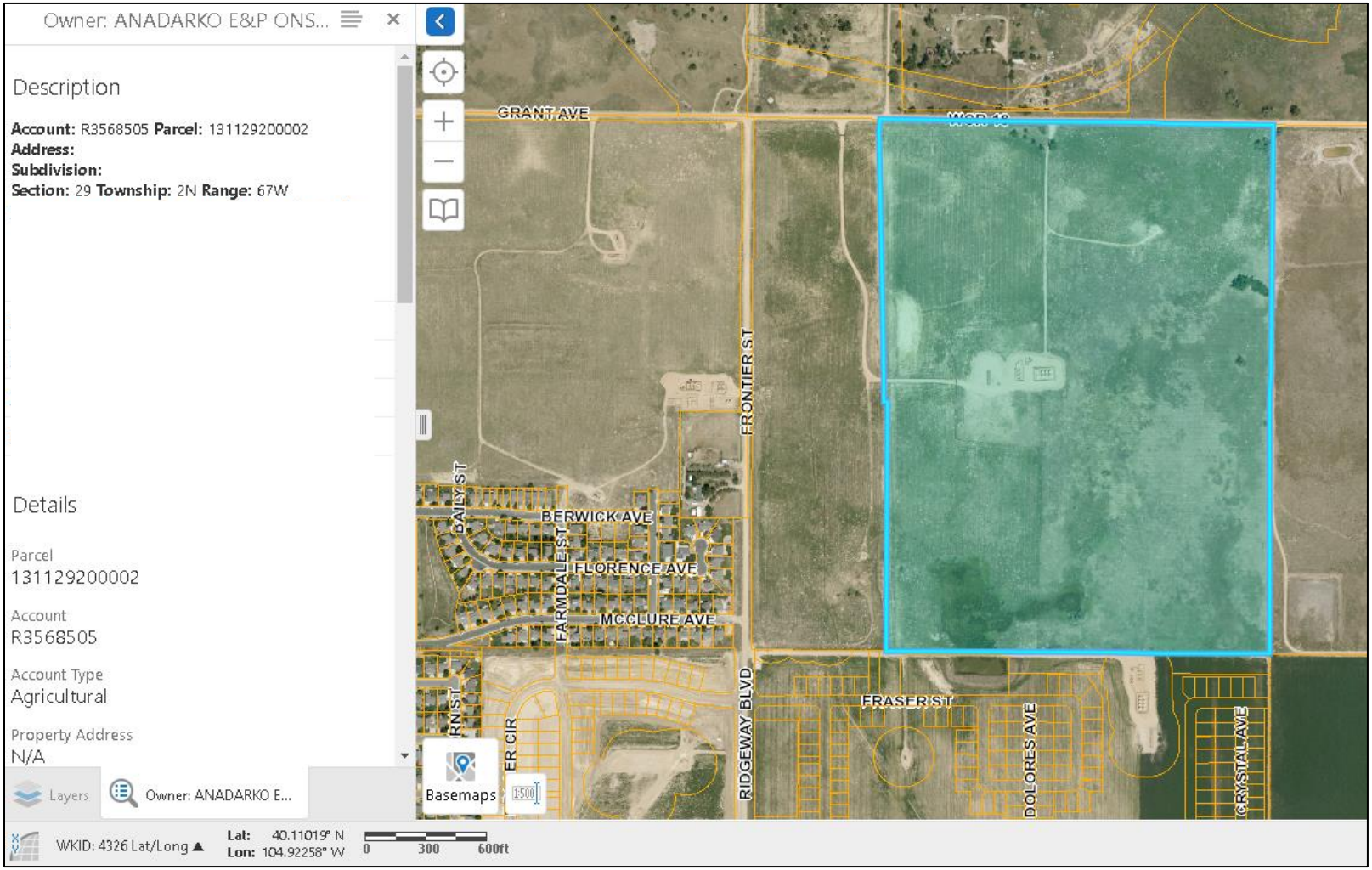


Figure 2-2 Weld County Geographic Information Systems (GIS) Parcel # 131129200002

3. Noise Fundamentals

Sound is most commonly experienced by people as pressure waves passing through air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. The rate at which sound pressure changes occur is called the frequency. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear range from approximately 20 Hz to 20,000 Hz. Toward the lower end of this range are low-pitched sounds, including those that might be described as a “rumble” or “boom”. At the higher end of the range are high-pitched sounds that might be described as a “screech” or “hiss”.

Environmental noise generally derives, in part, from a combination of distant noise sources. Such sources may include common experiences such as distant traffic, wind in trees, and distant industrial or farming activities. These distant sources create a low-level "background noise" in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment but varies slowly from hour to hour as natural forces change or as human activity follows its daily cycle.

Superimposed on this low-level, slowly varying background noise is a succession of identifiable noisy events of relatively brief duration. These events may include the passing of single-vehicles, aircraft flyovers, screeching of brakes, and other short-term events. The presence of these short-term events causes the noise level to fluctuate. Typical indoor and outdoor A-weighted sound levels are shown in Figure 3-1.

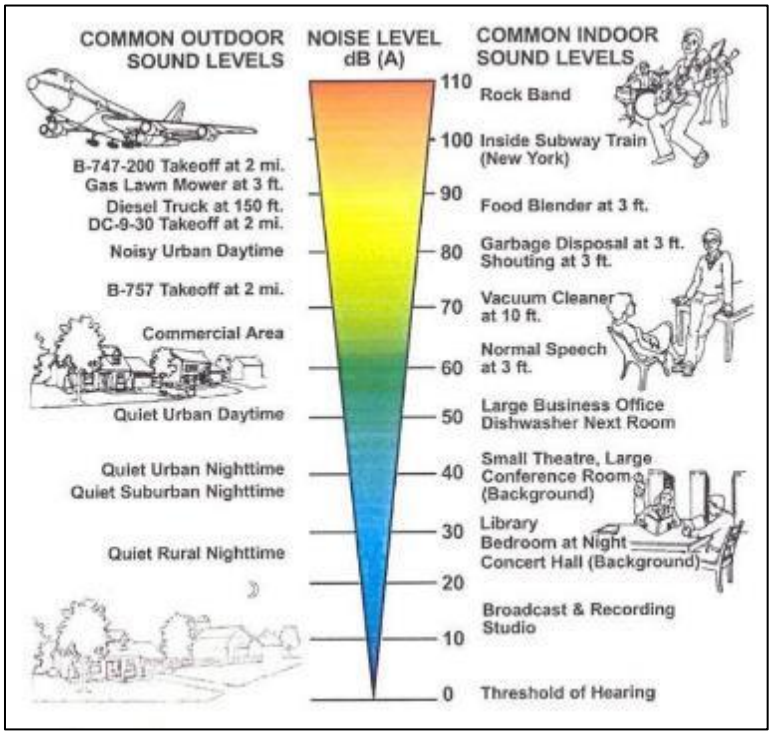


Figure 3-1 Typical Indoor and Outdoor A-Weighted Sound Levels

4. Noise Standards

The pad is located in Firestone in the state of Colorado and is subject to the regulations of the Colorado Oil and Gas Conservation Commission (COGCC) and the Cooperative Development Agreement with the Town of Firestone. The COGCC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423.

4.1 Colorado Oil and Gas Conservation Commission (COGCC)

The COGCC Code lists noise limits for oil and gas operations. "All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423." The noise limits are provided in Table 4-1.

Table 4-1 COGCC Table 423-1 – Maximum Permissible Noise Levels

Zone	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential / Rural / State Parks & State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2):

(2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:

A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 db(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(A) in the hours between 7:00 a.m. to 7:00 p.m.; and

B. In all zones maximum permissible noise levels will be 65 db(C) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(C) in the hours between 7:00 a.m. to 7:00 p.m.

To demonstrate compliance with the sound level limits, Rule 423.c.(2).A states:

> A. In response to a complaint or at the Director's request, Operators will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dbC) indicated issues. For high frequency (dbA) measurement will be at the nearest point of compliance. For equipment installed at Oil and Gas Locations subject to a Form 2A approved prior to January 15, 2021, after the Commencement of Production Operations, no single piece of equipment will exceed the maximum permissible noise levels listed in Table 423-1 as measured at a point 350 feet from the equipment generating the noise in the direction from which the complaint was received.

Defining noise points of compliance, Rule 423.a.(5) states:

> (5) For proposed Oil and Gas Locations with a Working Pad Surface within 2,000 feet of one or more Residential Building Units, at least one, and no more than six noise points of compliance where monitors will be located. Operators will identify noise points of compliance using the following criteria:
>
> A. Provide one noise point of compliance in each direction in which a Residential Building Unit is located within 2,000 feet of the proposed Working Pad Surface.
>
> B. Noise points of compliance will be located at least 350 feet from the Working Pad Surface, and no less than 25 feet from the exterior wall of the Residential Building Unit that is closest to the Working Pad Surface. If a Surface Owner or tenant refuses to provide the Operator with access to install a noise monitor, then the noise point of compliance will be located at either the next-closest Residential Building Unit or an alternative location approximately the same distance and direction from the Working Pad Surface.

With regards to adjusting maximum permissible noise levels based on measured ambient sound levels, Rule 423.d. states:

> d. Cumulative Noise. All noise measurements will be cumulative.
>
> (1) Noise measurements taken at noise points of compliance designated pursuant to Rule 423.a.(5) will take into account ambient noise, rather than solely the incremental increase of noise from the facility targeted for measurement.
>
> (2) At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m. This Rule 423.d.(2) does not allow Operators to increase noise above the maximum cumulative noise thresholds specified in Table 423-2 after the Commencement of Production Operations.

(3) After the Commencement of Production Operations, if ambient noise levels already exceed the maximum permissible noise thresholds identified in Table 423-1, under no circumstances will new Oil and Gas Operations or a significant modification to an existing Oil and Gas Operations raise cumulative ambient noise above:

Table 423-2 – Maximum Cumulative Noise Levels

LAND USE	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential /Rural/State Parks/State Wildlife Areas	65 db(A)	60 db(A)
Commercial/Agricultural	70 db(A)	65 db(A)
Light Industrial	80 db(A)	75 db(A)
Industrial	90 db(A)	85 db(A)
All Zones	75 db(C)	70 db(C)

4.2 Cooperative Development Agreement (CDA)

Kerr-McGee Oil & Gas Onshore, LP (KMOG) and the Town of Firestone have entered into a Cooperative Development Agreement (CDA) to develop and implement a Noise Mitigation and Monitoring Plan. The Operational Standards identified in the CDA state:

(2) **Noise Mitigation**. To reduce the noise effects of the Town and its residents during drilling, and provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at last 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

4.3 Summary of COGCC Maximum Permissible Noise Levels

Notwithstanding any influence or adjustments due to ambient noise or maximum cumulative noise levels of Rule 423 – Table 423-2, based on COGCC Rule 423, the allowable noise level limits applicable to the site are as follows:

Table 4-2 Unadjusted Maximum Permissible Noise Levels

Operation	Applicable Zoning	Noise Limits (dBA)	Noise Limits (dBC)
Drilling	Agricultural/Commercial	65 day / 60 night	65 day and night
Completions	Agricultural/Commercial	65 day / 60 night	65 day and night
Production	Agricultural/Commercial	60 day / 55 night	60 day and night

5. Ambient Sound Level Survey

5.1 Ambient Sound Level Survey Procedure

Four Type 1 SVANTEK SVAN 971 sound level meters were utilized to conduct an ambient sound level survey adjacent to the Columbine 4-29HZ pad. The sound level meters conform to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meters were calibrated prior to deployment. The sound level monitoring period began on Friday, April 30, 2021 with the meters programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, May 3, 2021. The locations of the sound level meters and weather station used to conduct the ambient sound level survey can be seen in Figure 5-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

Per COGCC Rule 423.c.(2), the measurements were conducted at an approximate height of 5 feet. When calculating the ambient average sound levels shown in Table 5-1 and Table 5-2, the weather data collected during the survey was used to exclude periods from the calculation when winds exceeded 5 mph. The graphed ambient survey results show the measurement data before periods of wind above 5 mph were removed.

5.2 Ambient Sound Level Survey Results

The measured A-weighted and C-weighted hourly average Leq for each monitoring location can be seen in Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5, respectively. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1 and 2 are shown in Table 5-1 below. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 3 and 4 are shown in Table 5-2 below.

Table 5-1 Ambient Sound Level Survey Results for Monitoring Locations 1 & 2

Day	Location 1				Location 2			
	Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels		Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	52	72	47	61	53	66	47	59
2	52	70	46	65	51	66	45	62
3	53	65	51	63	52	66	48	61
4	54	62	-	-	54	62	-	-
Overall L_{eq}	52	70	48	63	52	66	47	61

Note: Day 1 Daytime is an L_{eq} from 12pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 1pm.

Table 5-2 Ambient Sound Level Survey Results for Monitoring Locations 3 & 4

Day	Location 3				Location 4			
	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	59	67	52	62	50	74	42	67
2	57	78	57	82	56	73	53	75
3	60	86	58	84	57	73	46	73
4	59	74	-	-	62	75	-	-
Overall Leq	59	81	55	80	56	74	50	72

Note: Day 1 Daytime is an L_{eq} from 12pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 1pm.

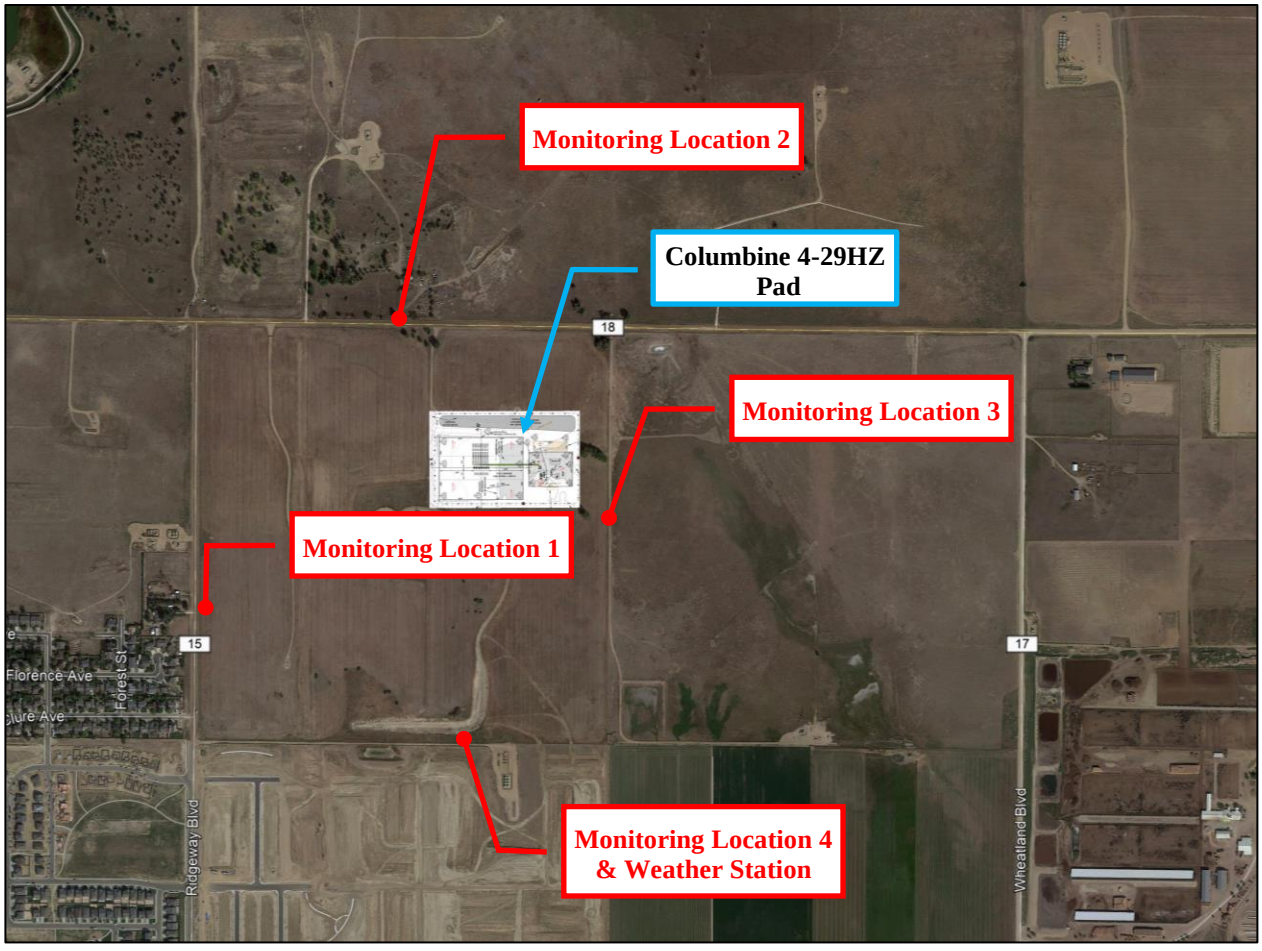


Figure 5-1 Ambient Monitoring Locations

5.3 Maximum Adjusted Noise Levels

The measured ambient sound levels already exceed the maximum permissible noise thresholds identified in COGCC Table 423-1 at multiple locations. Based on COGCC Rule 423.d.(2), for drilling and completions operations, the operational noise levels at the site will be limited to the measured ambient noise level plus 5 dBC during nighttime and 7 dBC during daytime. The following table presents the adjusted allowable noise levels for the site.

Table 5-3 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Drilling and Completions (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 3 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	81/80 dBC	88/85 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	74/72 dBC	81/77 dBC

Table 5-4 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	70/63 dBC	75/68 dBC
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	66/61 dBC	73/66 dBC
Location 3 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 3)	81/80 dBC *	75/70 dBC *
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	74/72 dBC	75/70 dBC

Note: Maximum adjusted production cumulative noise levels capped at 75/70 day/night dBC
* Maximum adjusted cumulative noise levels at location 3 are below the measured ambient noise levels.

The drilling, completions, and production operations are planned to occur 24 hours a day, as such, the stricter nighttime allowable level will be utilized in the noise modeling analysis.

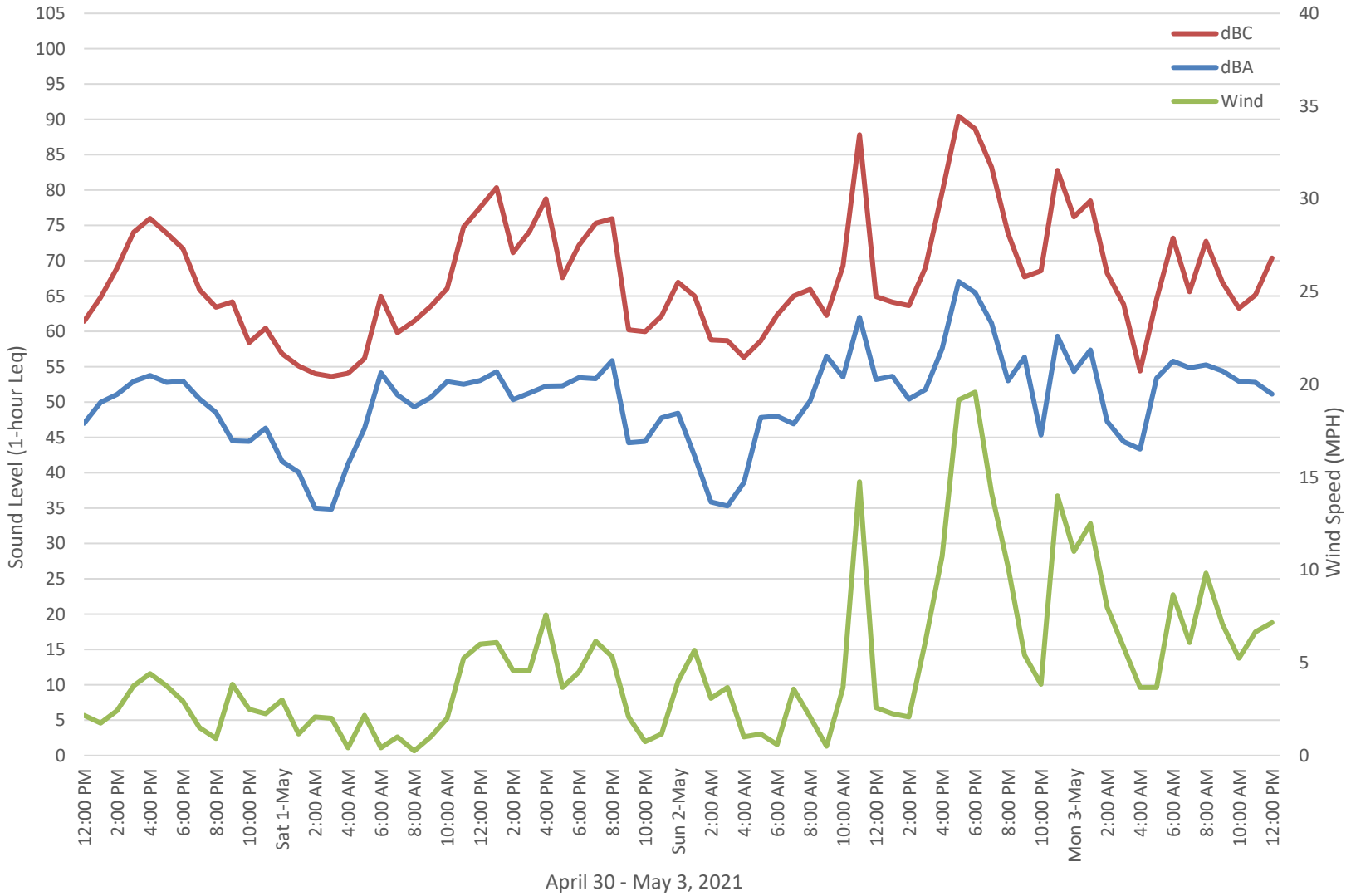


Figure 5-2 Ambient Sound Level Data for Measurement Location 1

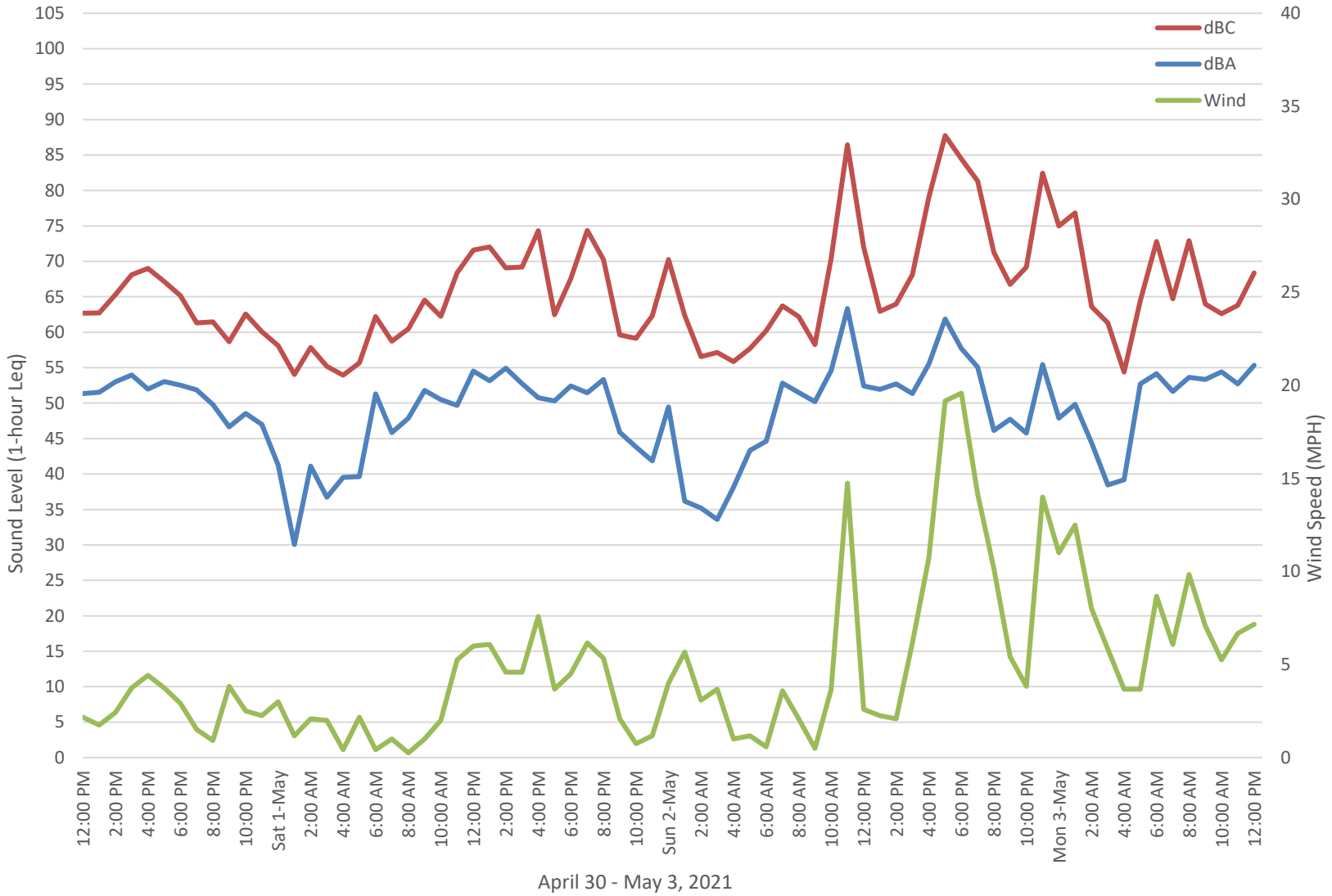


Figure 5-3 Ambient Sound Level Data for Measurement Location 2

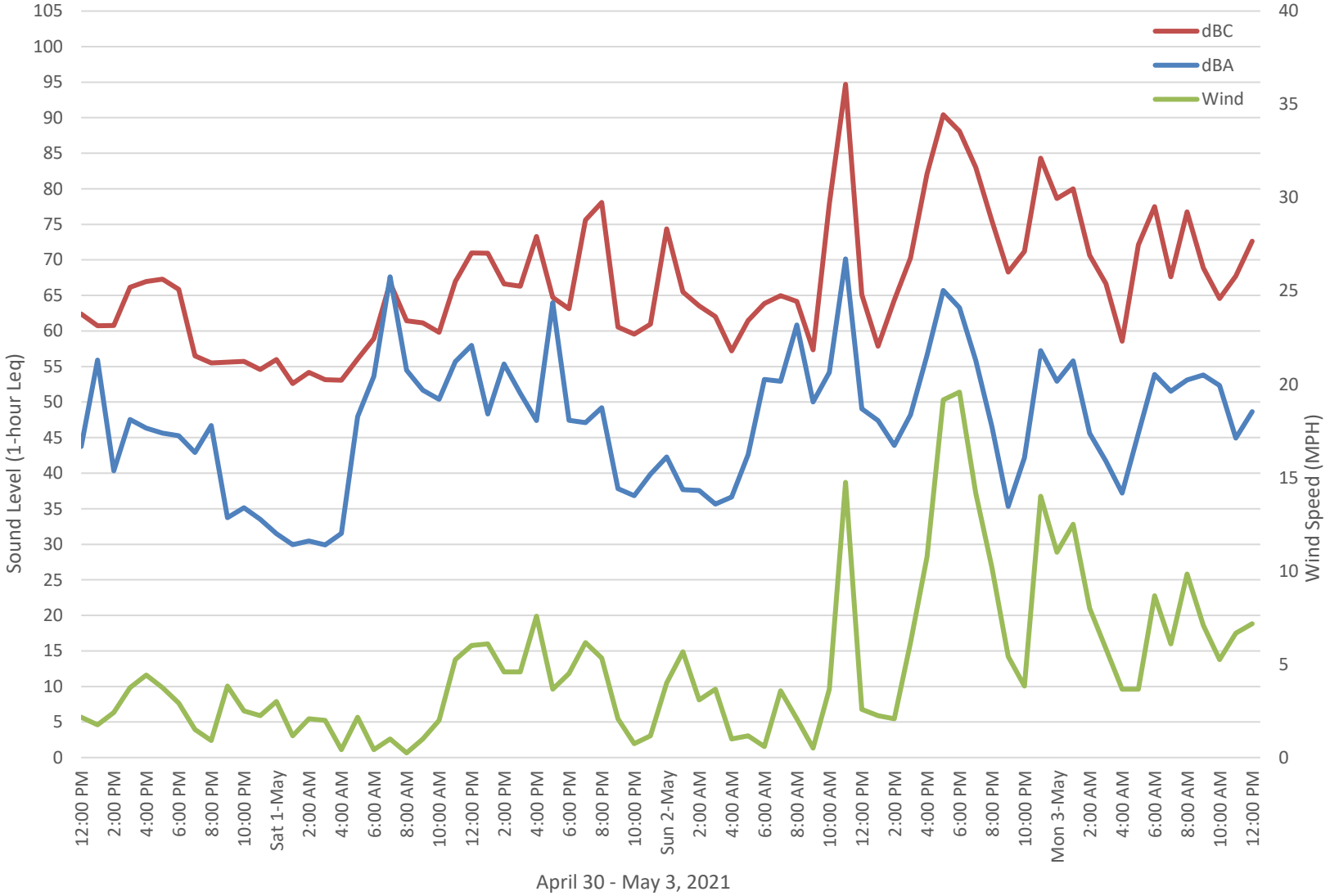


Figure 5-4 Ambient Sound Level Data for Measurement Location 3

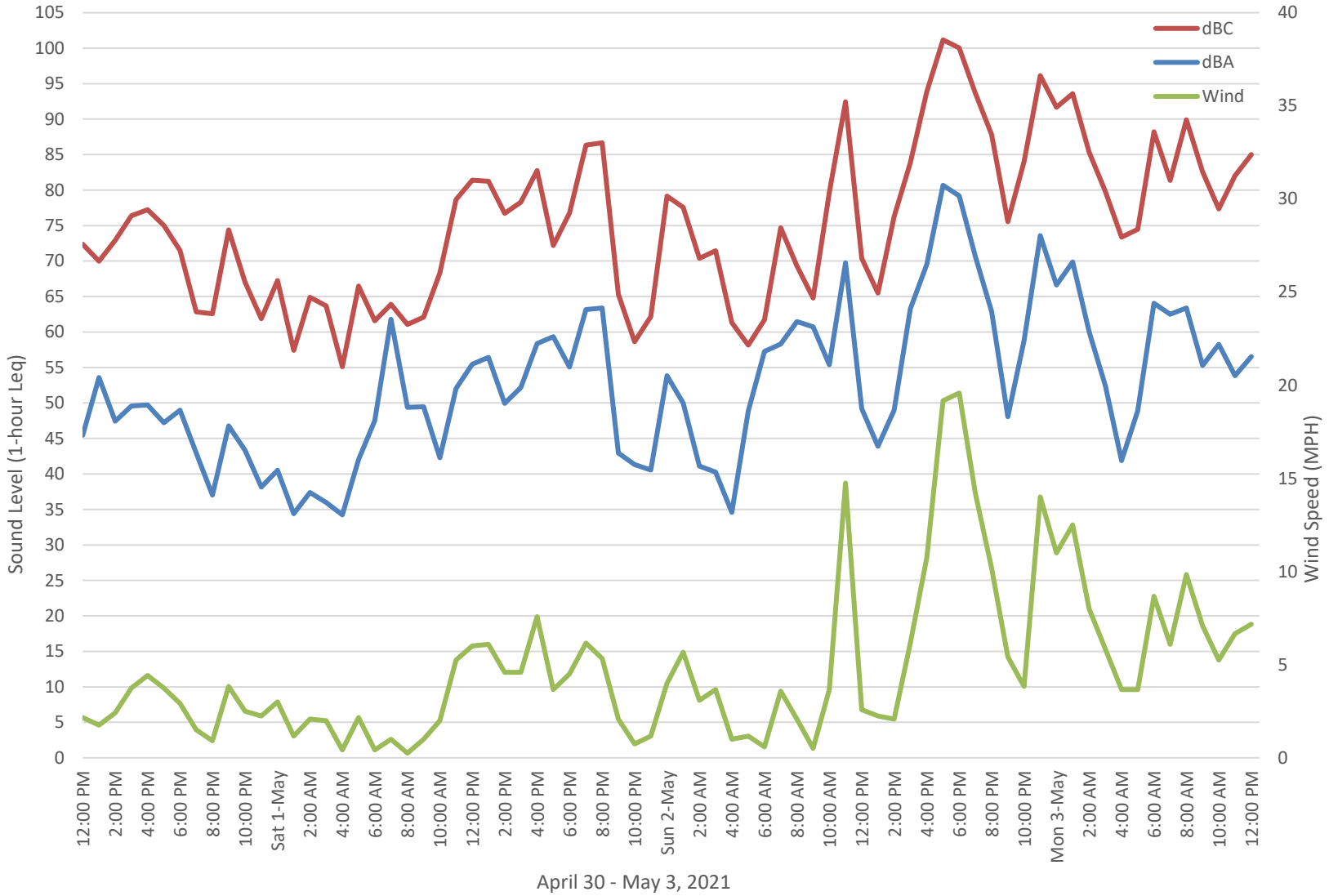


Figure 5-5 Ambient Sound Level Data for Measurement Location 4

6. Columbine 4-29HZ Pad Noise Modeling

6.1 Noise Modeling Methodology

The noise modeling was completed with use of three-dimensional computer noise modeling software. All models in this report were developed with SoundPLAN 8.1 software using the ISO 9613-2 standard. Noise levels are predicted based on the locations, noise levels and frequency spectra of the noise sources, and the geometry and reflective properties of the local terrain, buildings and barriers. To ensure a conservative assessment and compliance with ISO 9613-2 standards, light to moderate winds are assumed to be blowing from the source to receptor. The predicted noise levels represent only the contribution of the drilling, completions and production facility equipment operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Sound level data utilized in the surface drilling model was based on file data of the Precision 461 rig collected by BAENC. The V door faces west with the backyard equipment positioned to the south. Rig placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

Sound level data utilized in the completions model was based on file data of the Halliburton Quiet Fleet completions crew collected by BAENC. The model consists of 12 completions trucks positioned west of the well heads. Completions equipment placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

6.2 Noise Sensitive Receptors

The noise sensitive receptors utilized in the drilling and completions modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the drill pad surface. Receptor points used in the modeling can represent multiple closely located RBU's. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 6-1 shows the dBA and dBC noise sensitive receptor locations.

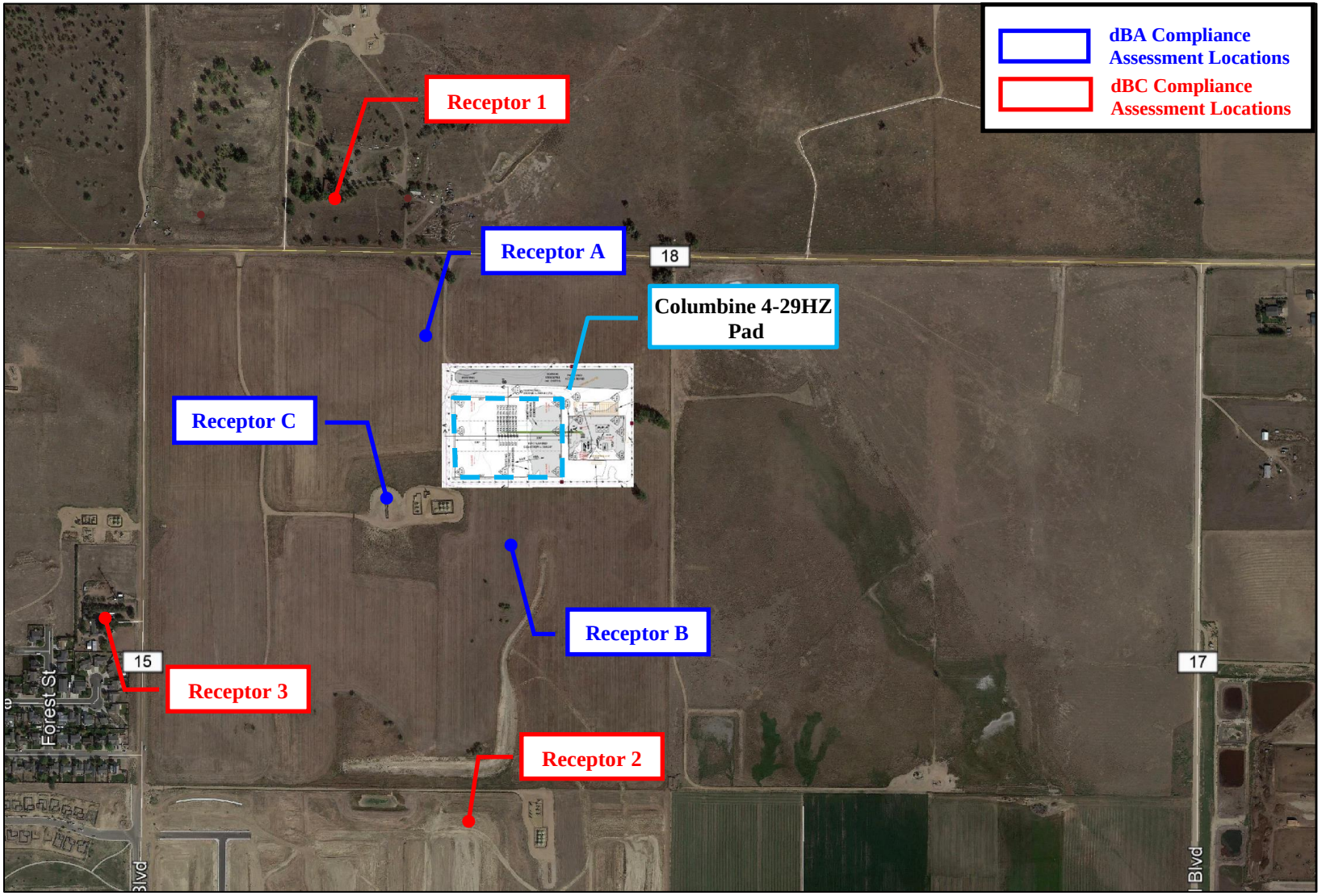


Figure 6-1 Noise Sensitive Receptor Locations

6.3 Unmitigated Drilling and Completions Noise Modeling Results

The unmitigated modeling is based off of current drilling and completions plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated drilling noise modeling are presented in Table 6-1 and Table 6-2. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-2 and Figure 6-3 shows the Unmitigated PD 461 Noise Contour Map in dBA and dBC respectively. Figure 6-4 and Figure 6-5 shows the Unmitigated Halliburton Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

Table 6-1 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location A	350 Feet Northwest	55	63
Location B	350 Feet South	57	63
Location C	350 Feet Southwest	58	61
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**	**65 Day / 60 Night**

Table 6-2 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location 1	7247 County Road 18	60	63
Location 2	South of Columbine 4-29HZ Pad	60	64
Location 3	7639 County Road 15	58	61
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted and C-weighted noise level limits. However, a mitigated modeling scenario has been included for drilling operations to show the noise reduction in the surrounding environment.

The results of the unmitigated noise modeling indicate that the completions operations will comply with the COGCC C-weighted noise level limits. However, the results of the unmitigated noise modeling indicate that the completions operations will exceed the COGCC A-weighted noise level limits. Therefore, mitigation will be recommended for completions.

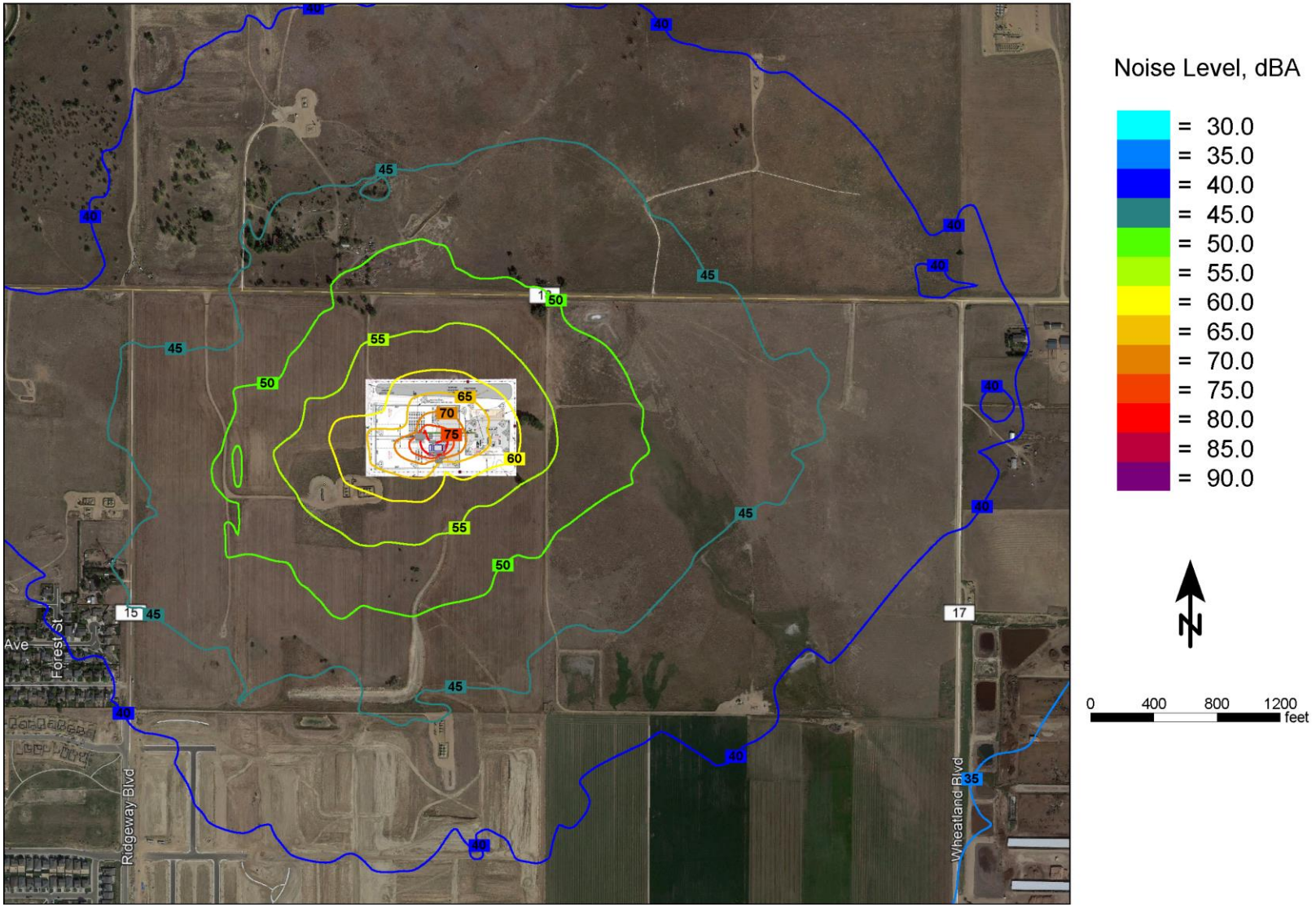


Figure 6-2 PD 461 Unmitigated Noise Contour Map (dBA)



Figure 6-3 PD 461 Unmitigated Noise Contour Map (dBC)

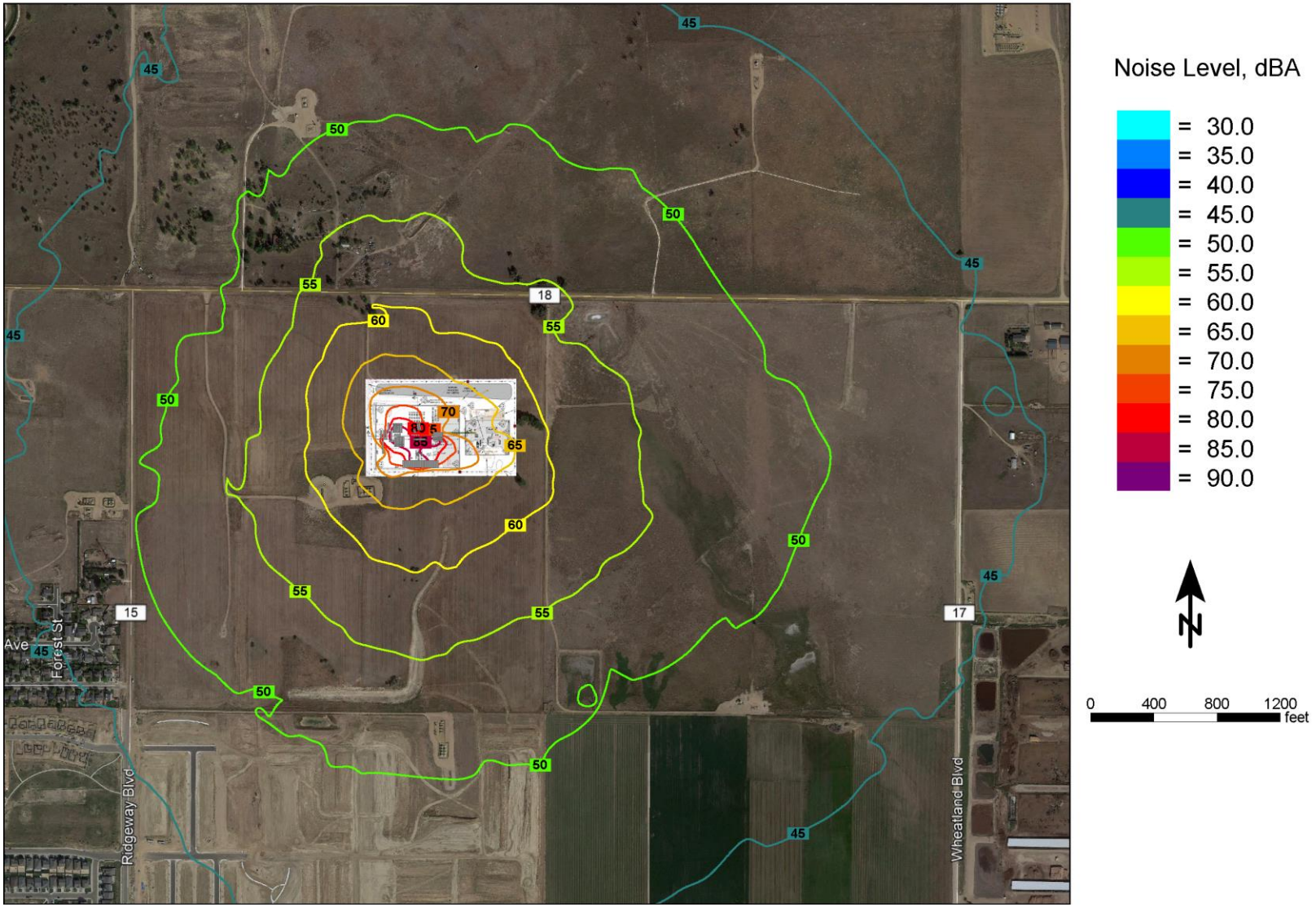


Figure 6-4 Halliburton Unmitigated Noise Contour Map (dBA)

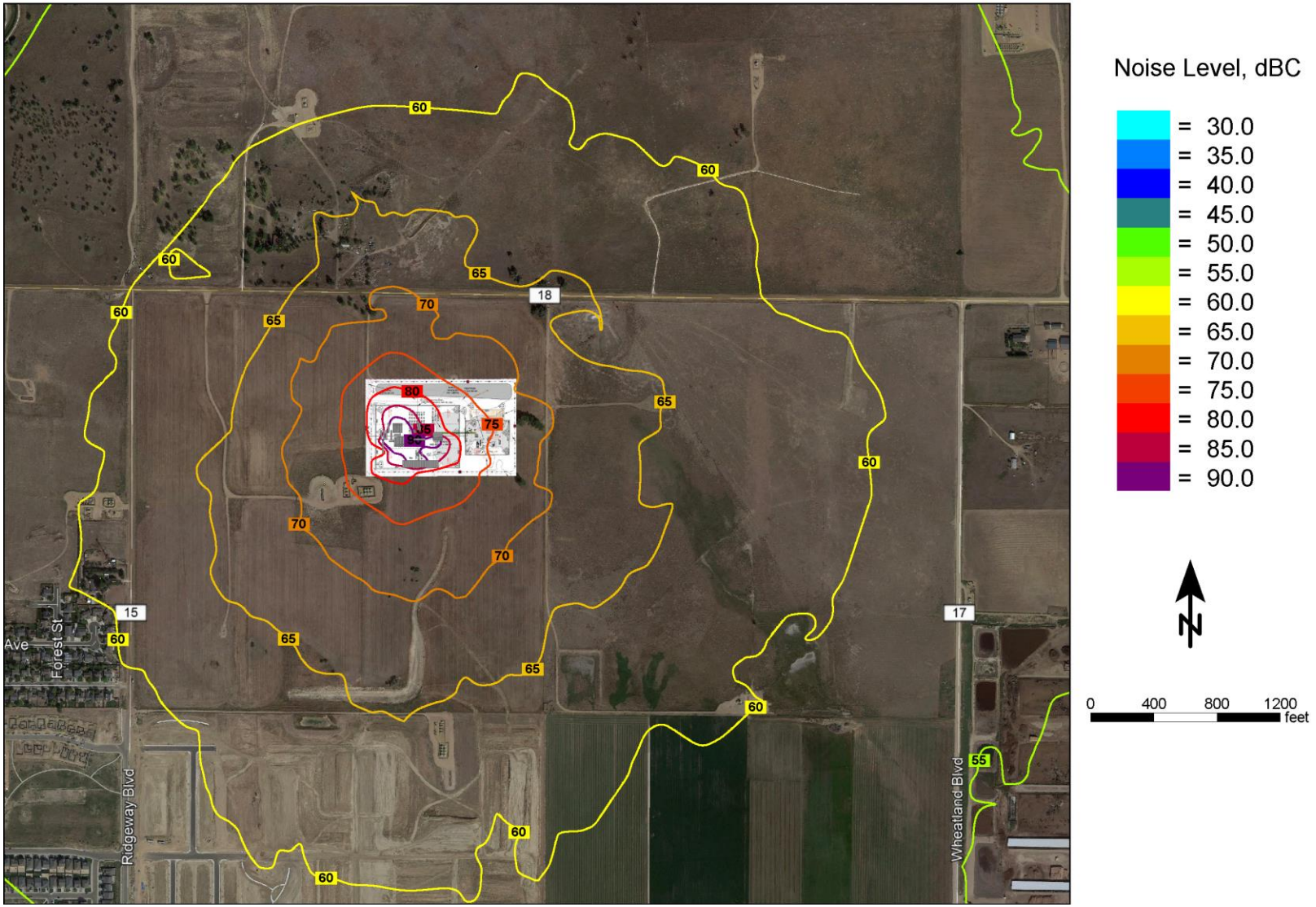


Figure 6-5 Halliburton Unmitigated Noise Contour Map (dBC)

6.4 Drilling Mitigated Modeling Results

Noise mitigation for drilling operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 840 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the south, west, and north perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-6.

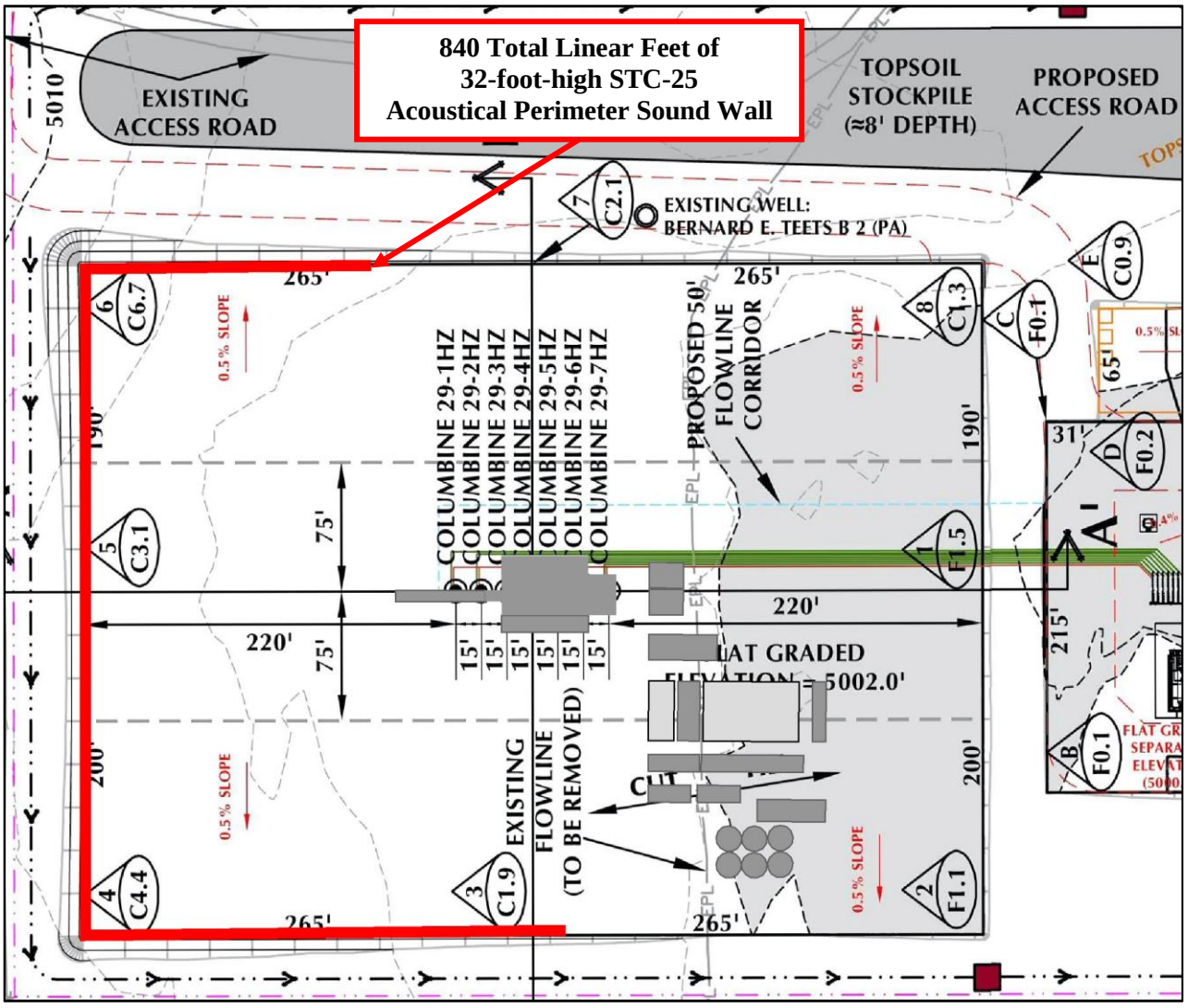


Figure 6-6 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-6. The results of the mitigated noise modeling are presented in Table 6-3 and Table 6-4. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the drilling operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-3 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461
Location A	350 Feet Northwest	51
Location B	350 Feet South	57
Location C	350 Feet Southwest	51
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-4 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461
Location 1	7247 County Road 18	59
Location 2	South of Columbine 4-29HZ Pad	61
Location 3	7639 County Road 15	57
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed drilling operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-7 shows the Mitigated PD 461 Noise Contour Map in the A-weighted scale and Figure 6-8 shows the Mitigated PD461 Noise Contour Map in the C-weighted scale.

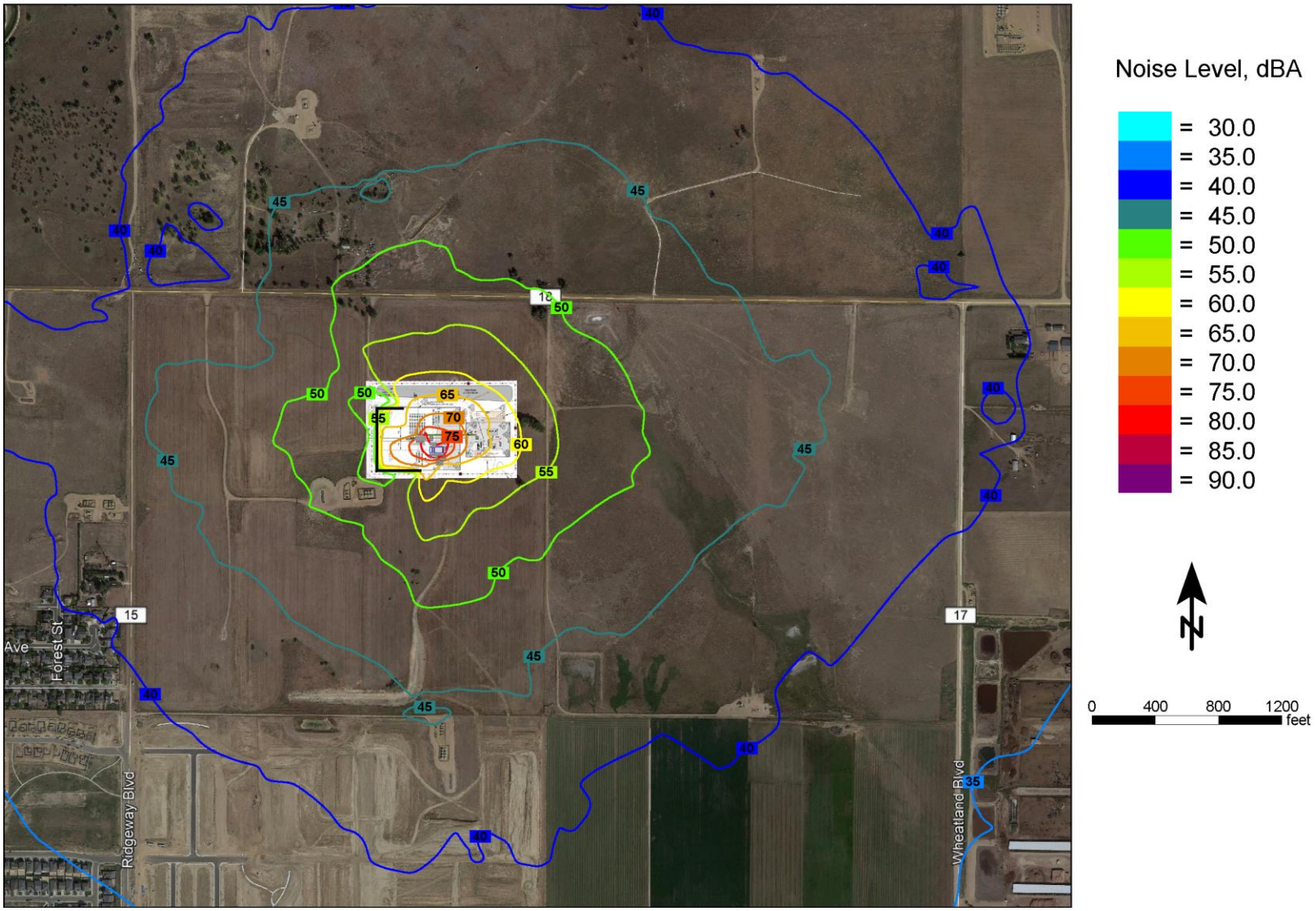


Figure 6-7 Mitigated PD 461 Noise Contour Map (dBA)



Figure 6-8 Mitigated PD 461 Noise Contour Map (dBC)

6.5 Completions Mitigated Modeling Results

Noise mitigation for completions operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 840 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-9.

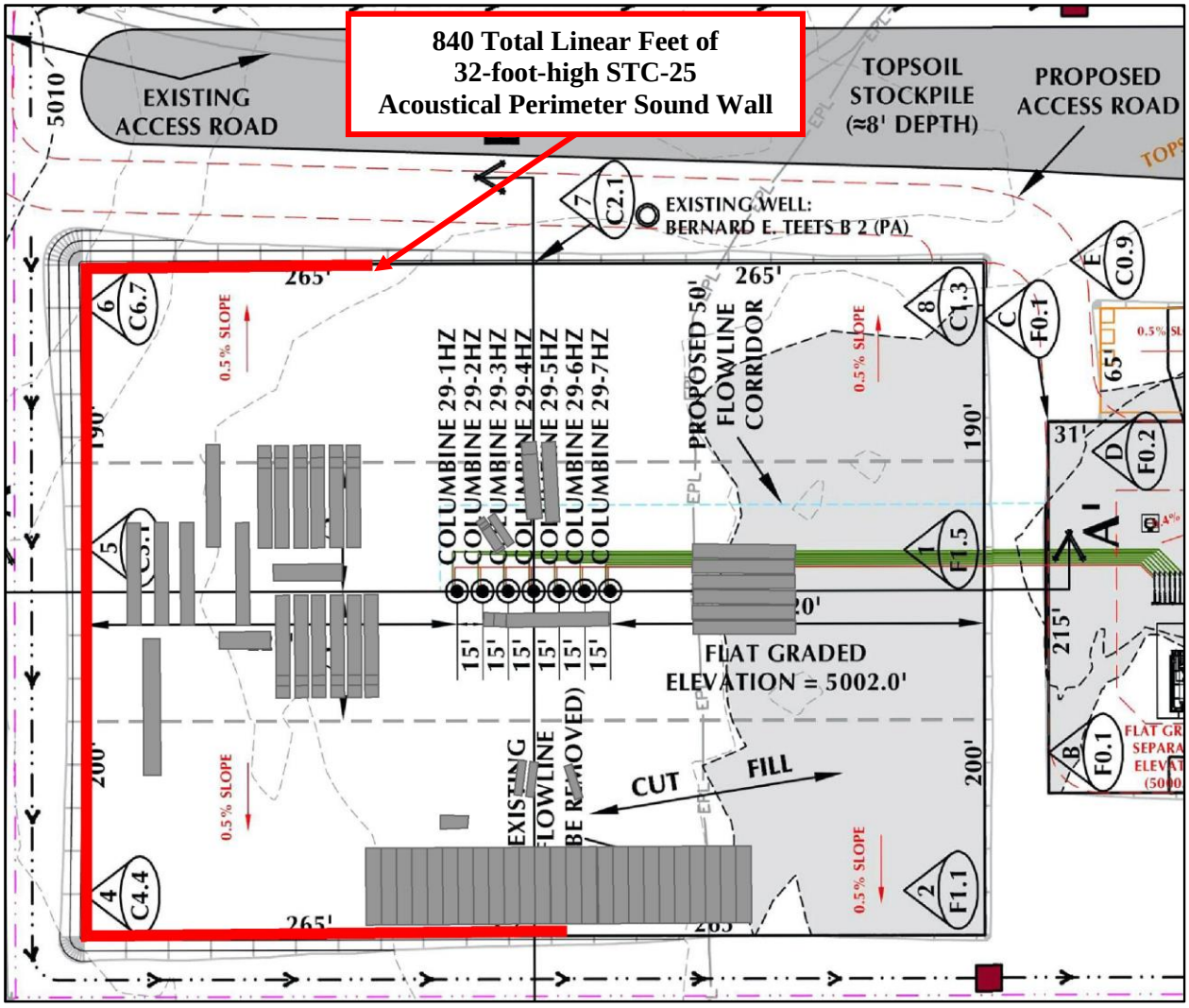


Figure 6-9 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-9. The results of the mitigated noise modeling are presented in Table 6-5 and Table 6-6. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the completions operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-5 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Halliburton Quiet Fleet
Location A	350 Feet Northwest	56
Location B	350 Feet South	58
Location C	350 Feet Southwest	56
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-6 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Halliburton Quiet Fleet
Location 1	7247 County Road 18	62
Location 2	South of Columbine 4-29HZ Pad	62
Location 3	7639 County Road 15	60
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 2 is subject to adjusted allowable limits of 81 day/ 77 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed completions operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-10 shows the Mitigated Halliburton Noise Contour Map in the A-weighted scale Figure 6-11 shows the Mitigated Halliburton Noise Contour Map in the C-weighted scale.

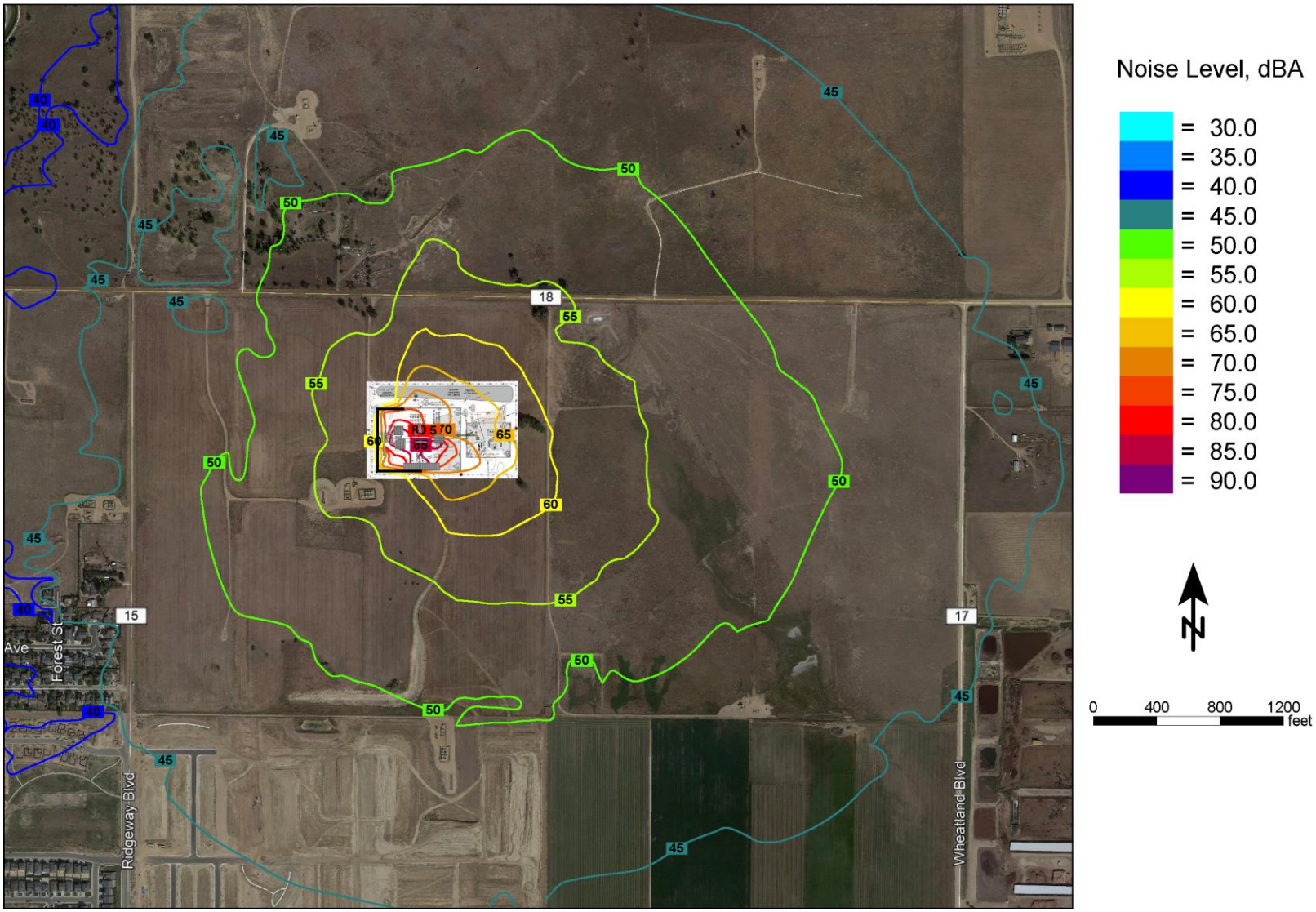


Figure 6-10 Mitigated Halliburton Noise Contour Map (dBA)



Figure 6-11 Mitigated Halliburton Noise Contour Map (dBC)

7. Columbine 4-29HZ Pad Production Facility Noise Modeling

7.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off of current production site plans and does not include sound walls or other third-party acoustical mitigation measures. The production facility operational noise model was created to predict the constant, steady-state noise levels at the Columbine 4-29HZ pad and adjacent surroundings. The production facility was modeled assuming all listed equipment was operating simultaneously to represent the loudest operating scenario. Sound level data utilized in the production model was based on file data previously collected by BAENC at a KMOG production facility with similar equipment. The production facility equipment list and equipment orientation were supplied by KMOG and can be seen Figure 7-1. The predicted modeling results are dependent on equipment and orientation as indicated.

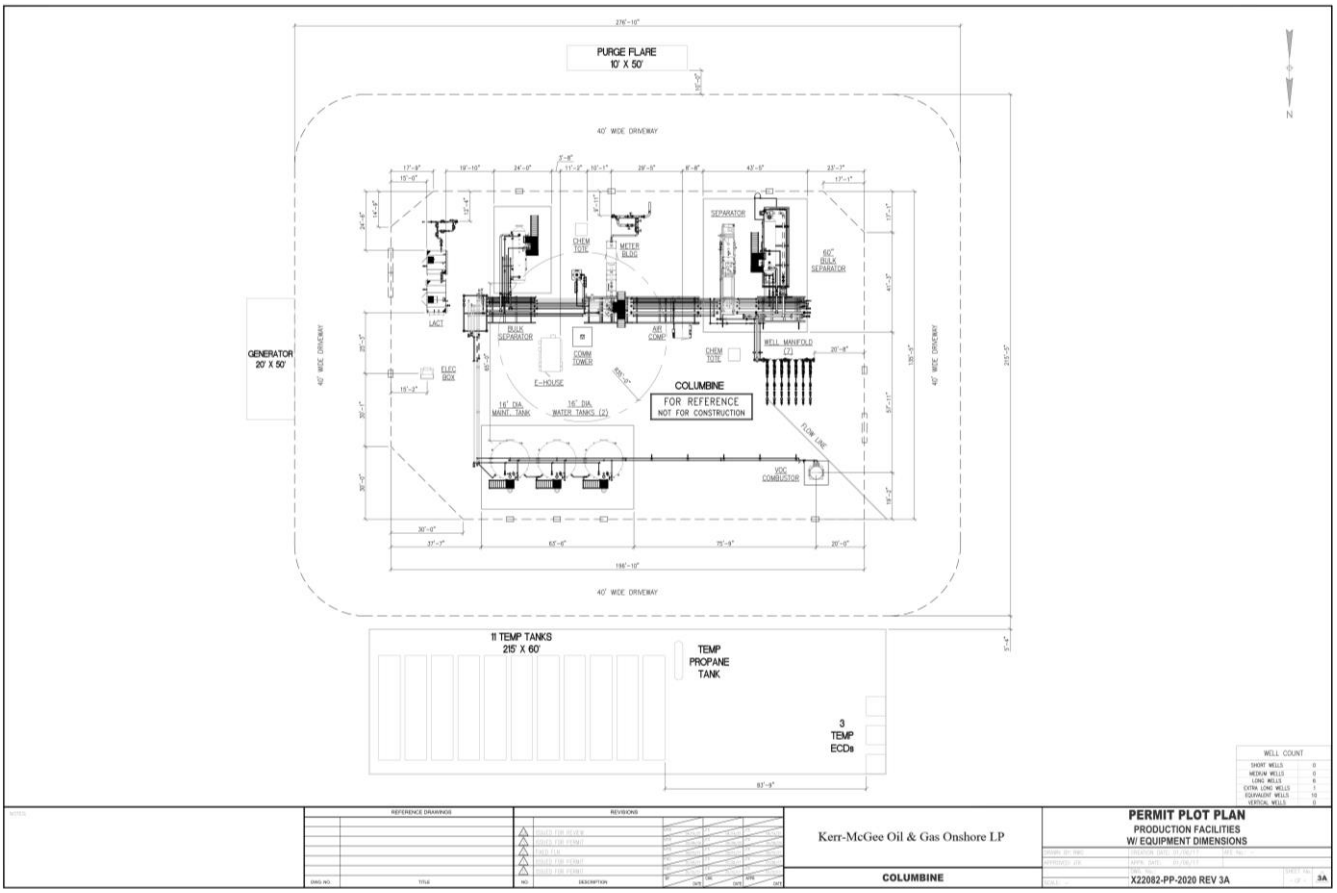


Figure 7-1 Modeled Columbine 4-29HZ Production Facility Layout (DWG # X22082-PP-2020 REV 3A, 01/06/2017)

The equipment list and layout were scrutinized to determine the major noise emitting sources planned for the site. These major noise sources, listed in Table 7-1, were included in the production modeling. Other auxiliary/temporary equipment or smaller equipment not anticipated to generate significant noise was not included in the production model.

The noise sensitive receptors utilized in the production modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the production pad surface. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 7-2 shows the dBA and dBC noise sensitive receptor locations.

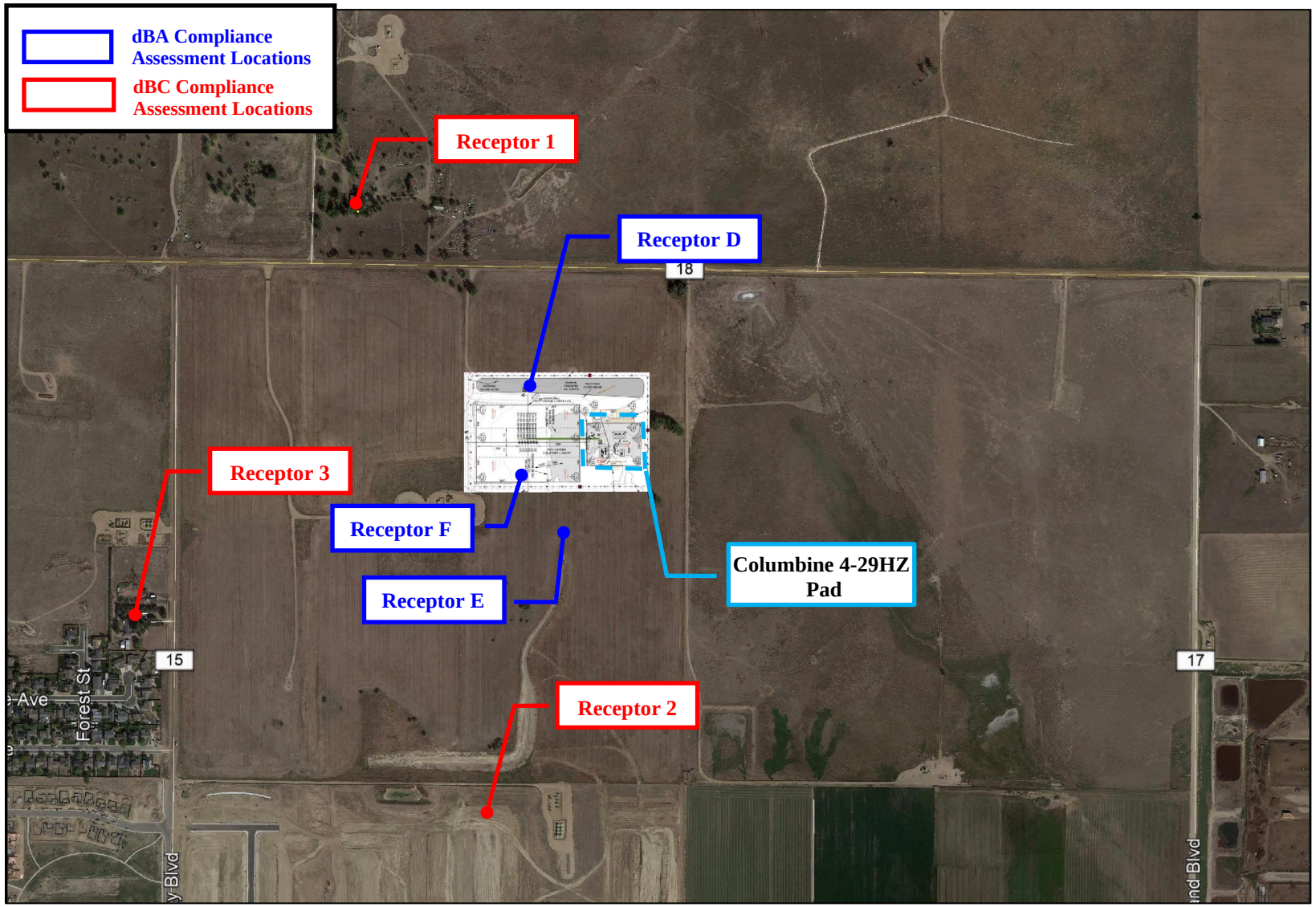


Figure 7-2 Noise Sensitive Receptor Locations

The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 7-1.

Table 7-1 Production Facility Major Noise Emitting Equipment Included in Model

Equipment	Quantity
Air Compressor	1
Electrical Panel/Box	2
LACT Building	1
Fisher 4-inch ET Series Whisper I Trim Globe Control Valve	1
Separator	1
Bulk Separator	2
Three Phase Separator Burner	3
VOC Combustor	1

The results of the unmitigated production facility noise modeling are presented in Table 7-2 and Table 7-3. The locations in the tables correspond to the locations identified in Figure 7-2. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 7-3 and Figure 7-4 shows the Unmitigated Production Facility Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

The results of the unmitigated noise modeling indicate that the production operations will comply with the COGCC A-weighted and C-weighted noise level limits.

Table 7-2 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Production Facility
Location D	350 Feet North	38
Location E	350 Feet Northeast	40
Location F	350 Feet East	42
COGCC Noise Limit	**350 ft. from the working pad surface**	**60 Day / 55 Night**

Table 7-3 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Production Facility
Location 1*	7247 County Road 18	36
Location 2**	South of Columbine 4-29HZ Pad	38
Location 3***	7639 County Road 15	35
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**60**

*Location 1 is subject to adjusted allowable limits of 73 day/ 66 night dBC for production
**Location 2 is subject to adjusted allowable limits of 75 day/ 70 night dBC for production
*** Location 3 is subject to adjusted allowable limits of 75 day/ 68 night dBC for production

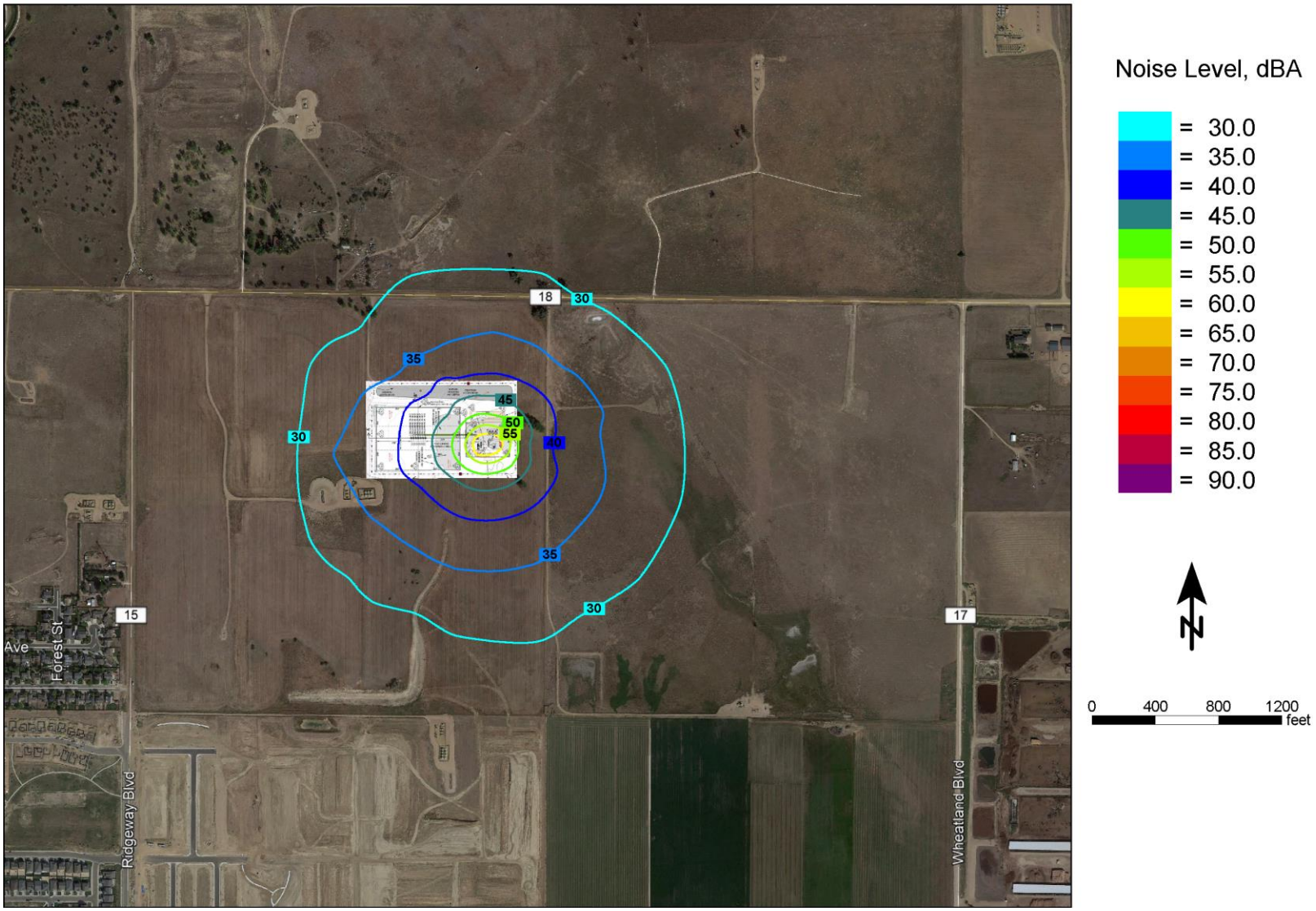


Figure 7-3 Production Facility Unmitigated Noise Contour Map (dBA)

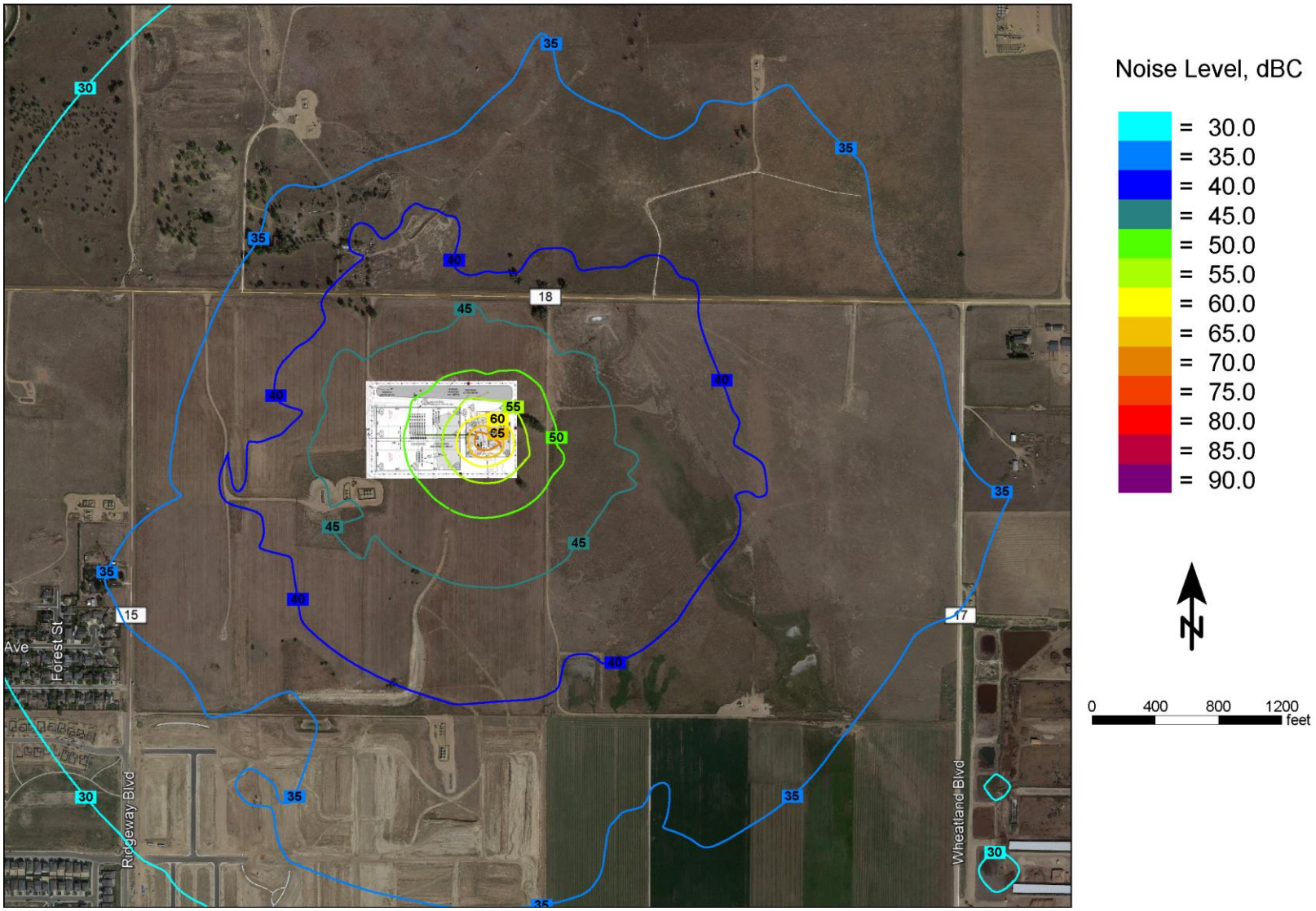


Figure 7-4 Production Facility Unmitigated Noise Contour Map (dBC)

8. Noise Points of Compliance and Continuous Noise Monitoring

8.1 Continuous Monitoring Procedure

The following continuous monitoring procedures are proposed to ensure compliance with the monitoring procedures outlined in COGCC Rule 423.c.(2) and CDA with the Town of Firestone. To demonstrate compliance with COGCC noise regulations, pre-production activities and ongoing operations lasting longer than 24 consecutive hours will require continuous monitoring measurements from each noise point of compliance designated. According to Section 423. Noise (c), to demonstrate compliance with Tables 423-1 and 423-2 Operators will measure sound levels according to the following standards:

> (1) During pre-production activities and ongoing operations lasting longer than 24 consecutive hours such as drilling, completion, recompletion, Stimulation, and Well maintenance, in areas zoned residential or within 2,000 feet of a Building Unit, Operators will take continuous sound measurements from each noise point of compliance designated pursuant to Rule 423.a.(5).

Figure 8-1 shows an aerial view of the proposed pad with an approximate 2,000 ft. radius from the working pad surface. There are Residential Building Units (RBU) with in the 2,000 ft. radius. Proposed noise points of compliance are detailed in Table 8-1. The noise points of compliance were selected to represent RBU's in multiple directions from the pad. Three noise points of compliance are proposed. There are no RBU's within 2,000 feet to the east of the pad, so a fourth noise point of compliance was not proposed.

Residential Building Units (RBU) may be exempt to continuous monitoring due to rule 423.b.(5) if an agreement is made between the surface owner and operator and subsequently accepted by the COGCC.

Table 8-1 Proposed Continuous Monitoring Locations

Location	Description	Notes
Noise Point of Compliance 1	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 2	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 3	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted • RBU's around Noise Point of Compliance 3 are not constructed at the time of this report. This point of compliance may be except if RBU's are not completed by the time drilling and completions occur

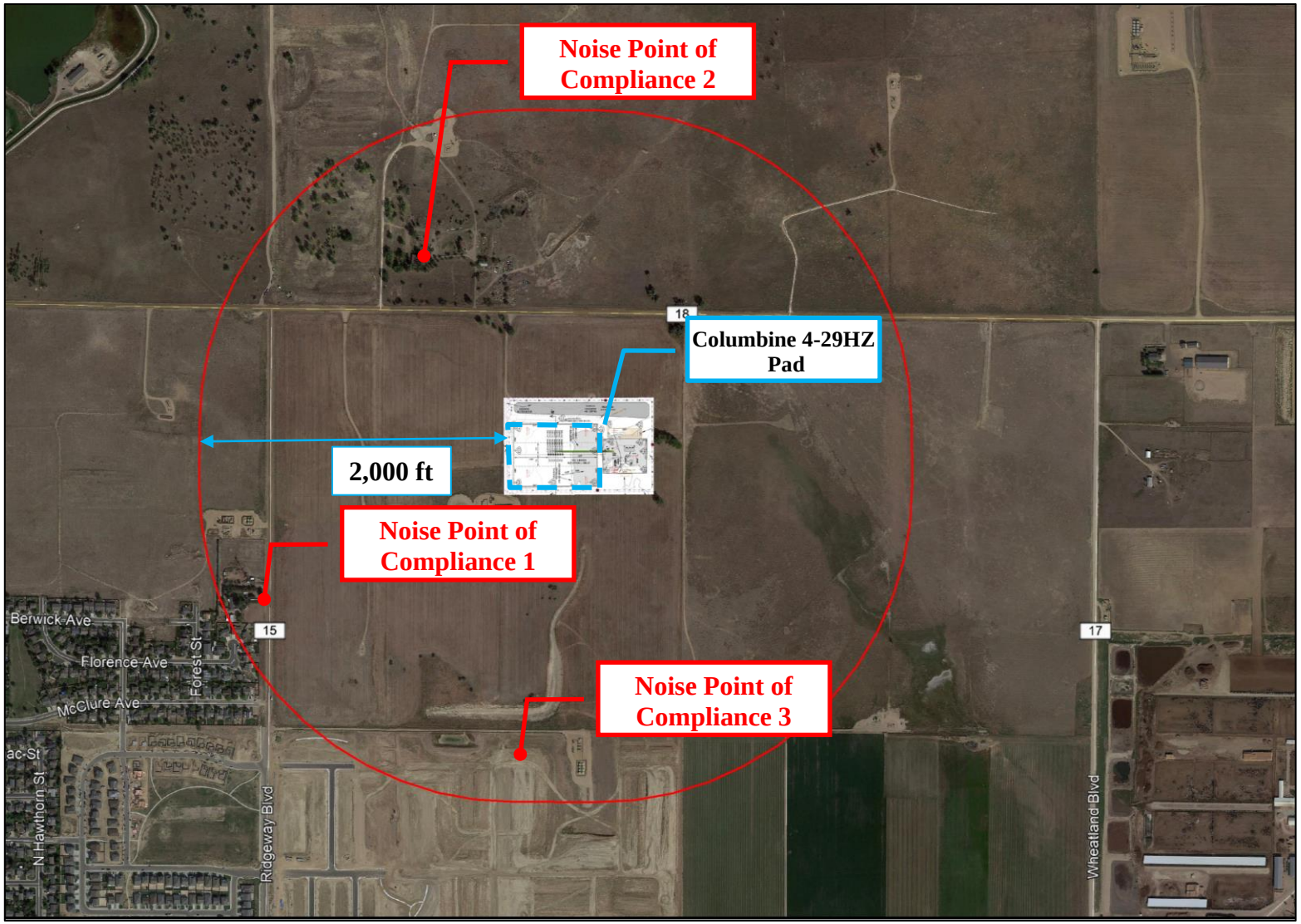


Figure 8-1 Proposed Continuous Monitoring Locations

Appendix A - Ambient Data

Table A-8-2 Recorded Hourly Average Ambient Sound Levels Location 1 (1-hr dBA L_{eq})

Location 1 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	47	61	1:00 AM	42	65
1:00 PM	50	65	2:00 AM	36	59
2:00 PM	51	69	3:00 AM	35	59
3:00 PM	53	74	4:00 AM	39	56
4:00 PM	54	76	5:00 AM	48	59
5:00 PM	53	74	6:00 AM	48	62
6:00 PM	53	72	7:00 AM	47	65
7:00 PM	50	66	8:00 AM	50	66
8:00 PM	49	63	9:00 AM	57	62
9:00 PM	45	64	10:00 AM	54	69
10:00 PM	44	58	11:00 AM	62	88
11:00 PM	46	60	12:00 PM	53	65
Sat 1-May	42	57	1:00 PM	54	64
1:00 AM	40	55	2:00 PM	50	64
2:00 AM	35	54	3:00 PM	52	69
3:00 AM	35	54	4:00 PM	58	80
4:00 AM	41	54	5:00 PM	67	90
5:00 AM	46	56	6:00 PM	66	89
6:00 AM	54	65	7:00 PM	61	83
7:00 AM	51	60	8:00 PM	53	74
8:00 AM	49	61	9:00 PM	56	68
9:00 AM	51	64	10:00 PM	45	69
10:00 AM	53	66	11:00 PM	59	83
11:00 AM	53	75	Mon 3-May	54	76
12:00 PM	53	78	1:00 AM	57	78
1:00 PM	54	80	2:00 AM	47	68
2:00 PM	50	71	3:00 AM	44	64
3:00 PM	51	74	4:00 AM	43	54
4:00 PM	52	79	5:00 AM	53	65
5:00 PM	52	68	6:00 AM	56	73
6:00 PM	53	72	7:00 AM	55	66
7:00 PM	53	75	8:00 AM	55	73
8:00 PM	56	76	9:00 AM	54	67
9:00 PM	44	60	10:00 AM	53	63
10:00 PM	44	60	11:00 AM	53	65
11:00 PM	48	62	12:00 PM	51	70
Sun 2-May	48	67			

Table A-8-3 Recorded Hourly Average Ambient Sound Levels Location 2 (1-hr dBA L_{eq})

Location 2 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	51	63	1:00 AM	36	62
1:00 PM	52	63	2:00 AM	35	57
2:00 PM	53	65	3:00 AM	34	57
3:00 PM	54	68	4:00 AM	38	56
4:00 PM	52	69	5:00 AM	43	58
5:00 PM	53	67	6:00 AM	45	60
6:00 PM	53	65	7:00 AM	53	64
7:00 PM	52	61	8:00 AM	51	62
8:00 PM	50	61	9:00 AM	50	58
9:00 PM	47	59	10:00 AM	55	70
10:00 PM	49	63	11:00 AM	63	86
11:00 PM	47	60	12:00 PM	52	72
Sat 1-May	41	58	1:00 PM	52	63
1:00 AM	30	54	2:00 PM	53	64
2:00 AM	41	58	3:00 PM	51	68
3:00 AM	37	55	4:00 PM	56	79
4:00 AM	40	54	5:00 PM	62	88
5:00 AM	40	56	6:00 PM	58	84
6:00 AM	51	62	7:00 PM	55	81
7:00 AM	46	59	8:00 PM	46	71
8:00 AM	48	60	9:00 PM	48	67
9:00 AM	52	65	10:00 PM	46	69
10:00 AM	50	62	11:00 PM	55	82
11:00 AM	50	68	Mon 3-May	48	75
12:00 PM	55	72	1:00 AM	50	77
1:00 PM	53	72	2:00 AM	44	64
2:00 PM	55	69	3:00 AM	38	61
3:00 PM	53	69	4:00 AM	39	54
4:00 PM	51	74	5:00 AM	53	64
5:00 PM	50	62	6:00 AM	54	73
6:00 PM	52	68	7:00 AM	52	65
7:00 PM	51	74	8:00 AM	54	73
8:00 PM	53	70	9:00 AM	53	64
9:00 PM	46	60	10:00 AM	54	63
10:00 PM	44	59	11:00 AM	53	64
11:00 PM	42	62	12:00 PM	55	68
Sun 2-May	49	70			

Table A-8-4 Recorded Hourly Average Ambient Sound Levels Location 3 (1-hr dBA L_{eq})

Location 3 - Hourly Leq					
Time	**dBA**	**dBC**	**Time**	**dBA**	**dBC**
12:00 PM	68	71	1:00 AM	53	82
1:00 PM	56	68	2:00 AM	54	81
2:00 PM	56	65	3:00 AM	61	88
3:00 PM	59	68	4:00 AM	61	87
4:00 PM	60	69	5:00 AM	55	79
5:00 PM	55	66	6:00 AM	55	65
6:00 PM	55	63	7:00 AM	56	69
7:00 PM	58	64	8:00 AM	55	65
8:00 PM	51	62	9:00 AM	55	62
9:00 PM	58	63	10:00 AM	62	88
10:00 PM	52	61	11:00 AM	65	92
11:00 PM	49	60	12:00 PM	58	85
Sat 1-May	38	58	1:00 PM	56	79
1:00 AM	47	59	2:00 PM	54	76
2:00 AM	37	59	3:00 PM	64	88
3:00 AM	44	61	4:00 PM	68	93
4:00 AM	40	59	5:00 PM	67	93
5:00 AM	50	63	6:00 PM	60	88
6:00 AM	58	65	7:00 PM	56	84
7:00 AM	55	63	8:00 PM	59	86
8:00 AM	59	67	9:00 PM	56	84
9:00 AM	57	64	10:00 PM	62	88
10:00 AM	55	62	11:00 PM	58	85
11:00 AM	57	65	Mon 3-May	59	86
12:00 PM	58	66	1:00 AM	56	83
1:00 PM	55	66	2:00 AM	49	77
2:00 PM	52	62	3:00 AM	53	81
3:00 PM	54	66	4:00 AM	45	73
4:00 PM	55	69	5:00 AM	54	80
5:00 PM	57	72	6:00 AM	57	73
6:00 PM	61	86	7:00 AM	58	75
7:00 PM	59	85	8:00 AM	57	73
8:00 PM	52	66	9:00 AM	58	72
9:00 PM	51	77	10:00 AM	58	73
10:00 PM	50	67	11:00 AM	59	73
11:00 PM	48	72	12:00 PM	57	73
Sun 2-May	48	73			

Table A-8-5 Recorded Hourly Average Ambient Sound Levels Location 4 (1-hr dBA L_{eq})

Location 4 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
12:00 PM	45	72	1:00 AM	50	78
1:00 PM	54	70	2:00 AM	41	70
2:00 PM	47	73	3:00 AM	40	71
3:00 PM	50	76	4:00 AM	35	61
4:00 PM	50	77	5:00 AM	49	58
5:00 PM	47	75	6:00 AM	57	62
6:00 PM	49	71	7:00 AM	58	75
7:00 PM	43	63	8:00 AM	61	69
8:00 PM	37	63	9:00 AM	61	65
9:00 PM	47	74	10:00 AM	55	80
10:00 PM	43	67	11:00 AM	70	92
11:00 PM	38	62	12:00 PM	49	70
Sat 1-May	41	67	1:00 PM	44	65
1:00 AM	34	57	2:00 PM	49	76
2:00 AM	37	65	3:00 PM	63	84
3:00 AM	36	64	4:00 PM	70	94
4:00 AM	34	55	5:00 PM	81	101
5:00 AM	42	66	6:00 PM	79	100
6:00 AM	48	62	7:00 PM	71	94
7:00 AM	62	64	8:00 PM	63	88
8:00 AM	49	61	9:00 PM	48	76
9:00 AM	49	62	10:00 PM	59	84
10:00 AM	42	68	11:00 PM	74	96
11:00 AM	52	79	Mon 3-May	67	92
12:00 PM	55	81	1:00 AM	70	94
1:00 PM	56	81	2:00 AM	60	85
2:00 PM	50	77	3:00 AM	52	80
3:00 PM	52	78	4:00 AM	42	73
4:00 PM	58	83	5:00 AM	49	74
5:00 PM	59	72	6:00 AM	64	88
6:00 PM	55	77	7:00 AM	63	81
7:00 PM	63	86	8:00 AM	63	90
8:00 PM	63	87	9:00 AM	55	83
9:00 PM	43	65	10:00 AM	58	77
10:00 PM	41	59	11:00 AM	54	82
11:00 PM	41	62	12:00 PM	57	85
Sun 2-May	54	79			

Section 13

Traffic Management Plan and Baseline Road Study

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Shayelyn Marshall
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, CO 80202

Arcadis U.S., Inc.
11001 W. 120th Avenue
Suite 200
Broomfield
Colorado 80021
Tel 303 544 0043
Fax 720 887 6051
www.arcadis.com

Subject:
Traffic Management Plan for Columbine Pad

ENVIRONMENT

Date:
December 16, 2021

Contact:
Steve Rice

Phone:
303.710.7537

Email:
Steve.Rice@arcadis.com

Our ref:
30057047

Dear Ms. Marshall:

Kerr McGee Oil and Gas Onshore LP (Kerr McGee) has plans to develop mineral leases within the town limits of Firestone, Colorado and has contracted Arcadis U.S., Inc. (Arcadis) to prepare this Traffic Management Plan (TMP) to summarize the guidelines Kerr McGee will adhere to during the construction and development of Oil & Gas well facilities, and associated infrastructure. The objective of this TMP is to provide the Town of Firestone with a summary of the traffic anticipated by the development, along with supplemental information to demonstrate Kerr McGee's intent to comply with the requirements of the Town of Firestone to limit traffic impacts.

DEVELOPMENT PLAN OVERVIEW

The work will include the Columbine Pad. The Columbine Pad will include 7 wells, approximately 12.66 acres of temporary disturbance, and approximately 5 acres of final, permanent disturbance. The grading plan, which include a layout of the pad, are provided in **Attachment 1.** The proposed haul routes and truck turning movements for the Columbine Pad are presented in **Attachment 2**. The anticipated traffic associated with development of this facility has been summarized in trip generation tables included as **Attachment 3**.

MANAGEMENT OF ROAD IMPACT CONCERNS

A baseline road survey was completed for the Columbine Pad to aid in future assessment of road damage that may occur due to Kerr McGee development activities (**Attachment 4**). Results from the baseline survey indicated County Road (CR) 18 is in less than acceptable condition. The roadway shows signs of

moderate to high rutting with loose aggregate on the surface and shoulders. Loose aggregate that has accumulated in some areas of the shoulder could impede drainage. CR 19 is in good condition from a ride quality standpoint and that the roadway shows low to moderate rutting, transverse cracking, and fatigue cracking in certain areas. Portions of CR 19 were actively receiving a chip seal treatment, or roadway improvement, during the baseline study.

Once Kerr McGee's interim reclamation activities are complete, Arcadis will conduct a follow-up survey to determine if, and where, damage attributable to the added truck traffic occurred. In the event roads are damaged and warrant repair, Kerr McGee will use the baseline and post-completion survey data to determine the nature and extent of damage attributable to their traffic, and work with Firestone to determine how they prefer to handle the repairs.

MANAGEMENT OF TRAFFIC OPERATIONS

Kerr McGee understands the importance of maintaining positive relations with all community stakeholders. Kerr McGee will conduct neighborhood meetings prior to development to help address community concerns as it relates to traffic. As part of their community outreach they will also provide information on how members of the public can raise issues or complaints about traffic directly to Kerr McGee for resolution. The proposed haul route included as **Attachment 2** was selected following review of potential constraints. During route planning it was determined that there are no anticipated conflicts with weight or height restrictions, travel through school zones, or conflicts with routes that are heavily used by residential commuters.

Arcadis also modeled truck movements at each intersection and the proposed access location and has confirmed the anticipated development phase traffic can safely negotiate all the necessary right- and left-hand turning movements along this route. Some minor access point modifications at the Pad, specifically driveway widening will likely be required. Truck turning movements are included in **Attachment 2**.

Based on Arcadis' review of the proposed route, existing roadway speed limits, unobstructed sight distance, and the anticipated levels of development traffic, Arcadis does not anticipate that restrictions on when deliveries are made to the facility, or use of supplemental traffic controls (e.g., flagging, temporary signage) are warranted.

Kerr McGee does not anticipate, and Arcadis agrees, that their use of public roads to develop this facility will result in a need for an increase in roadway maintenance. Any dust associated with on-site activities and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the site to the extent practical given wind conditions. Additionally, improvements to the access roads will be made such that they are constructed of 100 linear feet of crushed stone and 100 linear feet of hard surface from the point of connection to the respective public road to help mitigate dust and mud concerns. Kerr McGee will apply water or a low magnesium chloride product to dirt roads as necessary. Kerr McGee will also inspect the access regularly and clean/remove any mud or dirt that gets tracked onto public roadways, as necessary.

Kerr McGee instructs all its contractors to adhere to all posted speed limits and traffic controls as a matter of policy. Policy compliance is reinforced through a combination of training, use and review of telematics by their carriers to monitor safe behaviors and investigate concerns, and through periodic audit and review meetings.

Sincerely,

Arcadis U.S., Inc.



Steve Rice
Project Manager

Enclosures:

Attachments

1 Grading Plans
2 Haul Routes and Truck Turning Movements
3 Estimated Trip Generation Data
4 Baseline Roadway Assessment Report

ATTACHMENT 1

Grading Plans

TEMPORARY EQUIPMENT PAD - COLUMBINE 4-29HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED PAD AREA = 0.32 ACRES
TOTAL PAD AREA = 0.33 ACRES

PAD QUANTITIES

TOTAL CUT FOR PAD = 0 C.Y.
TOTAL FILL FOR PAD = 702 C.Y.
TOPSOIL @ 14" DEPTH = 625 C.Y.
IMPORT MATERIAL = 702 C.Y.

FACILITY PAD - COLUMBINE 4-29HZ FACILITY DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

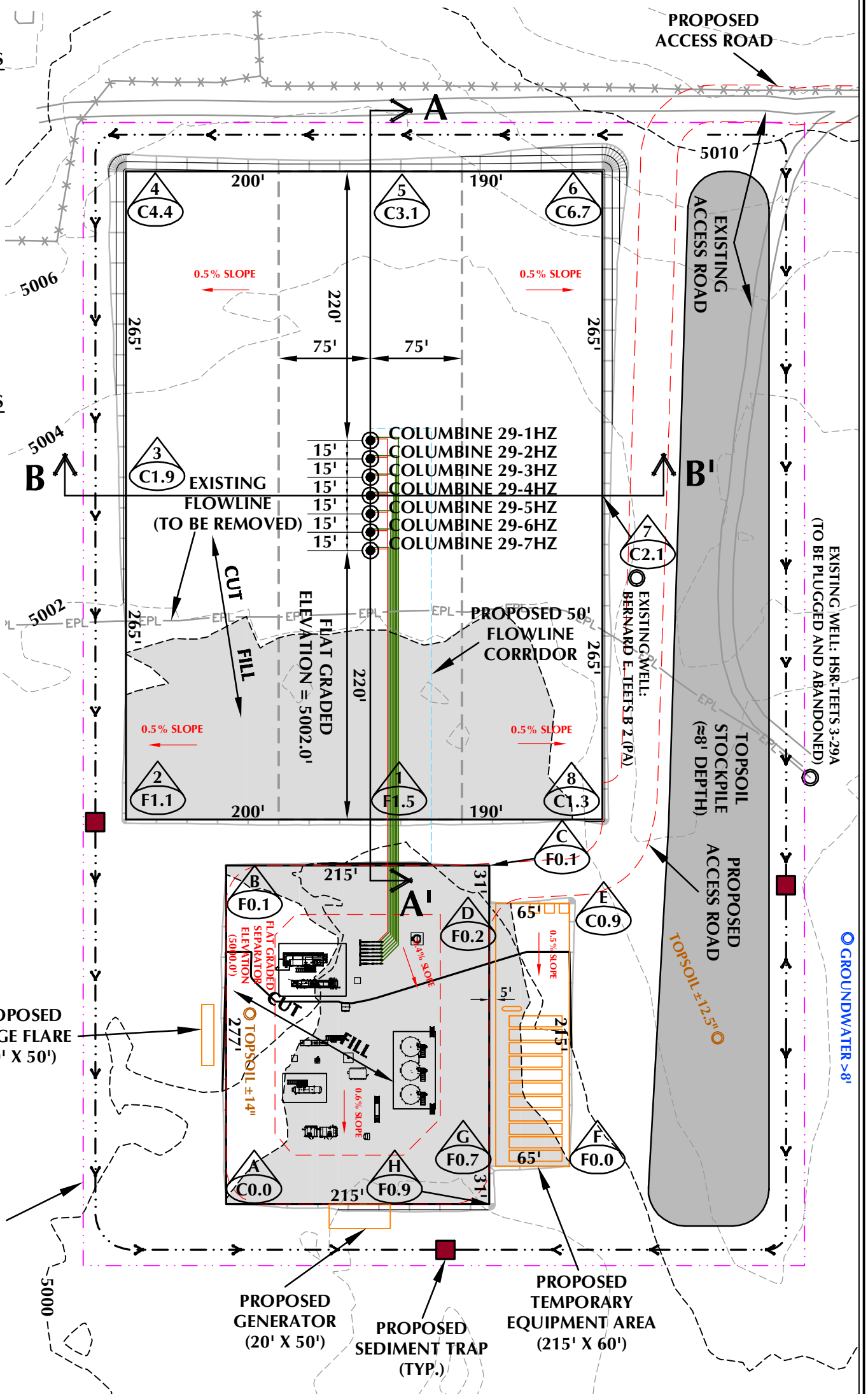
CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED FACILITY PAD AREA = 1.37 ACRES
TOTAL FACILITY PAD AREA = 1.43 ACRES

FACILITY PAD QUANTITIES

TOTAL CUT FOR FACILITY PAD = 0 C.Y.
TOTAL FILL FOR FACILITY PAD = 3,784 C.Y.
TOPSOIL @ 14" DEPTH = 2,685 C.Y.
IMPORT MATERIAL = 3,784 C.Y.

WELL NAME:	C/F
COLUMBINE 29-1HZ	C0.8
COLUMBINE 29-2HZ	C0.6
COLUMBINE 29-3HZ	C0.7
COLUMBINE 29-4HZ	C0.7
COLUMBINE 29-5HZ	C0.6
COLUMBINE 29-6HZ	C0.6
COLUMBINE 29-7HZ	C0.5

POINT NUMBER	EXISTING GRADE	FINISHED GRADE
A	4999.0	4999.0
B	5000.3	5000.4
C	5000.3	5000.4
D	5000.0	5000.2
E	5001.1	5000.2
F	4999.1	4999.1
G	4998.4	4999.1
H	4998.1	4999.0



NOTE:
FLARE IS TO BE LOCATED A MINIMUM OF 100' FROM THE NEAREST PROPOSED WELL HEAD.

NOTE:

1. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
2. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.
3. CENTER OF WELL PAD REFERENCED BELOW CORRESPONDS TO THE SURFACE LOCATION OF THE COLUMBINE 29-4HZ WELL.
4. FLAT GRADED AREA TO BE RECLAIMED DURING INTERIM RECLAMATION.

WELL PAD - COLUMBINE 4-29HZ DESIGN SUMMARY

WELL PAD QUANTITIES AND DESIGN PARAMETERS

EXISTING GRADE @ CENTER OF WELL PAD = 5002.7'
FINISHED GRADE ELEVATION = 5002.0'
CUT SLOPES = 3:1
FILL SLOPES = 3:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED WELL PAD SURFACE AREA = 4.75 ACRES
TOTAL WELL PAD AREA = 5.08 ACRES
OPERATIONAL DISTURBANCE AREA = 12.66 ACRES

WELL PAD QUANTITIES

TOTAL CUT FOR WELL PAD = 4,769 C.Y.
TOTAL FILL FOR WELL PAD = 4,769 C.Y.
TOPSOIL @ 14" DEPTH = 9,570 C.Y.
IMPORT MATERIAL = 0 C.Y.

DRAFT

FACILITY REVISION: COLUMBINE-PP-2020 REV 3A

WELL PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH AND/OR BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

WELL PAD - COLUMBINE 4-29HZ

WELL PAD - GRADING PLAN
COLUMBINE 29-1HZ,
COLUMBINE 29-2HZ, COLUMBINE 29-3HZ,
COLUMBINE 29-4HZ, COLUMBINE 29-5HZ,
COLUMBINE 29-6HZ & COLUMBINE 29-7HZ
LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

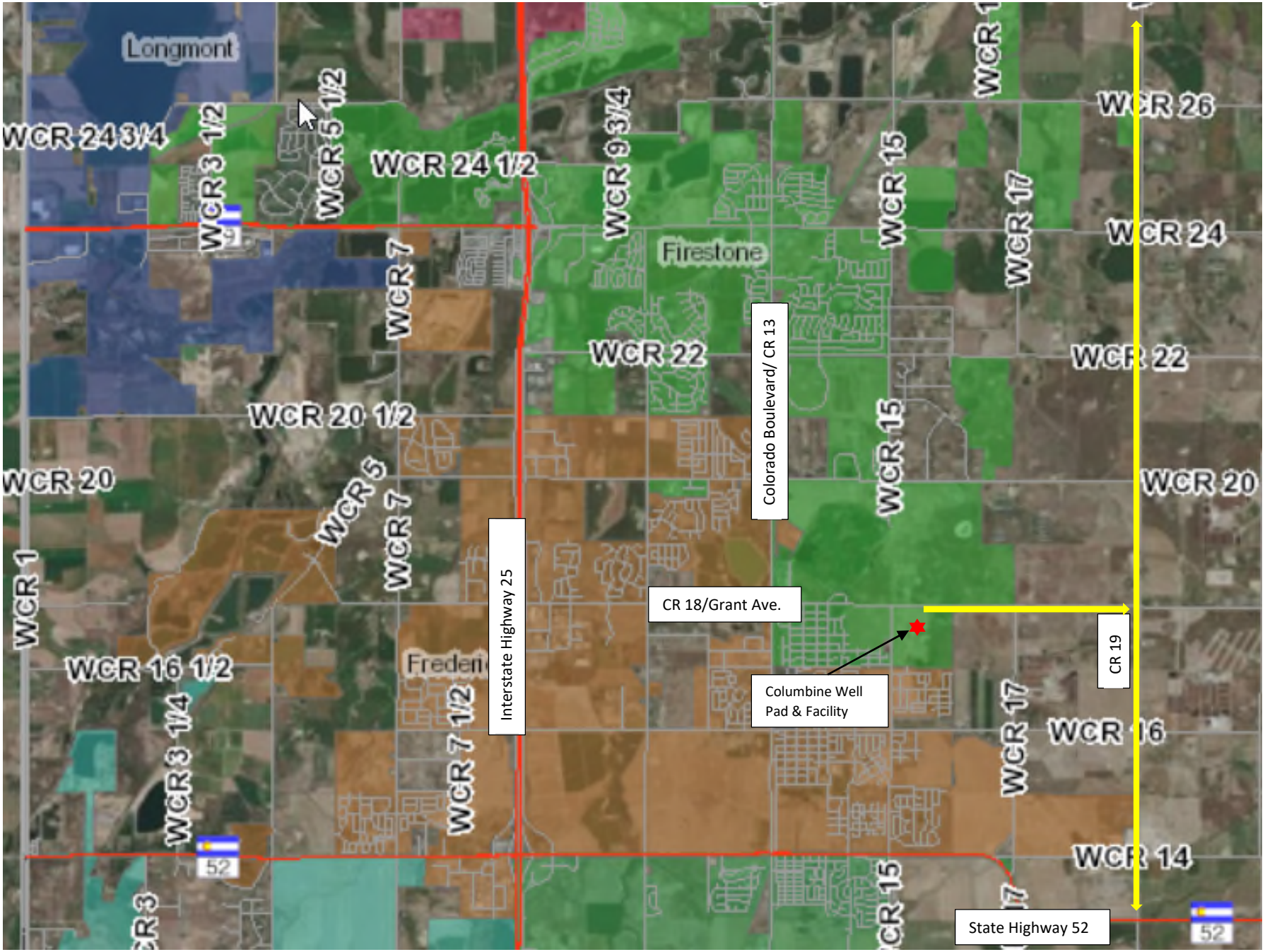
609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100' | DATE: 9/19/19 | SHEET NO: 1 1 OF 1
REVISED: HJL 4/20/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\COLUMBINE_8_HALFMOON.dwg, 4/20/2021 11:42:17 AM, steven

ATTACHMENT 2

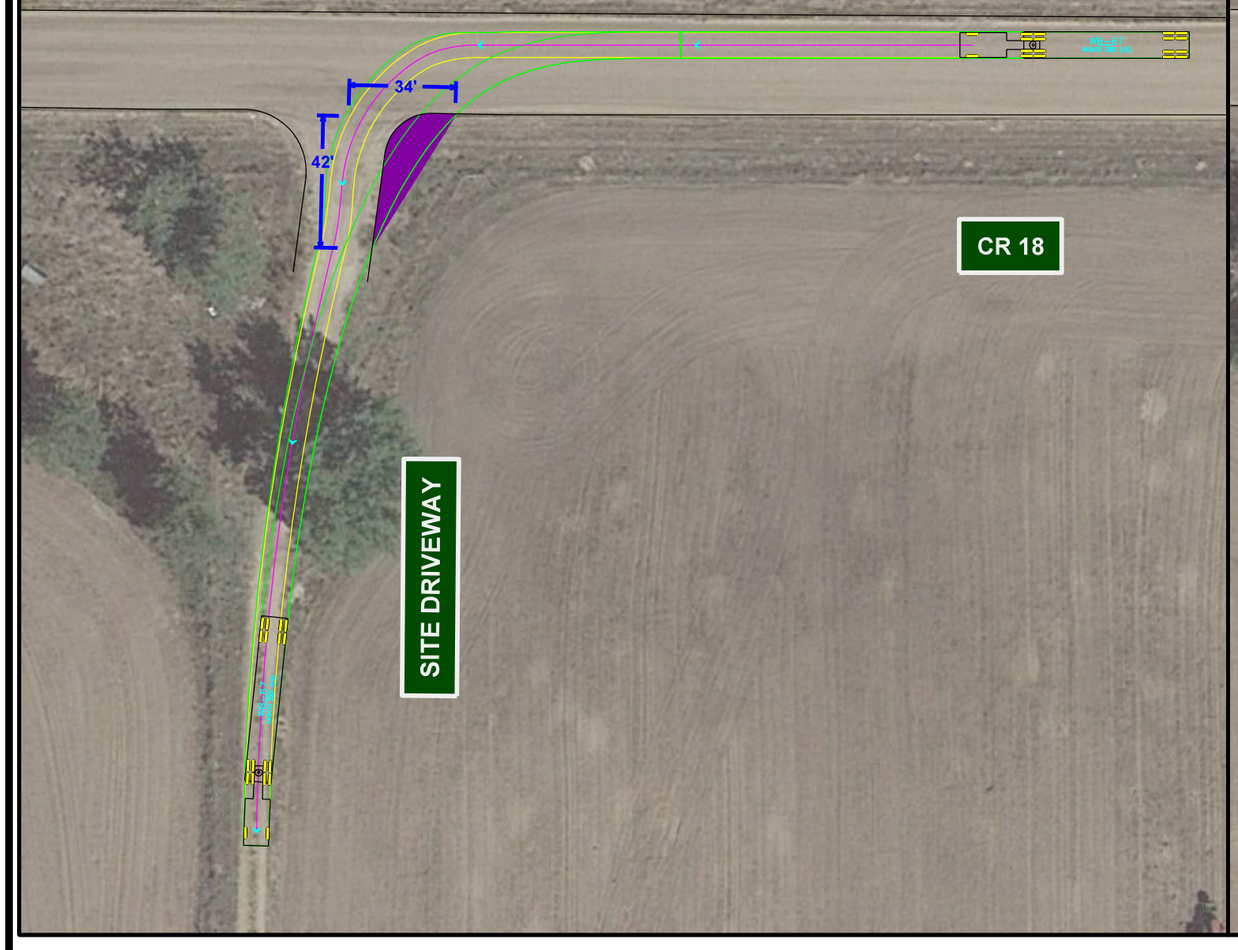
Haul Routes and Truck Turning Movements



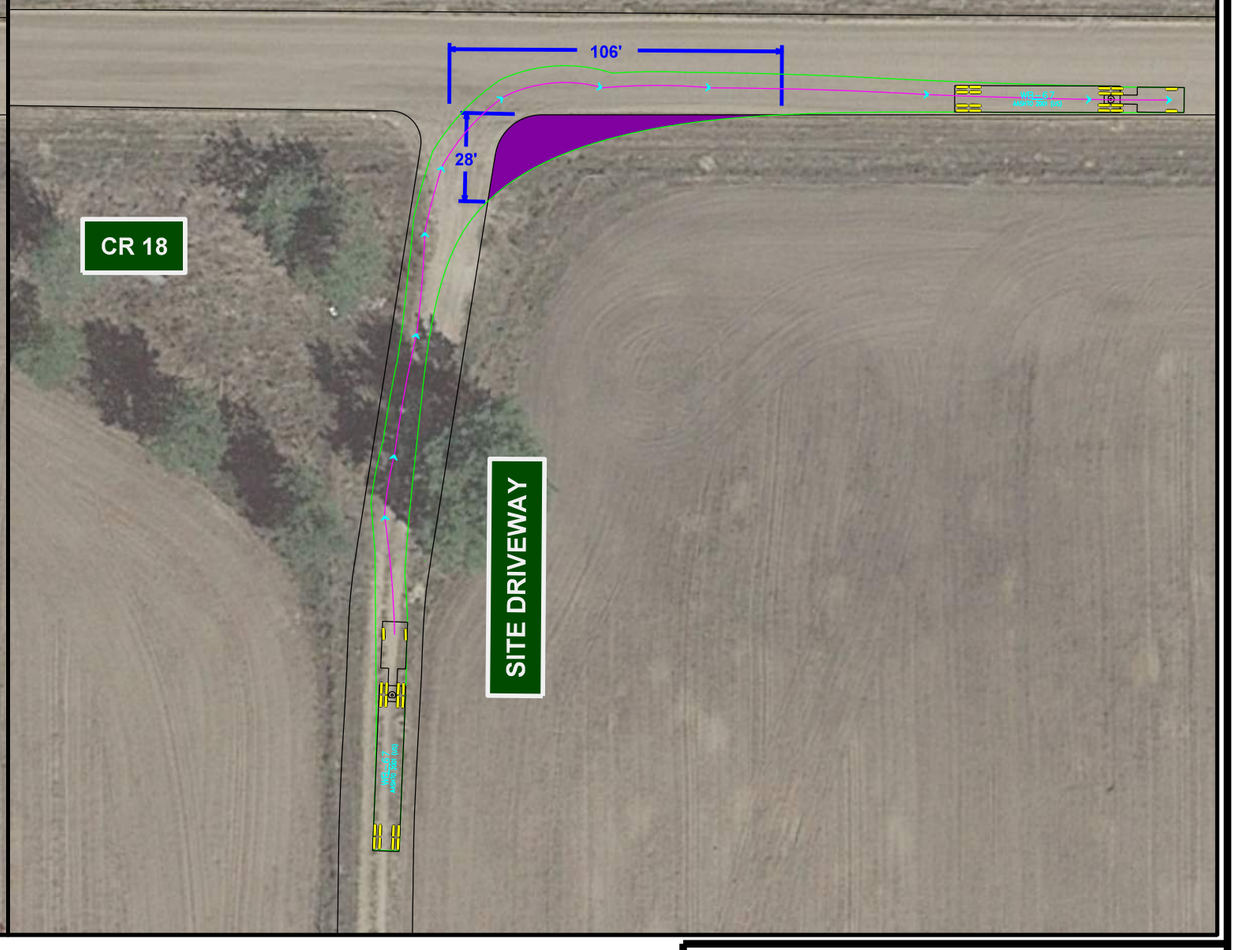
Columbine – Proposed Haul Routes

Firestone, Colorado

LEFT TURN FROM CR 18 WB ONTO SITE



RIGHT TURN FROM SITE TO CR 18 EB



LEGEND

PAVEMENT WIDENING FOR TRUCK TURNS

FIGURE 1 - TRUCKS ENTERING / EXITING COLUMBINE PAD
LEFT TURN FROM CR-18 WB ONTO SITE
RIGHT TURN FROM SITE ONTO CR-18 EB

N

0 50 100

GRAPHIC SCALE

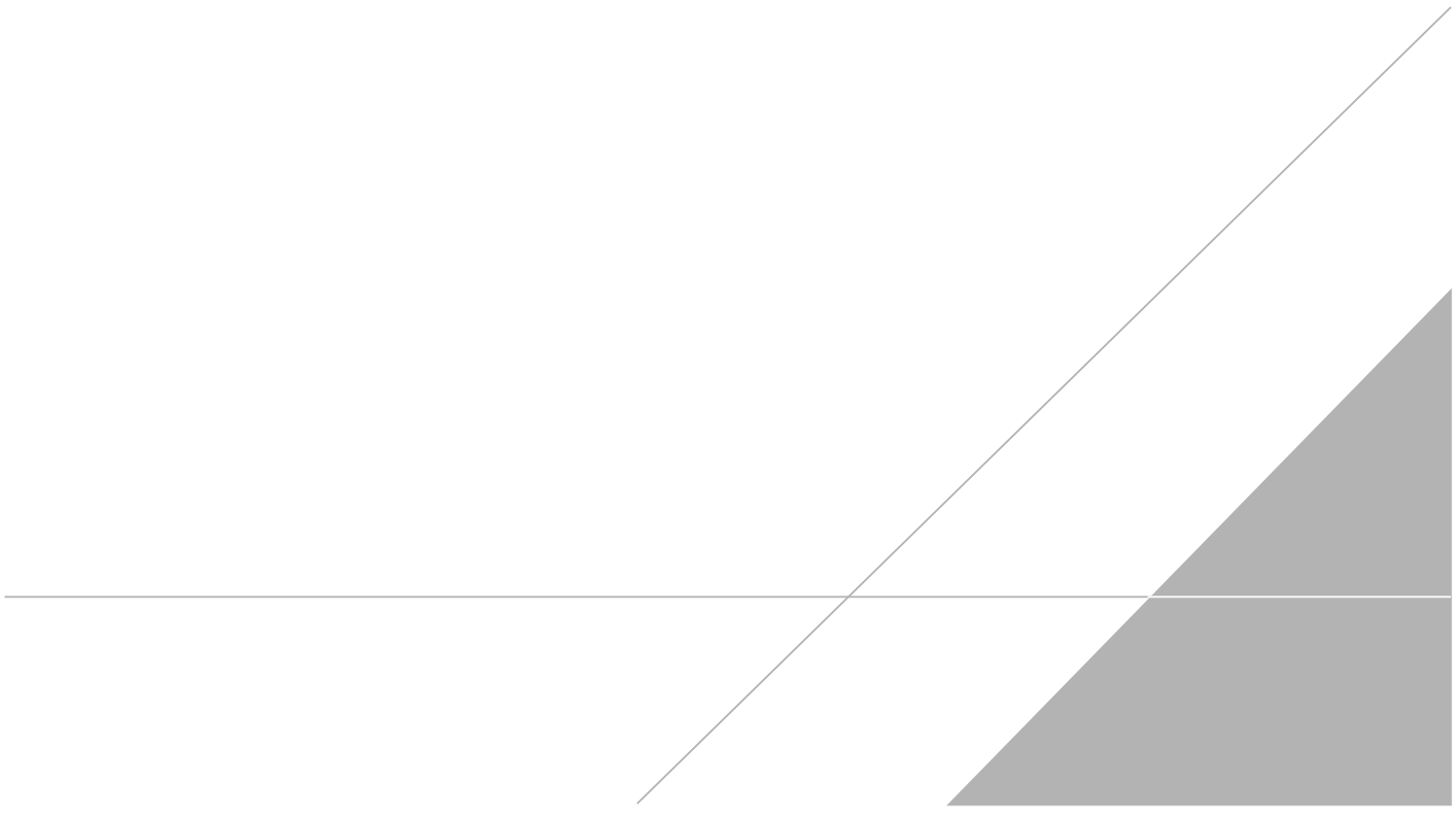
KERR MCGEE OIL AND GAS ONSHORE LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCK TURNING FIGURES

ARCADIS | FIGURE 1

ATTACHMENT 3

Estimated Trip Generation Data



COLUMBINE
Firestone, CO
Estimated Trip Generation Data
Site Preparation through Interim Reclamation

Phase of Development	Estimated Duration (days, max)[1]	Vehicle Type[2]	CDOT SHAC Equivalency Factor (PCE/Veh)[3]	Estimated Number of Veh/Day[4]		Average Daily Trips[5]		AM Peak Hour[6]						PM Peak Hour[6]						Total Trips	
								In		Out		Total		In		Out		Total			
				Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE
Site Preparation	30	Light Vehicle	1	3	3	6	6	*2*	*2*	*0*	*0*	**2**	**2**	*0*	*0*	*2*	*2*	**2**	**2**	176	176
		Single Unit	2	3	5	5	10	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	155	310
		Combo Unit	3	34	103	69	206	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,055	6,166
		Oversize Load	3	0	1	0	1	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	14	42
		Traffic Summary (Site Preparation):		**40**	**112**	**80**	**223**	*5*	*11*	*3*	*9*	**8**	**20**	*3*	*9*	*5*	*11*	**8**	**20**	**2,400**	**6,694**
Production Facility Construction	30	Light Vehicle	1	2	2	5	5	*1*	*1*	*0*	*0*	**1**	**1**	*0*	*0*	*1*	*1*	**1**	**1**	147	147
		Single Unit	2	1	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	35	70
		Combo Unit	3	7	21	14	43	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	425	1,276
		Oversize Load	3	0	1	1	2	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	22	66
		Traffic Summary (Production Facility Construction):		**10**	**26**	**21**	**52**	*3*	*7*	*2*	*6*	**5**	**13**	*2*	*6*	*3*	*7*	**5**	**13**	**629**	**1,559**
Surface Casing Preset	7	Light Vehicle	1	8	8	15	15	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	106	106
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	25	49
		Combo Unit	3	49	148	98	295	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	689	2,066
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Surface Casing Preset):		**59**	**159**	**117**	**317**	*9*	*16*	*5*	*12*	**14**	**28**	*5*	*12*	*9*	*16*	**14**	**28**	**819**	**2,221**
Surface Rig Mobilization	2	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	36	36
		Single Unit	2	11	22	22	44	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	44	88
		Combo Unit	3	176	528	352	1,056	*8*	*24*	*8*	*24*	**16**	**48**	*8*	*24*	*8*	*24*	**16**	**48**	704	2,112
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Mobilization):[7]		**198**	**564**	**395**	**1,127**	*15*	*34*	*11*	*30*	**26**	**64**	*11*	*30*	*15*	*34*	**26**	**64**	**790**	**2,254**
Sequential Drilling and Pad Regrade	66	Light Vehicle	1	24	24	49	49	*15*	*15*	*3*	*3*	**18**	**18**	*3*	*3*	*15*	*15*	**18**	**18**	3,224	3,224
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	241	482
		Combo Unit	3	7	22	15	45	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	984	2,952
		Oversize Load	3	0	1	1	3	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	59	177
		Traffic Summary (Sequential Drilling and Pad Regrade):		**34**	**52**	**68**	**104**	*18*	*23*	*6*	*11*	**24**	**34**	*6*	*11*	*18*	*23*	**24**	**34**	**4,508**	**6,835**
Surface Rig Demobilization	2	Light Vehicle	1	27	27	54	54	*16*	*16*	*3*	*3*	**19**	**19**	*3*	*3*	*16*	*16*	**19**	**19**	108	108
		Single Unit	2	11	21	21	42	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	42	84
		Combo Unit	3	146	437	291	873	*7*	*21*	*7*	*21*	**14**	**42**	*7*	*21*	*7*	*21*	**14**	**42**	582	1,746
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Demobilization):[7]		**185**	**489**	**369**	**978**	*25*	*42*	*12*	*29*	**37**	**71**	*12*	*29*	*25*	*42*	**37**	**71**	**738**	**1,956**
Well Completions	35	Light Vehicle	1	57	57	114	114	*34*	*34*	*7*	*7*	**41**	**41**	*7*	*7*	*34*	*34*	**41**	**41**	3,990	3,990
		Single Unit	2	8	15	15	30	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	525	1,050
		Combo Unit	3	19	57	38	114	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	1,330	3,990
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Well Completions):		**84**	**129**	**167**	**258**	*36*	*39*	*9*	*12*	**45**	**51**	*9*	*12*	*36*	*39*	**45**	**51**	**5,845**	**9,030**
Reclamation	30	Light Vehicle	1	15	15	30	30	*9*	*9*	*2*	*2*	**11**	**11**	*2*	*2*	*9*	*9*	**11**	**11**	902	902
		Single Unit	2	19	37	37	75	*2*	*4*	*2*	*4*	**4**	**8**	*2*	*4*	*2*	*4*	**4**	**8**	1,125	2,249
		Combo Unit	3	23	68	45	136	*2*	*6*	*2*	*6*	**4**	**12**	*2*	*6*	*2*	*6*	**4**	**12**	1,364	4,093
		Oversize Load	3	0	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	16	48
		Traffic Summary (Reclamation):		**57**	**122**	**114**	**243**	*13*	*19*	*6*	*12*	**19**	**31**	*6*	*12*	*13*	*19*	**19**	**31**	**3,407**	**7,293**
										Max AM Peak Hour:		**45**	**71**				*Max PM Peak Hour:*		**45**	**71**		
																				Development Totals:		**19,137**	**37,841**

Abbreviations:

ADT	Average Daily Trips	lbs.	pounds	PCE	Passenger Car Equivalents
CDOT	Colorado Department of Trans	GVW	Gross Vehicle Weight	SHAC	State Highway Access Code
ft	feet	KMG	Kerr McGee Oil & Gas Onshore, LP	Veh	Vehicle

Notes:

1 Estimate of phase durations is based on anticipated development expectations for each phase based on previous schedules provided by Anadarko

2 Arcadis has categorized the trip data into the four unique Vehicle Types based on trip profile data provided by KMG which summarizes traffic based on these categories. Vehicle categories include the following: Light Vehicles (e.g. pickup trucks) have a GVW between 4,500 and 8,500 lbs. and measures < 20 ft long; Single Unit vehicles (e.g. 3-axle bobtail or dump truck) having a GVW between 10,000 and 20,000 lbs. and measuring between 20-40 ft long; Combo Unit vehicles (typically a semi and Trailer) having GVW between 50,000 and 70,000 lbs., measuring between 40 and 60 ft long; Oversize Loads (low boy equip trailers, wide loads) usually having GVW greater than 70,000 lbs., and measuring between 40 and 60 feet long.

3 CDOT SHAC assumes: passenger vehicle < 20ft, single unit truck from 20 to 40 ft, multiple unit truck > 40 ft; 1 Single Unit truck = 2 PCE, and 1 Combo Unit truck = 3 PCE.

4 Estimated number of vehicles per day is based on trip generation breakdown summary provided by KMG for other similarly sized facilities. These data were then scaled/adjusted to approximate trip generation traffic for specific Pad/Facility based on the number of wells that will be drilled.

5 Average Daily Trips number assumes all vehicles make a round trip (e.g., ADT = No. of Vehicles per day x 2) and that the total trips in and out levels/evens out on a daily basis.

6 AM peak hour and PM peak hour trips are estimated based on input from KMG experience with similar facility development projects. Light truck traffic is almost entirely associated with daily crew/worker trips to the site; Approximately 60% of the worker trips associated with shift changes will likely occur during the AM and PM peak hours. The larger vehicle (Single unit, Combo units, Oversize loads), daily truck traffic will occur uniformly over the course of a 12 hour work day for the Site Preparation and Reclamation phases. Larger vehicle traffic (Single unit, Combo units, Oversize loads) during the remaining phases (e.g., casing preset, rig mobe/demobe, sequential drilling, and completions) will be spread uniformly over a 24 hour period.

7 Rig mobilization and demobilization will generally occur while temporary traffic controls are in place

ATTACHMENT 4

Baseline Roadway Assessment Report

ARCADIS Design & Consultancy for natural and built assets

Kerr McGee Oil and Gas Onshore LP

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 18 & COUNTY ROAD 19

Columbine Well Pad

Town of Firestone

Weld County, Colorado

July 23, 2020

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 18 AND COUNTY ROAD 19

Columbine Well Pad

Town of Firestone, Weld County, Colorado



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Date:

July 23, 2020

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Figure 3. Baseline Roadway Assessment of Proposed Trucking Routes North/Eastbound Lanes

APPENDICES

A: HSP Charts (on DVD)

B: Visual Assessment Photographic Log

ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis U.S., Inc.
Blvd	Boulevard
CDOT	Colorado Department of Transportation
CR	County Road
Firestone	City of Firestone
FHWA	Federal Highway Administration
HSP	High Speed Profiler
Hwy	Highway
in/mi	inches per mile
IRI	International Roughness Index
Kerr McGee	Kerr McGee Oil and Gas Onshore LP
MRI	Mean Roughness Index

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) completed a baseline road assessment on behalf of Kerr McGee Oil and Gas Onshore LP (Kerr McGee) to document the current condition of select roadways maintained by both the Town of Firestone (Firestone) and Weld County, within Weld County, Colorado. The purpose of the assessment was to document baseline roadway conditions prior to planned oil and gas development activities by Kerr McGee. The assessed road segments will be used to access areas designated for new construction, operation, and production at a proposed well pad site (Columbine Pad) within the town limit of Firestone. The facility will utilize roadways within Firestone for access.

The proposed trucking routes that will be utilized by Kerr McGee for facility access include portions of County Roads 18 and 19; the full length of roadways assessed include:

- 2 miles (4 lane miles) of County Road 18, between County Road 15/Frontier Street and County Road 19
- 8.6 miles (17.2 lane miles) of County Road 19, between Hwy 52 and Hwy 66

Sections of these roadways which will not be utilized by Kerr McGee but were assessed will serve as a comparison for roadway deterioration should a follow-up assessment be performed. Specific routes utilized for each well pad location are shown on **Figure 1.**

This report documents findings from a baseline roadway assessment conducted prior to use by Kerr McGee. After interim reclamation, Kerr McGee will conduct a follow-up assessment to evaluate the nature and extent of any impacts to this road that may be attributable to construction traffic. Those findings will be documented, as appropriate, in a subsequent report.

2 ASSESSMENT OVERVIEW

The baseline roadway assessment included two separate elements. First, a high-speed profiler (HSP) was used to measure and map relative smoothness of the roadway. Following collection of the surface roughness data, Arcadis conducted a visual inspection to qualify the nature of any pavement distresses and the potential causes of any roughness anomalies. The roadway assessment and documentation efforts were completed under the supervision of an Arcadis Professional Engineer. Further discussion of how the data were collected to support this assessment is provided below.

- To provide a quantitative measure of pavement conditions, the roadway was profiled utilizing the HSP, equipped with a laser scanner, to measure smoothness of the pavement. Scans were collected on July 14, 2020 of both the right and left wheel paths, for both lanes of traffic, along the entire truck hauling route. The profiler system was calibrated, and scanner data were collected, stored, and analyzed in accordance with Colorado Department of Transportation's (CDOT's) standard practice for HSP systems (Colorado Procedure 78-14). Applicable output files from the profiling system software (viewable in Google Earth) are provided as **Appendix A** on the attached DVD. In addition, all roadway surfaces were photo-logged at 50-foot intervals in both directions to

provide additional details of baseline roadway conditions. Electronic copies of the photos and output files accompany this report as **Appendix A**.

- On July 20 and 22, 2020, Arcadis conducted a visual inspection to further assess roadway conditions, including any potential issues related to drainage or utility crossings. Photographic logs depicting key areas of concern and typical roadway conditions observed during the baseline inspection are attached as **Appendix B**. Roadway distress observations were documented and qualitatively classified using U.S. Department of Transportation guidelines and terminology[1]. **Table 1** summarizes the distress types and severity standards used to classify roadway distress during the visual assessment.

3 BASELINE DETERMINATIONS

This section summarizes the key findings and observations from the baseline assessment. The assessment included analysis of the data collected (as described in **Section 2**), as well as (1) review of findings from the HSP; and (2) observations from the visual assessment and inspection. Collectively, these data were used to prepare a summary of roadway conditions for each road segment.

3.1 High-Speed Profiling

The HSP scan was performed to record roughness and imperfections along the roadway surface. The HSP uses a line laser system to measure the ride quality of asphalt pavement, concrete pavement, and can also be used on gravel roads. The HSP system provides a high-resolution measurement of surface displacement along each wheel path over a longitudinal distance and is able to provide data output in one of several frequently used indices. These baseline results can later be compared to the final, post-completion assessment to provide a quantitative measure of roadway deterioration that occurred following the baseline survey. Baseline results of this profiling are provided in **Appendix A** and summarized on **Figures 2** and **3.** Additionally, the scanner data output, including International Roughness Index (IRI) and Mean Roughness Index (MRI) data for each lane segment, is summarized in **Tables 2 through 4**. Additional data was collected beyond to the east and west to serve as comparison of roadway deterioration beyond the segments utilized by Kerr McGee.

The IRI and MRI are measures of road smoothness, reported in units of inches per mile (in/mi). The IRI is a scale for roughness based on simulated response of a generic motor vehicle along a single wheel path of the road surface. The IRI value is determined by obtaining a suitably accurate measurement of the profile of the road, processing it through an algorithm that simulates a reference vehicle's (e.g., passenger car) response to the roughness inputs, while accounting for the suspension travel over time and distance. These indices are typically derived for one tenth of mile segments of roadway. The MRI is like IRI and is simply the calculated mean of the IRI from both wheel paths.

[1] Miller and Bellinger, 2003. "*Distress Identification Manual for the Long-Term Pavement Performance Program.*" U.S. Department of Transportation, Federal Highway Administration, Office of Infrastructure Research and Development; Publication No. FHWA-RD-031. June 2003. Fourth Edition.

In general terms, the lower the IRI or MRI, the smoother the road. For context, the Federal Highway Administration (FHWA) has established recommended IRI (or MRI) threshold values for highways and rural roadways. According to FHWA guidelines, roadways with IRI or MRI values:

- Less than 60 in/mi are considered to be in very good condition;
- Between 60 and 94 in/mi are considered to be in good condition;
- Between 95 and 119 in/mi are considered to be in fair condition;
- Between 120 and 170 in/mi are considered to be in mediocre condition; and
- Greater than 170 in/mi are considered to be in poor condition.

Typically, for asphalt or concrete paved roads, IRI values less than 170 in/mi (very good to mediocre conditions) are considered acceptable from a ride quality perspective. Road segments with IRI values greater than 170 in/mi are deemed less acceptable and often warrant further evaluation for repair or reconstruction.

3.2 Visual Assessment

The roadway visual assessment was completed using the guidelines provided in the US Department of Transportation, Distress Identification Manual to identify and further document and qualify roadway distress within the survey area. All documentation was done by walking the roadway and classifying typical roadway distress based on type and severity. Detailed photos and descriptions of the distress included in **Appendix B** document the findings of the visual assessment.

3.2.1 County Road 18

The portion of County Road 18 assessed includes an unpaved dirt/gravel segment, which runs from Country Road 15/Frontier St to County Road 19. Moderate to high wash-boarding and rutting were observed throughout the roadway, with loose aggregate on the surface and shoulders of some segments. Loose aggregate accumulated in some portions of the shoulder could impede drainage; overall ride quality was in poor condition.

Based on the FHWA recommended standards, the eastbound lane of County Road 18 MRI values indicated that 85 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), 15 percent in fair-to-mediocre (95-170 in/mi) and less than one percent of the eastbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire eastbound segment was 238 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the eastbound segment of County Road 18 and are depicted on **Figure 3**.

The MRI values determined by the HSP indicate that 80 percent of the roadway in the westbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 20 percent in fair-to-mediocre (95-170 in/mi) and less than one percent of the westbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire westbound segment was 236 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the westbound segment of County Road 18 and are depicted on **Figure 2.**

3.2.2 County Road 19

The portion of County Road 19 assessed was in the midst of being chip sealed at the time the visual survey was completed. The portion of roadway Kerr McGee intends to use runs approximately 8.5 miles between Hwy 52 and Hwy 66. For this roadway portion the overall ride quality was in good condition. Areas that were recently chip sealed showed minimal to no wear or deterioration. Areas that had yet to be chip sealed displayed low to moderate rutting, transverse cracking, and fatigue cracking.

Based on the FHWA recommended standards, the southbound lane of County Road 19 MRI values indicated that about 2 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 20 percent in fair-to-mediocre (95-170 in/mi) and 78 percent of the southbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire southbound segment was 83 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the southbound segment of County Road 19 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that approximately one percent of the roadway in the northbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 23 percent in fair-to-mediocre (95-170 in/mi) and 76 percent of the northbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire northbound segment was 85 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the northbound segment of County Road 19 and are depicted on **Figure 3.**

4 CONCLUSIONS AND RECOMMENDATIONS

The baseline road assessment is intended to provide documentation of current road conditions prior to the development activities planned by Kerr McGee. It was observed that County Road 19 is in good shape, while County Road 18 in poor condition. It can be expected that County Road 18 will deteriorate more rapidly under normal traffic and weathering since it is an unpaved dirt/gravel roadway.

Kerr McGee will conduct a follow-up survey of these roadways once their interim reclamation activities are substantively complete. The follow up survey should include a visual assessment of the roads and an evaluation of ride quality using the HSP scanner. The assessment and HSP scan can then be compared to these baseline observations to identify roadway segments that may have been adversely impacted or distressed by construction traffic.

In the interim, Arcadis also recommends that Kerr McGee's construction foreman periodically inspect and monitor the condition of these roadways during the construction period. If, based on the monitoring, it is determined that interim repairs or further distress mitigation efforts are warranted, mitigation efforts (e.g., routing/filling cracks, pothole repairs) should be discussed with Arcadis, Firestone's Engineers, and performed as necessary to prevent significant or accelerated deterioration of these roadways.

TABLES



Table 1
Road Distress: Type and Severity

Distress Type	Distress Description	Severity Levels
Block Cracking	A pattern of cracks that turns pavement into approximately rectangle pieces, ranging from 0.1 m^2 (square meter) to 10 m^2.	Low - Cracks with a mean width ≤ 6 millimeters (mm). Moderate - Cracks with a mean width greater than (>) 6 mm and less than or equal to (≤) 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to low severity random cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to high-severity random cracking.
Fatigue Cracking	Occurs in areas subject to repeated traffic loading (wheel paths). Can be a series of interconnecting cracks in early stages of development. Develops into many-sided, sharp, angled pieces, usually less than 0.3 m. Often referred to as 'chicken wire' or 'alligator' cracking in later stages.	Low - An area of cracks with no or only few connecting cracks; cracks are not spalled or sealed. Moderate - An area of interconnecting cracks forming a complete pattern; may be slightly spalled, and cracks may be sealed. High - An area of interconnecting cracks forming a complete pattern; pieces may move when subject to traffic.
Longitudinal Cracking	Cracks predominantly parallel to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 mm and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low-severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to moderate- to high-severity random cracking.
Transverse Cracking	Cracks predominantly perpendicular to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 m and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent moderate- to high-severity random cracking.
Rutting	A rut is a longitudinal surface depression in the wheel path. It may be associated with transverse displacement.	Not applicable (N/A). Severity levels can be defined by categorizing the measurements collected.

Table 2
Bsaeline Ride Quality Data for County Road 18

Eastbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	240.0	276.1	258
2	528	1056	528	246.4	252.2	249
3	1056	1584	528	146.3	209.9	178
4	1584	2112	528	199.6	273.6	237
5	2112	2640	528	209.3	187.3	198
6	2640	3168	528	168.3	277.0	223
7	3168	3696	528	257.3	236.9	247
8	3696	4224	528	218.9	209.3	214
9	4224	4752	528	361.8	394.7	378
10	4752	5280	528	312.0	310.7	311
11	5280	5808	528	278.7	221.6	250
12	5808	6336	528	252.6	198.0	225
13	6336	6864	528	271.5	236.4	254
14	6864	7392	528	287.1	294.0	291
15	7392	7920	528	450.1	351.1	401
16	7920	8448	528	218.6	246.3	232
17	8448	8976	528	188.7	100.7	145
18	8976	9504	528	136.7	92.2	114
19	9504	10032	528	193.6	85.4	139
20	10032	10515.6	484	240.2	203.0	222
		Overall Averages:		**244**	**233**	**238**

Westbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	258.9	256.0	257
2	528	1056	528	189.9	181.0	185
3	1056	1584	528	165.4	182.3	174
4	1584	2112	528	163.6	185.1	174
5	2112	2640	528	120.5	192.8	157
6	2640	3168	528	153.3	145.8	150
7	3168	3696	528	158.3	190.6	174
8	3696	4224	528	183.1	139.8	161
9	4224	4752	528	145.5	105.6	126
10	4752	5280	528	219.0	166.0	193
11	5280	5808	528	421.8	320.9	371
12	5808	6336	528	366.0	344.3	355
13	6336	6864	528	267.1	257.0	262
14	6864	7392	528	310.9	213.0	262
15	7392	7920	528	216.6	223.9	220
16	7920	8448	528	403.9	285.2	345
17	8448	8976	528	363.0	183.8	273
18	8976	9504	528	257.1	272.1	265
19	9504	10032	528	271.9	320.7	296
20	10032	10501.3	469	340.8	298.9	320
		Overall Averages:		**248**	**223**	**236**

Table 2
Bsaeline Ride Quality Data for County Road 18

Abbreviations:

IRI	International Roughness Index
MRI	Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The eastbound route began at GPS location 40.1166317122222 N 104.923761281667 W and ended at GPS location 40.1165025368889 N 104.887988146667 W. The westbound route began at GPS location 40.1165479767901 N 104.88624182321 W and ended at GPS location 40.1166852238889 N 104.922102417963 W.

Table 3
Baseline Ride Quality Data for County Road 19

Southbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	123.2	146.3	135
2	528	1056	528	89.0	77.6	83
3	1056	1584	528	96.0	70.2	83
4	1584	2112	528	75.1	63.9	70
5	2112	2640	528	72.4	71.6	72
6	2640	3168	528	68.2	64.5	66
7	3168	3696	528	73.7	70.3	72
8	3696	4224	528	69.1	79.1	74
9	4224	4752	528	62.6	77.0	70
10	4752	5280	528	77.6	112.4	95
11	5280	5808	528	49.8	58.8	54
12	5808	6336	528	62.1	74.4	68
13	6336	6864	528	67.1	85.3	76
14	6864	7392	528	58.1	82.1	70
15	7392	7920	528	58.1	86.3	72
16	7920	8448	528	56.0	69.1	63
17	8448	8976	528	67.7	80.2	74
18	8976	9504	528	64.5	72.8	69
19	9504	10032	528	57.2	58.0	58
20	10032	10560	528	120.5	143.0	132
21	10560	11088	528	94.9	116.9	106
22	11088	11616	528	80.4	101.8	91
23	11616	12144	528	96.3	115.8	106
24	12144	12672	528	105.4	124.4	115
25	12672	13200	528	79.3	80.0	80
26	13200	13728	528	94.4	141.7	118
27	13728	14256	528	80.5	95.5	88
28	14256	14784	528	85.5	109.0	97
29	14784	15312	528	85.1	114.2	100
30	15312	15840	528	90.7	124.8	108
31	15840	16368	528	136.6	163.2	150
32	16368	16896	528	57.2	57.6	57
33	16896	17424	528	50.3	60.9	56
34	17424	17952	528	59.2	55.9	58
35	17952	18480	528	71.1	86.4	79
36	18480	19008	528	63.1	77.1	70
37	19008	19536	528	56.0	67.8	62
38	19536	20064	528	46.8	67.7	57
39	20064	20592	528	55.3	62.1	59
40	20592	21120	528	48.9	52.4	51
41	21120	21648	528	62.8	70.5	67
42	21648	22176	528	48.9	57.1	53
43	22176	22704	528	51.0	60.2	56
44	22704	23232	528	50.3	68.0	59
45	23232	23760	528	45.1	52.5	49
46	23760	24288	528	68.6	73.9	71
47	24288	24816	528	54.9	64.8	60
48	24816	25344	528	61.9	81.5	72

Table 3
Baseline Ride Quality Data for County Road 19

49	25344	25872	528	68.7	71.1	70
50	25872	26400	528	59.9	76.7	68
51	26400	26928	528	147.3	138.5	143
52	26928	27456	528	68.8	75.1	72
53	27456	27984	528	76.4	72.7	75
54	27984	28512	528	68.3	62.2	65
55	28512	29040	528	70.7	70.2	70
56	29040	29568	528	62.8	80.4	72
57	29568	30096	528	62.4	72.9	68
58	30096	30624	528	100.5	106.3	103
59	30624	31152	528	88.5	118.3	103
60	31152	31680	528	63.4	60.8	62
61	31680	32208	528	72.4	85.5	79
62	32208	32736	528	59.4	81.3	70
63	32736	33264	528	72.7	91.0	82
64	33264	33792	528	92.5	105.1	99
65	33792	34320	528	64.9	98.8	82
66	34320	34848	528	71.8	84.0	78
67	34848	35376	528	63.4	70.6	67
68	35376	35904	528	60.9	71.6	66
69	35904	36432	528	72.5	74.7	74
70	36432	36960	528	86.2	85.0	86
71	36960	37488	528	104.7	111.2	108
72	37488	38016	528	64.7	77.1	71
73	38016	38544	528	66.2	76.0	71
74	38544	39072	528	80.8	87.8	84
75	39072	39600	528	73.0	95.7	84
76	39600	40128	528	80.3	95.9	88
77	40128	40656	528	79.3	120.5	100
78	40656	41184	528	75.6	106.6	91
79	41184	41712	528	84.0	108.5	96
80	41712	42240	528	70.8	80.9	76
81	42240	42768	528	88.9	102.3	96
82	42768	43296	528	67.9	69.2	69
83	43296	43824	528	63.2	94.9	79
84	43824	44352	528	69.4	112.1	91
85	44352	44880	528	75.0	97.6	86
86	44880	45194.8	315	601.3	571.8	587
			Overall Averages:	**77**	**90**	**83**

Northbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	137.8	161.1	149
2	528	1056	528	80.4	104.8	93
3	1056	1584	528	71.4	74.6	73
4	1584	2112	528	79.3	100.7	90
5	2112	2640	528	81.3	76.7	79
6	2640	3168	528	115.5	105.0	110
7	3168	3696	528	80.7	97.2	89
8	3696	4224	528	78.8	89.3	84
9	4224	4752	528	84.4	77.4	81

Table 3
Baseline Ride Quality Data for County Road 19

10	4752	5280	528	82.6	100.7	92
11	5280	5808	528	68.0	92.5	80
12	5808	6336	528	84.1	102.2	93
13	6336	6864	528	80.1	79.1	80
14	6864	7392	528	85.4	84.6	85
15	7392	7920	528	101.1	130.7	116
16	7920	8448	528	74.3	87.8	81
17	8448	8976	528	70.5	94.2	82
18	8976	9504	528	65.0	69.0	67
19	9504	10032	528	71.7	71.5	72
20	10032	10560	528	66.4	64.2	65
21	10560	11088	528	82.9	86.7	85
22	11088	11616	528	107.9	114.3	111
23	11616	12144	528	83.9	107.1	95
24	12144	12672	528	74.4	103.1	89
25	12672	13200	528	79.5	114.4	97
26	13200	13728	528	82.6	101.4	92
27	13728	14256	528	79.1	82.2	81
28	14256	14784	528	108.4	113.9	111
29	14784	15312	528	79.9	79.4	80
30	15312	15840	528	87.1	108.0	98
31	15840	16368	528	118.7	146.8	133
32	16368	16896	528	97.5	100.0	99
33	16896	17424	528	90.7	138.8	115
34	17424	17952	528	75.7	84.0	80
35	17952	18480	528	76.5	69.6	73
36	18480	19008	528	167.0	168.1	168
37	19008	19536	528	102.2	74.6	88
38	19536	20064	528	87.4	65.9	77
39	20064	20592	528	85.8	63.1	74
40	20592	21120	528	93.3	75.9	85
41	21120	21648	528	94.9	71.1	83
42	21648	22176	528	90.2	58.3	74
43	22176	22704	528	74.1	66.3	70
44	22704	23232	528	117.9	65.9	92
45	23232	23760	528	118.5	73.8	96
46	23760	24288	528	93.8	86.0	90
47	24288	24816	528	84.4	54.9	70
48	24816	25344	528	66.7	59.3	63
49	25344	25872	528	58.5	59.5	59
50	25872	26400	528	62.6	76.4	70
51	26400	26928	528	85.8	90.4	88
52	26928	27456	528	89.8	84.5	87
53	27456	27984	528	69.4	56.7	63
54	27984	28512	528	64.4	62.6	64
55	28512	29040	528	77.6	68.8	73
56	29040	29568	528	128.5	157.2	143
57	29568	30096	528	77.4	84.7	81
58	30096	30624	528	69.8	78.7	74
59	30624	31152	528	86.4	90.4	88
60	31152	31680	528	88.3	114.8	102
61	31680	32208	528	95.2	106.3	101
62	32208	32736	528	103.0	93.7	98

Table 3
Baseline Ride Quality Data for County Road 19

63	32736	33264	528	108.8	119.4	114
64	33264	33792	528	83.2	102.4	93
65	33792	34320	528	101.7	108.2	105
66	34320	34848	528	111.9	99.1	106
67	34848	35376	528	69.0	78.9	74
68	35376	35904	528	79.9	87.9	84
69	35904	36432	528	68.3	64.4	66
70	36432	36960	528	47.4	50.9	49
71	36960	37488	528	58.8	67.6	63
72	37488	38016	528	43.4	51.5	47
73	38016	38544	528	57.7	63.1	60
74	38544	39072	528	53.3	60.8	57
75	39072	39600	528	61.5	69.0	65
76	39600	40128	528	60.7	77.3	69
77	40128	40656	528	53.2	63.0	58
78	40656	41184	528	66.7	77.0	72
79	41184	41712	528	54.3	62.2	58
80	41712	42240	528	67.1	73.5	70
81	42240	42768	528	66.4	69.4	68
82	42768	43296	528	51.8	54.1	53
83	43296	43824	528	59.9	65.1	63
84	43824	44352	528	59.4	80.1	70
85	44352	44880	528	67.4	96.6	82
86	44880	45140.6	261	215.2	259.3	237
			Overall Averages:	**83**	**88**	**85**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

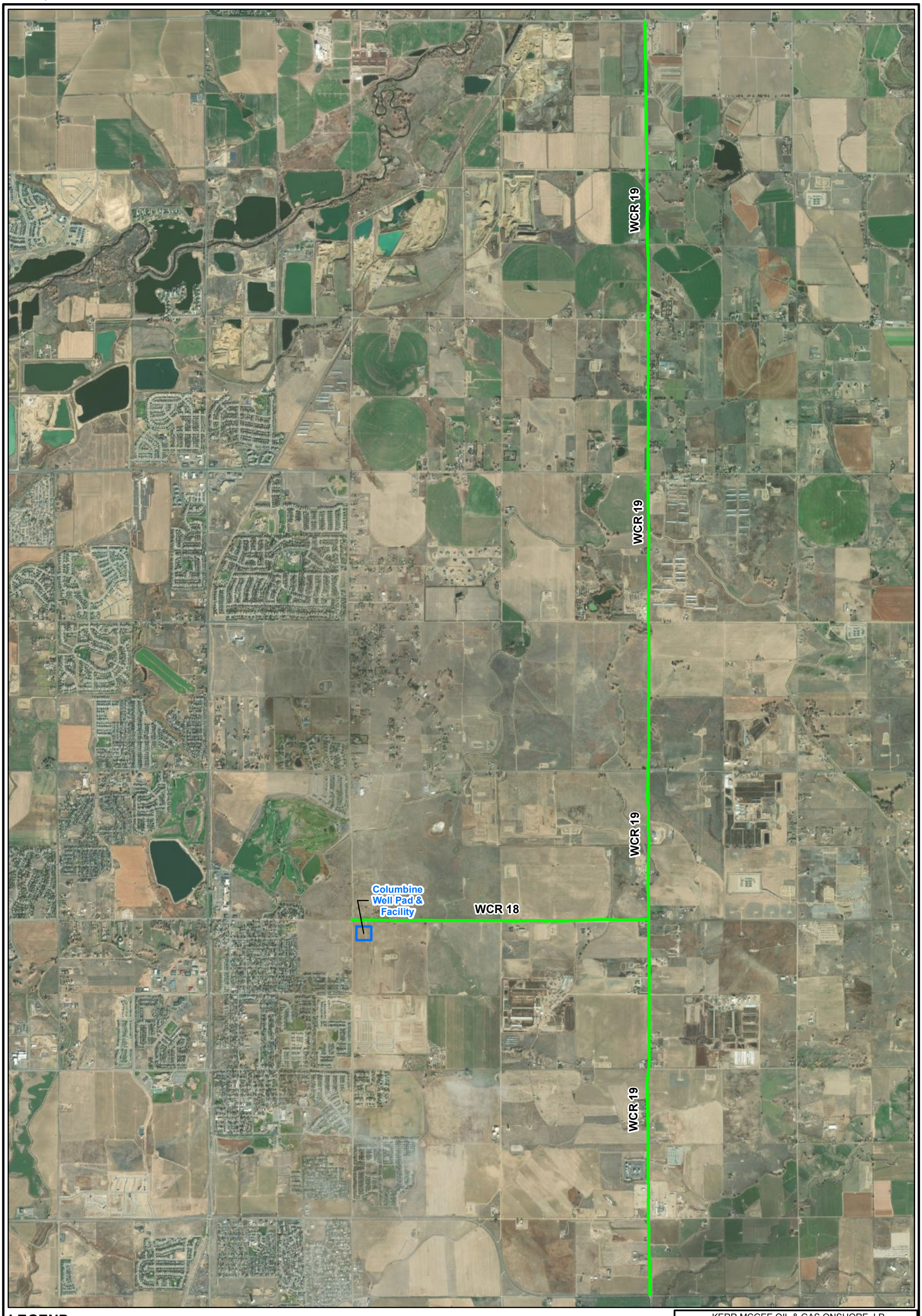
Good/Very Good <95 inches/mile 94.0
Fair/Mediocre 95-170 inches/mile 169.0
Less than acceptable >170 inches/mile 170.0

Notes:

Data was collected on July 14, 2020.
The start and stop locations were based on GPS coordinates. The southbound route began at GPS location 40.2038265215873 N 104.885933164921 W and ended at GPS location 40.0807181466162 N 104.886453600556 W. The northbound route began at GPS location 40.0800714961111 N 104.886415832222 W and ended at GPS location 40.2031560818519 N 104.885884058287 W.

FIGURES

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig1_Firestone_Trucking_Route_Columbine.mxd
12/13/2021, 4:37:54 PM



LEGEND

- Trucking Route
- Access Road
- Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

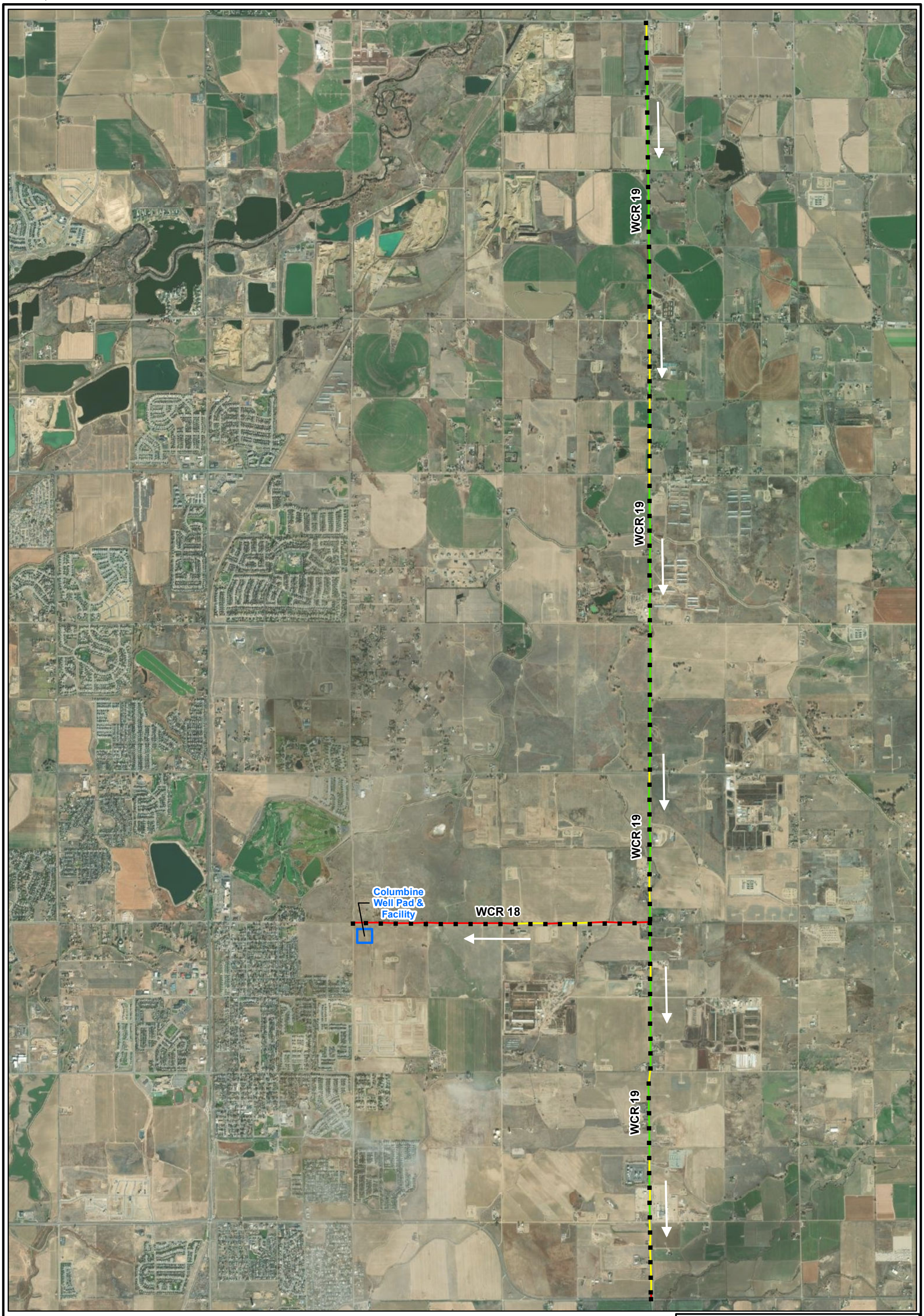
KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCKING ROUTE
WELD COUNTY ROADS 18 AND 19

ARCADIS | FIGURE 1

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
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LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

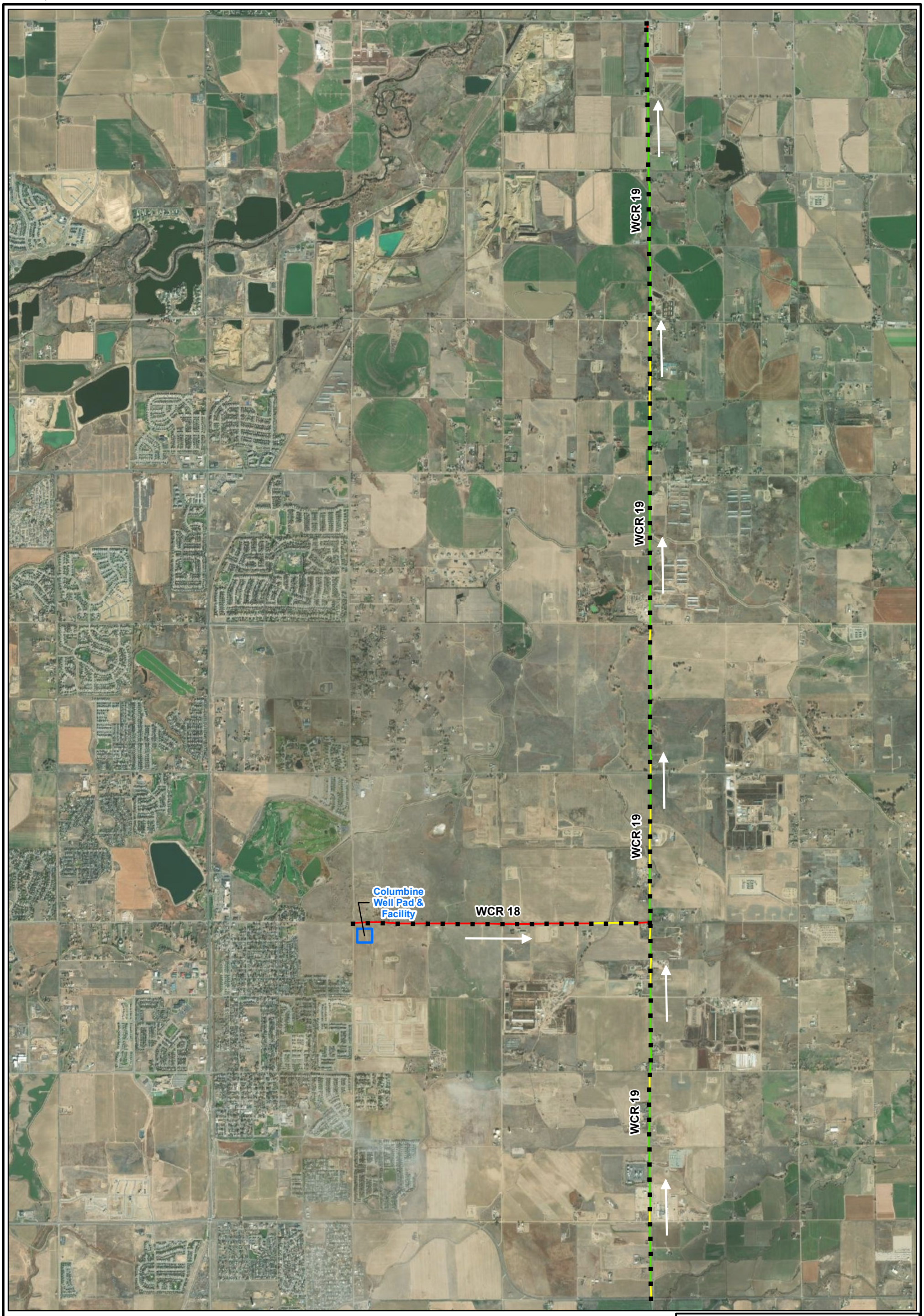
ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 18 AND 19 SOUTH/WESTBOUND

ARCADIS

FIGURE
2

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig3_Firestone_Northbound_Eastbound_Columbine.mxd
12/13/2021, 4:39:38 PM



LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 18 AND 19 NORTH/EASTBOUND

ARCADIS

FIGURE 3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX A

HSP Charts (on DVD)

APPENDIX B

Visual Assessment Photographic Log

Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 18
Time:	9:46:02 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165448504214	Longitude	-104.88643448
Primary Distress:	Washboarding	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 18
Time:	9:48:33 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165635698409	Longitude	-104.89613294
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:49:01 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1165107870755	Longitude	-104.90507745
Primary Distress:	Washboarding	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:49:51 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.116523401852	Longitude	-104.90515766
Primary Distress:	Washboarding	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:53:14 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1165405731753	Longitude	-104.90516843
Primary Distress:	Washboarding	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:55:13 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.116649143338	Longitude	-104.9179117
Primary Distress:	Washboarding	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 18
Time:	9:55:41 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1167133534437	Longitude	-104.92364684
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	9:59:40 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.2033372524287	Longitude	-104.88592954
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:00:47 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.2035102919943	Longitude	-104.88595845
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:04:05 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.195439346691	Longitude	-104.88589878
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:05:35 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1926557692914	Longitude	-104.88584477
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:07:25 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1847935416447	Longitude	-104.88580319
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:10:16 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.1747943941366	Longitude	-104.88575508
Primary Distress:	Fatigue (Alligator) Cracking	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:09:01 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1750818809408	Longitude	-104.88554018
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:	Fatigue (Alligator) Cracking	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:12:58 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1671455216539	Longitude	-104.88585588
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:15 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1597934500299	Longitude	-104.88595731
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:53 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1597814141739	Longitude	-104.88590627
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:20:11 AM	Section:	Mile 3.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1525085552292	Longitude	-104.88601847
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:05 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1456340336325	Longitude	-104.88612623
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:46 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1452690824332	Longitude	-104.88604164
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:24:33 AM	Section:	Mile 4.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1366233153063	Longitude	-104.88609123
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:09 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1317873269072	Longitude	-104.88607846
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:53 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1309659491344	Longitude	-104.88615778
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:29:26 AM	Section:	Mile 5.6
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1308417098263	Longitude	-104.88616857
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:32:15 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1164490931005	Longitude	-104.88631309
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:33:08 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1166034760774	Longitude	-104.88625442
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:35:39 AM	Section:	Mile 6.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1145219424268	Longitude	-104.88618993
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:05 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1085079818709	Longitude	-104.88627954
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:55 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1018067201925	Longitude	-104.88645202
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:42:07 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1017782490729	Longitude	-104.88645283
Primary Distress:	Transverse Cracking	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:43:20 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.0874621404114	Longitude	-104.88654459
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:46:29 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.0873702162933	Longitude	-104.88652399
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:48:47 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.0802392466538	Longitude	-104.88660283
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Arcadis U.S., Inc.

630 Plaza Drive

Suite 100

Highlands Ranch, Colorado 80129

Tel 720 344 3500

Fax 720 344 3535

www.arcadis.com

Section 14

Reclamation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Interim Reclamation Plan

Columbine 4-29HZ Well Pad and Facility

Firestone, CO

June 2021

TABLE OF CONTENTS

1.0 INTRODUCTION....1
2.0 SITE DESCRIPTION....1
3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES....2
4.0 INSPECTION AND MAINTENANCE PROCEDURES....3
4.1 Inspections....3
4.2 Maintenance....3

APPENDICES

Appendix A Seed Mix
Appendix B Grading Plan for Production Phase

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has developed this site-specific Interim Reclamation Plan to establish proper planning and execution for reclamation of the land within areas that are affected by oil and gas location construction and operations, but no longer in use by production operations. When all wells on a pad are completed and turned over to production, the drilling footprint will be reduced, and areas not needed for production will be restored and re-vegetated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) Series 1000 Reclamation Rules and consistent with the requirements of Rule 1003. Interim Reclamation. Reference shall also be made to Rules 304.c(14) Topsoil Protection Plan and 304.c(15) Stormwater Management Plan within this process.

Soil and aggregate mix used to build a compacted drilling pad will be removed. All segregated soil horizons removed from the disturbance area shall be replaced to their original relative positions and contour based on final land use and shall be tilled adequately to alleviate compaction and re-establish a proper seedbed. Final contour, irrigation, and landscape construction, including plantings and perennial seeding, will occur in the first favorable season. The area shall be treated as necessary to prevent invasion of undesirable species and noxious weeds as practicable. The site will be stabilized, inspected, and maintained to control erosion.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	Columbine 4-29HZ Well Pad and Facility
Location:	Sec 29, T2N, Range 67W, Firestone, Colorado
Total Area of Project:	12.66 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is winter wheat, land use is agriculture
Soil Type(s):	44-Olney loamy sand, 1-3% slopes 73-Vona loamy sand, 3-5% slopes
Operator ID:	47120
Reclamation Manager/Contact:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation 720-929-6317

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

1) Surface Owner Consultation and Timing: KMOG is the surface owner and interim reclamation shall occur approximately no later than 10/30/2023 after conclusion of subsequent operations. If soil conditions are not conducive due to weather conditions, a Sundry Notice Form 4 shall be submitted, and reclamation commenced as soon as conditions allow and as practicable.
2) Recontouring, Compaction Relief and Topsoil Redistribution: Refer to the Topsoil Protection Plan to address site specific requirements.
3) Soil Preparation: Equipment to be cleaned from soil or debris prior to mobilizing and commencing soil preparation operations between properties.
    a) Compaction Alleviation: After topsoil redistribution, the interim reclamation area shall be cross ripped to a depth of eighteen inches with an agricultural ripper/subsoiler; however, this depth may be adjusted in rocky or shallow soils. Chiseling/ripping will be performed at the minimum depth of topsoil. Cultipacking or disking may be required to reduce soil clod size. Ripping with construction style shanks, for the purpose of surface ridge roughness as a stormwater BMP, is only allowed to a six-inch depth.
    b) Leveling: All areas will be leveled and graded to drain properly and blend to the adjacent undisturbed land.
    c) Soil Amendments: Necessary amendments will be determined by soil analysis completed during Topsoil Protection Plan Site Investigation, land use, site conditions at time of interim reclamation, and surface owner consultation.
    d) Seedbed Preparation: Incorporate soil amendments by disking, harrowing or cultipacking and to provide a seedbed that is firm and friable, and properly crimp straw mulch material.
    e) Surface Rock Removal: Surface rocks that interfere with agricultural operations, seeding equipment or future mowing operations will be removed.
4) Seeding: Seed mix is considered based on consultations with NRCS, CPW, and Surface Owner; also, by soil type, land use, adjacent reference area vegetation and in accordance with Rule 1202.a.6. Seeding shall not occur in windy conditions or when the soil is frozen or wet. Equipment to be cleaned from previous mixes, soil, or debris, prior to mobilizing and commencing seeding operations between properties. Seed shall be applied using appropriate equipment that can place the specified seed at the specified rate and depth included as Appendix A.
5) Mulching: Due to location being in cropland, mulch will not be applied.
6) Implement Post-Construction Stormwater Control Measures: Additional erosion control measures and materials should include consideration of land use, surface owner grazing practices, and potential damage to materials. Refer to a site-specific stormwater management plan prior to implementation.
7) Weed control: Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act.
    a) Weed control measures shall be conducted in consultation with the Surface Owner and County Weed Management Specialist(s) based on site specific conditions. Kerr-McGee will monitor and control noxious weeds until achieving reclamation threshold for release within

reclaimed disturbance areas, including monitoring to measure success of treatments. Weed control measures employed may include mowing or removal and herbicide treatment during the appropriate growing season. During drilling, production, and reclamation operations, all disturbed areas shall be kept reasonably free of noxious weeds and undesirable species.

4.0 INSPECTION AND MAINTENANCE PROCEDURES

4.1 Inspections

Post-construction stormwater inspections will be conducted in accordance with COGCC Rules 1002.f and 1003.e, to document the status of the location, maintenance needs, effectiveness of stormwater control measures, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Reclamation Contact and conducted by their designated representative(s). Inspection forms will document current conditions, including evidence of or potential for off-site erosion, additional control measures that are needed, or repair and maintenance issues.

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection.

4.2 Maintenance

For maintenance items discovered, proposed repairs or upgrades to stormwater control measures, and reclamation areas will be documented and coordinated with production crews. Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for items requiring ground disturbance / earthwork.

APPENDIX A

Seed Mix

FORM 2B INTERIM RECLAMATION PLAN
(Appendix A): Seed Mix

Project/Site Name	Location	Existing Vegetation	Operator ID
COLUMBINE 4-29HZ Well Pad and Facility	T 2N: 67W Sec 29	Winter wheat, agricultural field	47120

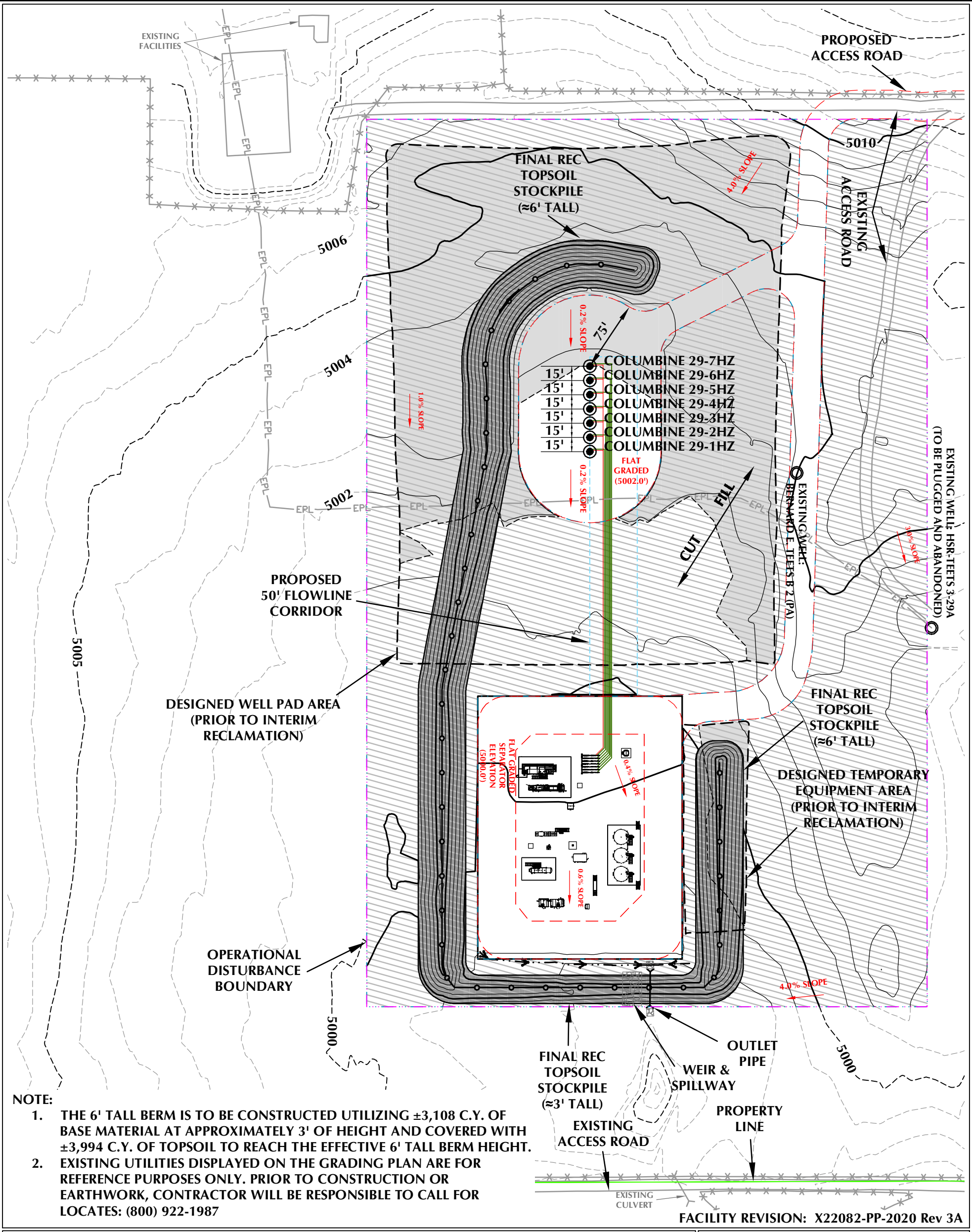
Landowner Requested Seed Mix

Crop Location

Due to the existing agricultural nature of the surrounding land to the proposed project, reclamation will be done to meet the requirements of Rule 1003.e.1. Segregated soil horizons will be replaced to their relative positions and contour, compaction alleviated, and proper preparation of the seed bed will occur.

APPENDIX B

Production Phase Grading Plan



NOTE:

1. THE 6' TALL BERM IS TO BE CONSTRUCTED UTILIZING ±3,108 C.Y. OF BASE MATERIAL AT APPROXIMATELY 3' OF HEIGHT AND COVERED WITH ±3,994 C.Y. OF TOPSOIL TO REACH THE EFFECTIVE 6' TALL BERM HEIGHT.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987

FACILITY REVISION: X22082-PP-2020 Rev 3A

WELL PAD - COLUMBINE 4-29HZ INTERIM RECLAMATION SUMMARY

QUANTITIES AND DESIGN PARAMETERS

SHRINKAGE FACTOR = 1.00
SWELL FACTOR = 1.00
TOTAL DISTURBANCE AREA = 12.66 ACRES
AREA RECLAIMED DURING
INTERIM RECLAMATION = 9.93 ACRES
TOTAL WELL PAD AREA AFTER
INTERIM RECLAMATION = 1.36 ACRES
TOTAL FACILITY PAD AREA AFTER
INTERIM RECLAMATION = 1.37 ACRES

WELL PAD QUANTITIES

TOTAL CUT = 1,119 C.Y.
TOTAL FILL = 1,119 C.Y.
TOPSOIL @ 14" DEPTH
FROM WELL PAD = 9,570 C.Y.
TOPSOIL @ 14" DEPTH
FROM FACILITY/TEMP TANK PAD = 3,310 C.Y.
TOTAL TOPSOIL = 12,880 C.Y.
TOPSOIL USED FOR INTERM REC = 8,886 C.Y.
TOPSOIL STORED FOR FINAL REC = 3,994 C.Y.
LAND USE = DRYLAND CROP

WELL PAD LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION
- EXISTING CONTOURS (1' INTERVAL)
- PROPOSED CONTOURS (1' INTERVAL)
- EXISTING PIPELINE
- PROPOSED FLOWLINE
- EXISTING FENCE
- RECLAMATION AREA
- BERM

HORIZONTAL 0 50' 100' 1" = 100'
1' CONTOURS

WELL PAD - COLUMBINE 4-29HZ

WELL PAD - INTERIM RECLAMATION
COLUMBINE 29-1HZ,
COLUMBINE 29-2HZ, COLUMBINE 29-3HZ,
COLUMBINE 29-4HZ, COLUMBINE 29-5HZ,
COLUMBINE 29-6HZ & COLUMBINE 29-7HZ
LOCATED IN SECTION 29, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100'	DATE: 9/23/2020	SHEET NO:
REVISED: HJL 6/17/21		1 1 OF 1

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\COLUMBINE_8_HALFMOON.dwg, 6/23/2021 2:21:32 PM, hayden

Section 15

Community Consultation Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

Community Consultation Plan

McGavin 6-19HZ and Columbine 4-29HZ Well Pads

DESCRIPTION OF AREA

The McGavin Working Pad Surface (WPS) is owned by the applicant and is located in the Town of Firestone, adjacent to the Town of Frederick. The McGavin pad is located south of Pine Cone Ave (CR 20) and east of Colorado Blvd (CR 13).

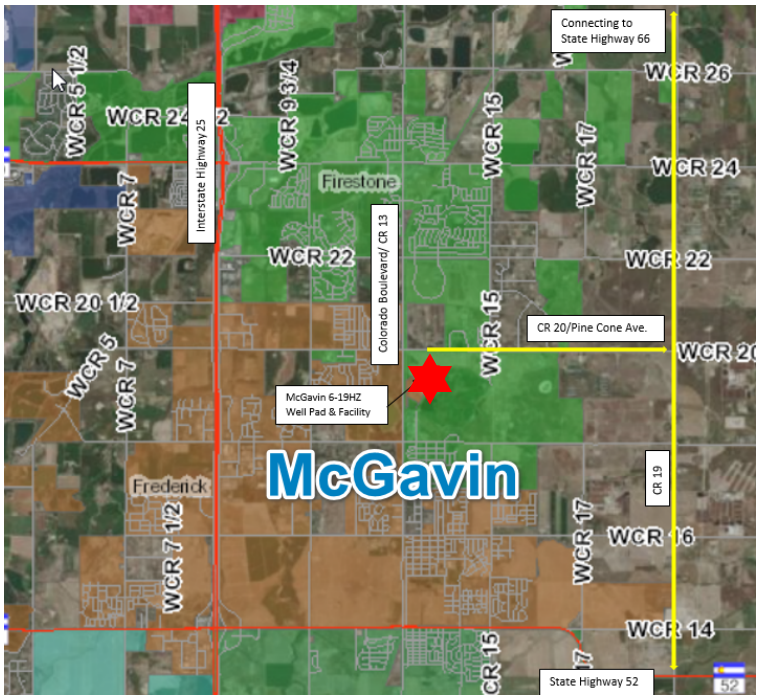


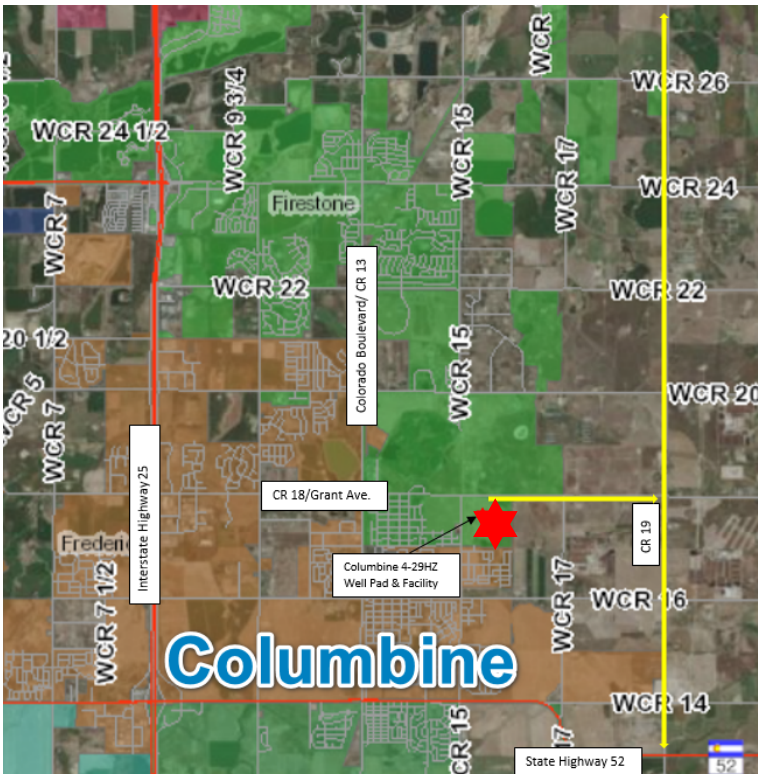
The Columbine WPS is also owned by the applicant and is located southeast of the McGavin pad near the intersection of Grant Ave (CR 18) and Frontier Street (CR 15).



PROPOSED OPERATIONAL HAUL ROUTES

Both the McGavin and Columbine locations will utilize CR 19 connecting to State Hwy 66 to the north and State Hwy 52 to the south. The McGavin location will be accessed via Pine Cone Ave (CR 20) and the Columbine location via Grant Ave (CR 18).

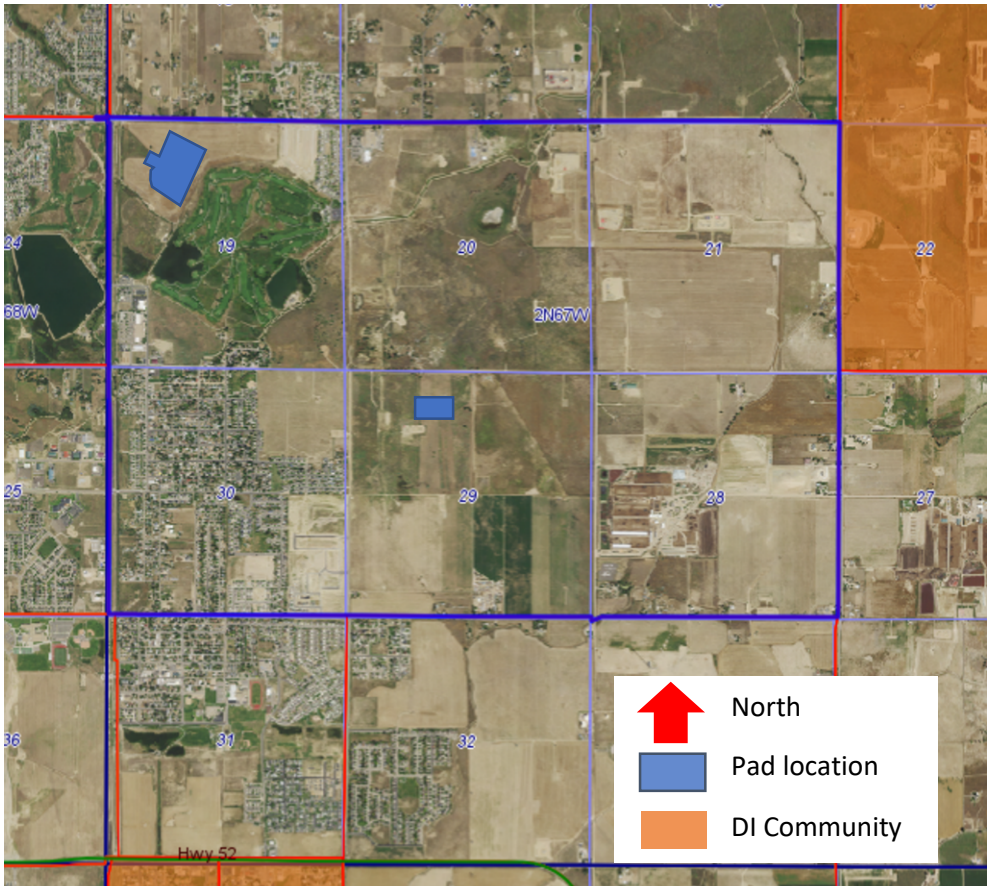




BLOCK GROUP DEMOGRAPHICS

Both the McGavin and Columbine locations fall within the same census block group and are approximately 1.5 miles east of the nearest disproportionally impacted community.

Block Group ID : 081230020161
Block Group Minority Population: 24.6 %
Linguistic Isolation: 1%
Median Household Income: $61,602



PLANNED COMMUNITY CONSULTATION

Because the area is not linguistically isolated (1%), we will send all notices and communications in English. However, we will provide translation services as requested. Our team will be available during daytime and evening hours via the Colorado Response Line and email.

We will consider owners and tenant's suggested mitigation measures and concerns related to public health, safety, welfare.

<u>Previous Communication:</u>

- In July 2020 we invited the neighborhood to a virtual community meeting to discuss the proposed projects. Out of the approximately 130 owners and residents that were invited only two registered to attend and three other residents contacted us after the scheduled meeting date. We contacted each of those residents and engaged and continue to engage with them individually.

Throughout Permitting:

- We will engage with owners and tenants within 2,000' of the WPS and within 300' of the property boundary and invite them to a virtual community meeting to learn more about the proposed projects. The community meeting will provide the owners and tenants with the following information:
    - A description and map of the physical siting of the proposed locations, including legal descriptions
    - A description, proposed timeline, and expected duration of different operations that are planned which include construction, drilling, completions, production, and reclamation
    - The number and orientation of wells, types of equipment, and other on- and off-location infrastructure related to planned operations
    - A description of each stage of operations along with a description of our best management practices to mitigate potential impacts including noise, vibration, light, odor, dust, traffic, and visual
    - Contact information for our Stakeholder Relations team, the Town of Firestone and the COGCC.
- After the first virtual community meeting, we will offer to meet with individuals and groups that have additional questions about the projects
- We will engage with homebuilders and provide information for them to provide to potential homebuyers about the proposed projects including and how to contact us
- Send the Completeness Determination Notice as described in COGCC Rule 303.e
- Complete any additional consultation as required under COGCC Rule 309.c
- Continue to engage with all owners and tenants within 2,000 feet of the WPS and within 300' of the property boundary prior to local and state public hearings

Prior to and after commencement of operations:

- Continue to engage with stakeholders to provide development updates and to answer questions or discuss concerns
- Send all required COGCC notices
- In addition to required notices, we frequently send courtesy notices to owners and tenants to ensure they have the most up to date information about our operations
- Throughout the lifecycle of the wells our Stakeholder Relations team is available to assist the community and can be reached at 866.248.9577 or ColoradoStakeholder@oxy.com Monday through Friday. Our 24-hour Integrated Operations Center can also be reached at 970.515.1500.

Section 16

Final Development Plan

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NE1/4 NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLOUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE COLUMBINE 4-29HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

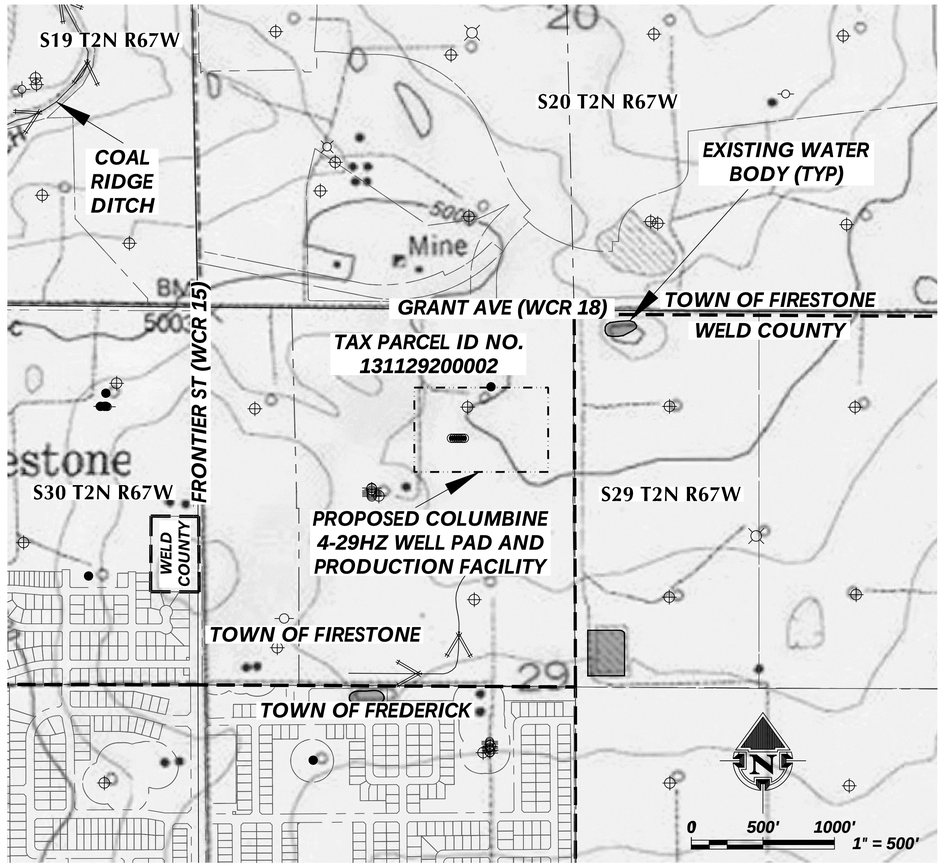
_____ MAYOR

ATTEST_____ TOWN CLERK

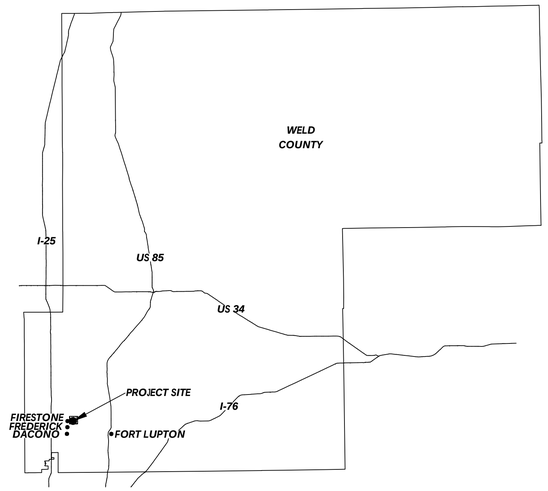
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- *CONSTRUCTION LIMITS OF DISTURBANCE*
- *PROPOSED WELL*
- *EXISTING WELL (PRODUCING)*
- *EXISTING WELL (PLUG & ABANDONED)*
- *EXISTING WELL (SHUT IN)*
- *EXISTING WELL (DRY AND ABANDONED)*
- *EXISTING WELL (TEMPORARILY ABANDONED)*
- *TOWN LIMITS*
- *WATER BODY*
- *PROPERTY LINE*
- *EXISTING DITCH / STREAM*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-013 / FDP21-013

SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_98_COLUMBINE_T2N_R67W_SEC_29\DWG\FINAL DEVELOPMENT PLAN\COLUMBINE 4-29HZ_FDP_COVER.dwg, 12/10/2021 3:20:53 PM, casey

COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013

OWNER: VISTAS AT SADDLEBACK (WELD COUNTY PARCEL I.D. 131119400038) ZONING: FIRESTONE

EXISTING FACILITY

S19 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300001) ZONING: FIRESTONE

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300025) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400034) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120400005) ZONING: FIRESTONE

S20 T2N R67W

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300002) ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC (WELD COUNTY PARCEL I.D. 131120300003) ZONING: FIRESTONE

OWNER: DIXIE WATER LLC (WELD COUNTY PARCEL I.D. 131120300022) ZONING: FIRESTONE

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273 DATE: 10/14/1889

TOWN OF FIRESTONE

GRANT AVE (WCR 18)

WELD COUNTY

OHP

ROAD EXISTING

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SEE ACCESS ROAD DETAIL

OWNER: KELLY ORRISA T (WELD COUNTY PARCEL I.D. 131120300023) ZONING: FIRESTONE

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

EXISTING ROAD (TO BE IMPROVED)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200002) ZONING: FIRESTONE

PROPOSED ACCESS ROAD

TEMPORARY EQUIPMENT AREA (215' x 60')

20'

20' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1632344) DATE: 03/20/74

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

60'

FRONTIER ST (WCR 15) 60' EXISTING ROW (BOOK 86 PAGE 273) DATE: 10/14/1889

OWNER: ANADARKO E & P ONSHORE LLC TRACT I THE OVERLOOK AT FIRESTONE, REPLAT "A" (WELD COUNTY PARCEL I.D. 131130117000) ZONING: FIRESTONE

S30 T2N R67W

PROPOSED COLUMBINE 4-29HZ WELL PAD

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131129200001) ZONING: FIRESTONE

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION RPLTA

EXISTING FACILITY

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1751456) DATE: 04/25/78

50'

EXISTING ACCESS ROAD

EXISTING FACILITY

OWNER: PATTON ROY C, PATTON MARGARET D & KANZLER DAWN E (WELD COUNTY PARCEL I.D. 131130100024) ZONING: AG-A

TOWN OF FIRESTONE

WELD COUNTY

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1699366) DATE: 09/20/76

50'

30' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 4084912) DATE: 02/23/15

30'

DRAINAGE EASEMENT (RECEPTION NO. 4176525) DATE: 01/27/16

PROPOSED DETENTION BASIN OUTLET (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691200, 1769650 & 1697790) DATE: 06/16/76, 10/13/78 & 09/01/76

50' WIDE RIGHT OF WAY EASEMENT (RECEPTION NO. 1691207) DATE: 06/16/76

50'

SUBDIVISION: THE OVERLOOK AT FIRESTONE SUBDIVISION

SUBDIVISION: VILLAGE EAST COMMUNITY RPLT #1

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #1

50'

EXISTING WATER BODY

50'

SUBDIVISION: HIDDEN CREEK FINAL PLAT AMD #4

EXISTING WATER BODY

EXISTING ROAD

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129100013) ZONING: AG-A

S29 T2N R67W

WHEATLAND BLVD (WCR 17)

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST (WELD COUNTY PARCEL I.D. 131129000011) ZONING: AG-A

WCR 17 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 17 PAGE 180

N

0 200' 400'

1" = 200'

ACCESS ROAD DETAIL

GRANT AVE (WCR 18)

106' 60'

30' R

42'

EXISTING FENCE (TYP.)

100' HARD SURFACE

EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)

GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273

PROPOSED ACCESS ROAD (26 FT.)

PROPOSED 15" CMP CULVERT

100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)

EXISTING ACCESS ROAD (TO BE IMPROVED)

N

0 50' 100'

1" = 50'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- EXISTING SANITARY SEWER LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING
- EXISTING DITCH / STREAM

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC

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SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

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1099 18th Street
Denver, Colorado 80202

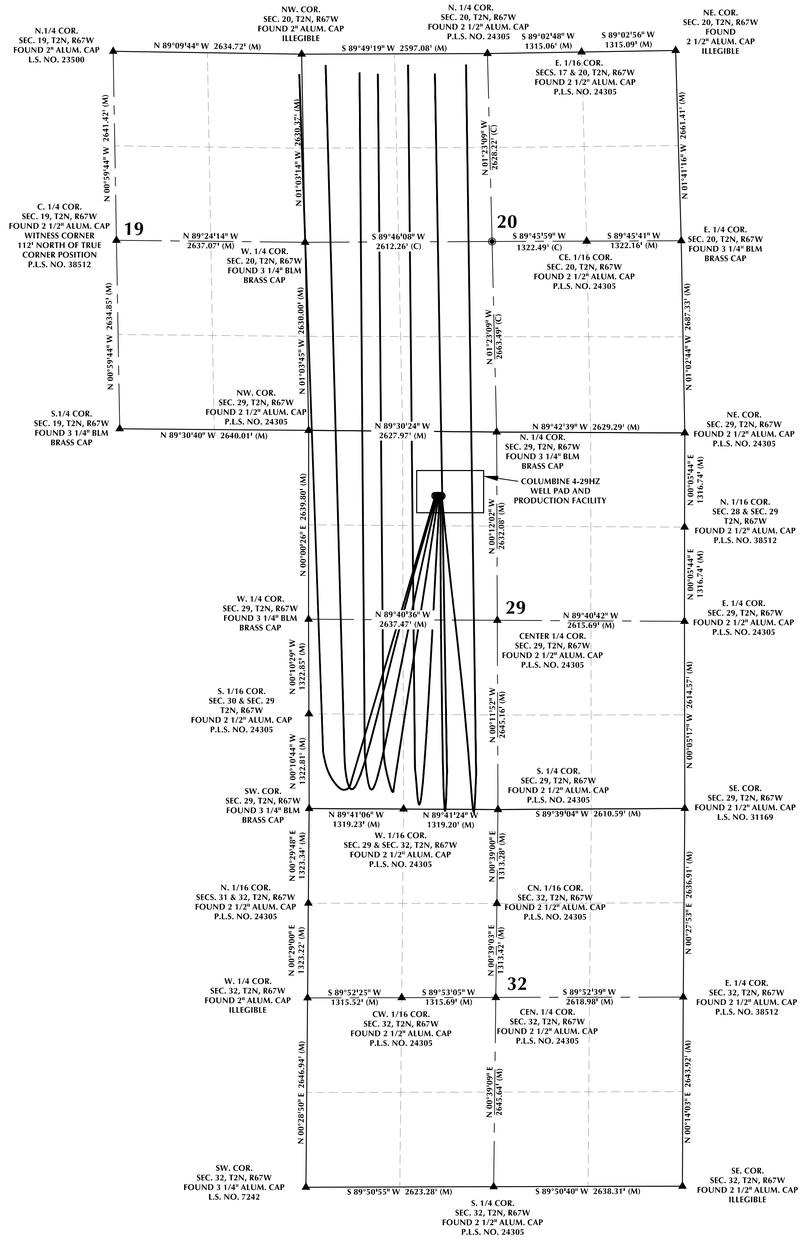
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-013 / FDP21-013

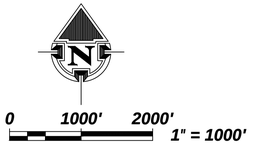
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SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- INDICATES CALCULATED SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. *BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.*
2. *ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972294 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-013 / FDP21-013

SCALE:	1" = 1000'	SHEET:	FDP-3
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

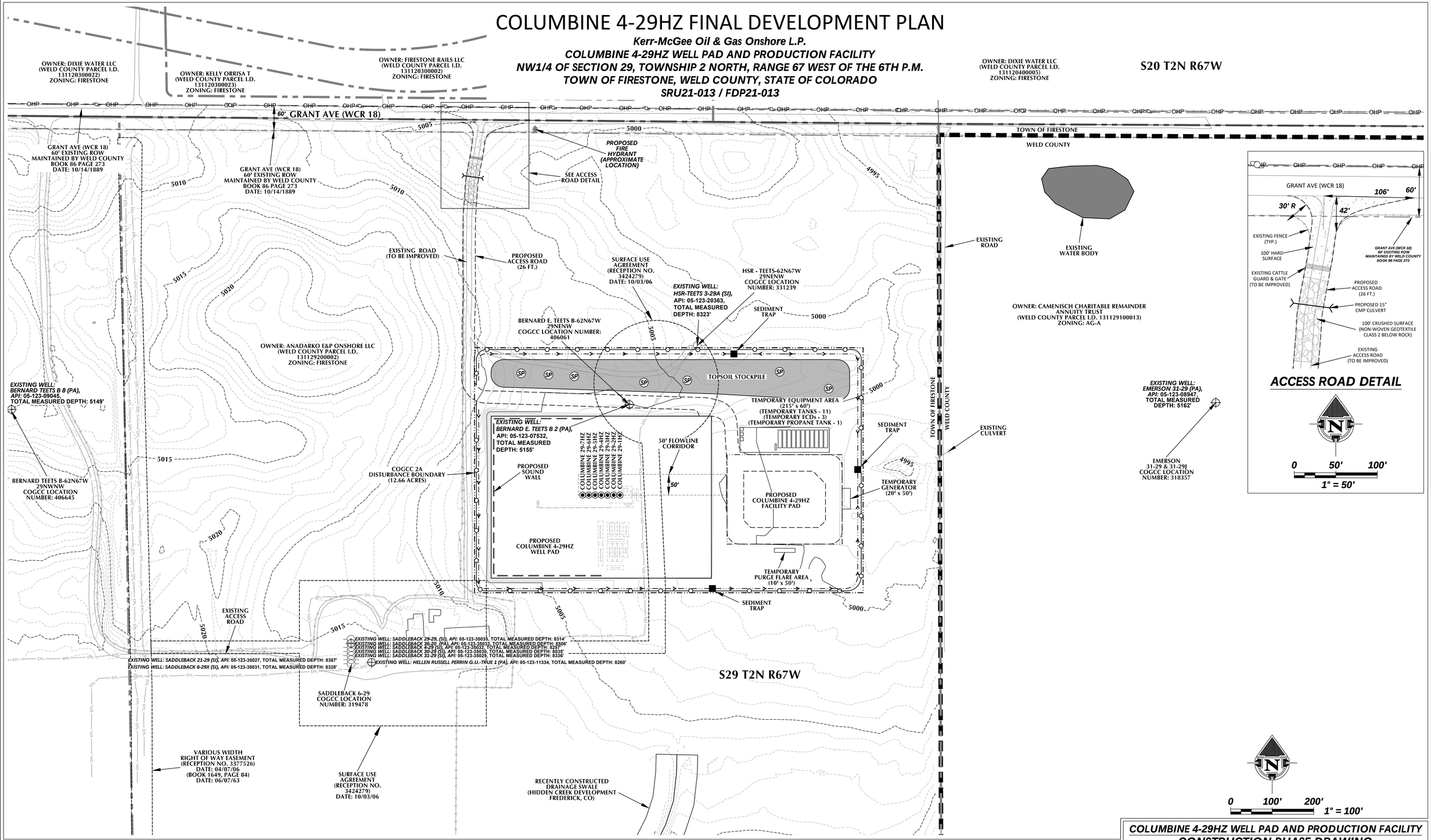
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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- DIVERSION DITCH
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

CONSTRUCTION PHASE DRAWING

SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-013 / FDP21-013

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120300022)
ZONING: FIRESTONE

OWNER: KELLY ORRISA T
(WELD COUNTY PARCEL I.D.
131120300023)
ZONING: FIRESTONE

OWNER: FIRESTONE RAILS LLC
(WELD COUNTY PARCEL I.D.
131120300002)
ZONING: FIRESTONE

OWNER: DIXIE WATER LLC
(WELD COUNTY PARCEL I.D.
131120400005)
ZONING: FIRESTONE

S20 T2N R67W

60' GRANT AVE (WCR 18)

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

GRANT AVE (WCR 18)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86 PAGE 273
DATE: 10/14/1889

TOWN OF FIRESTONE
WELD COUNTY

PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)

SEE ACCESS ROAD DETAIL

EXISTING ROAD (TO BE IMPROVED)

PROPOSED ACCESS ROAD (26 FT.)

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

EXISTING WELL: HSR-TEETS 3-29A (SI), API: 05-123-20363, TOTAL MEASURED DEPTH: 8323'

HSR - TEETS-62N67W 29NENW COGCC LOCATION NUMBER: 331239

BERNARD E. TEETS B-62N67W 29NENW COGCC LOCATION NUMBER: 406061

OWNER: ANADARKO E&P ONSHORE LLC
(WELD COUNTY PARCEL I.D.
13112900002)
ZONING: FIRESTONE

EXISTING WELL: BERNARD TEETS B 8 (PA), API: 05-123-09045, TOTAL MEASURED DEPTH: 5149'

BERNARD TEETS B-62N67W 29NWNW COGCC LOCATION NUMBER: 406645

EXISTING WELL: BERNARD E. TEETS B 2 (PA), API: 05-123-07532, TOTAL MEASURED DEPTH: 5155'

COGCC 2A DISTURBANCE BOUNDARY (12.66 ACRES)

PROPOSED COLUMBINE 4-29HZ WELL PAD

COLUMBINE 29-7HZ, COLUMBINE 29-6HZ, COLUMBINE 29-5HZ, COLUMBINE 29-4HZ, COLUMBINE 29-3HZ, COLUMBINE 29-2HZ, COLUMBINE 29-1HZ

50' FLOWLINE CORRIDOR

50'

OFF-SITE FLOW DEFLECTION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE VISUAL MITIGATION BERM CROSS SECTION DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED COLUMBINE 4-29HZ FACILITY PAD

SEEDED TOPSOIL STOCKPILE FOR FINAL RECLAMATION

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

EXISTING ROAD

EXISTING WATER BODY

OWNER: CAMENISCH CHARITABLE REMAINDER ANNUITY TRUST
(WELD COUNTY PARCEL I.D. 131129100013)
ZONING: AG-A

TOWN OF FIRESTONE
WELD COUNTY

EXISTING CULVERT

EXISTING WELL: EMERSON 31-29 (PA), API: 05-123-08947, TOTAL MEASURED DEPTH: 5162'

EMERSON 31-29 & 31-29J COGCC LOCATION NUMBER: 318357

EXISTING ACCESS ROAD

EXISTING WELL: SADDLEBACK 29-29, (SI), API: 05-123-35035, TOTAL MEASURED DEPTH: 8314'
EXISTING WELL: SADDLEBACK 36-20 (PA), API: 05-123-35033, TOTAL MEASURED DEPTH: 8506'
EXISTING WELL: SADDLEBACK 4-29 (SI), API: 05-123-35032, TOTAL MEASURED DEPTH: 8257'
EXISTING WELL: SADDLEBACK 30-29 (SI), API: 05-123-35030, TOTAL MEASURED DEPTH: 8035'
EXISTING WELL: SADDLEBACK 31-29 (SI), API: 05-123-35029, TOTAL MEASURED DEPTH: 8336'
EXISTING WELL: HELLEN RUSSELL PERRIN G.U.-TRUE 1 (PA), API: 05-123-11334, TOTAL MEASURED DEPTH: 8260'
EXISTING WELL: SADDLEBACK 21-29 (SI), API: 05-123-35027, TOTAL MEASURED DEPTH: 8387'
EXISTING WELL: SADDLEBACK 6-29X (SI), API: 05-123-35031, TOTAL MEASURED DEPTH: 8328'

S29 T2N R67W

SADDLEBACK 6-29 COGCC LOCATION NUMBER: 319478

VARIOUS WIDTH RIGHT OF WAY EASEMENT (RECEPTION NO. 3377526) DATE: 04/07/06 (BOOK 1649, PAGE 84) DATE: 06/07/63

SURFACE USE AGREEMENT (RECEPTION NO. 3424279) DATE: 10/03/06

RECENTLY CONSTRUCTED DRAINAGE SWALE (HIDDEN CREEK DEVELOPMENT FREDERICK, CO)

GRANT AVE (WCR 18)
106'
60'
30' R
42'
EXISTING FENCE (TYP.)
100' HARD SURFACE
EXISTING CATTLE GUARD & GATE (TO BE IMPROVED)
GRANT AVE (WCR 18) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86 PAGE 273
PROPOSED ACCESS ROAD (26 FT.)
PROPOSED 15" CMP CULVERT
100' CRUSHED SURFACE (NON-WOVEN GEOTEXTILE CLASS 2 BELOW ROCK)
EXISTING ACCESS ROAD (TO BE IMPROVED)

ACCESS ROAD DETAIL

0 50' 100'
1" = 50'

0 100' 200'
1" = 100'

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
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- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED PERMANENT SEEDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6***

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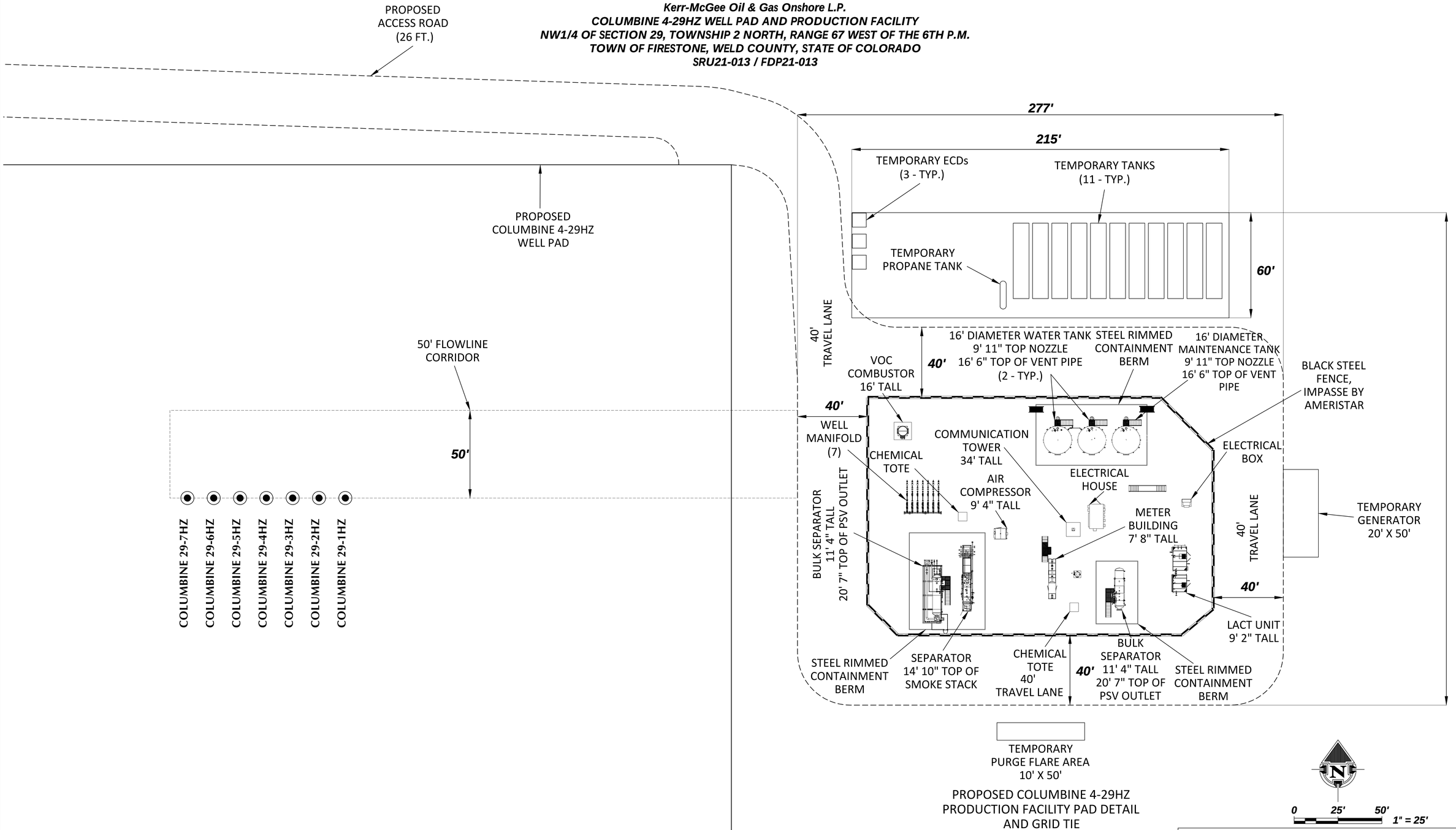
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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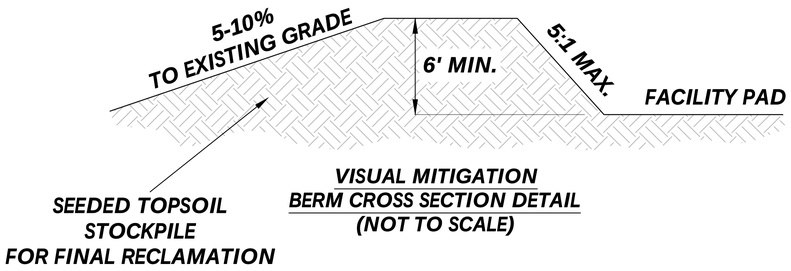
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-013 / FDP21-013

SCALE:	1" = 25'	SHEET:	FDP-6
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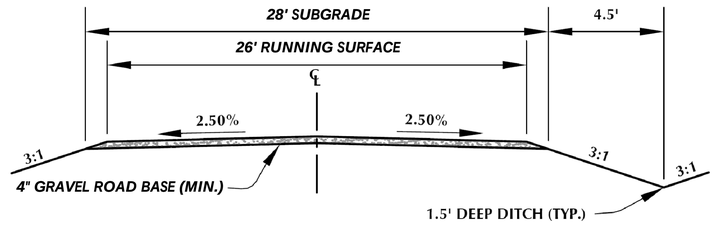
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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

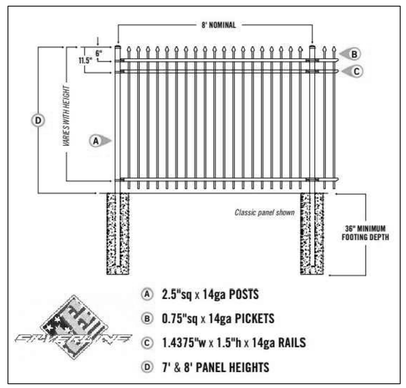
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COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013



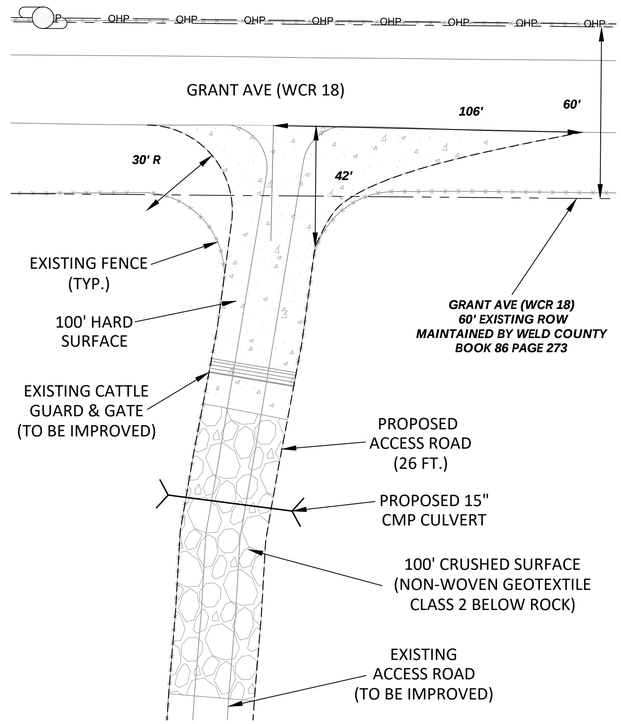
VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



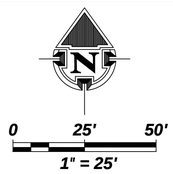
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE COLUMBINE 4-29HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

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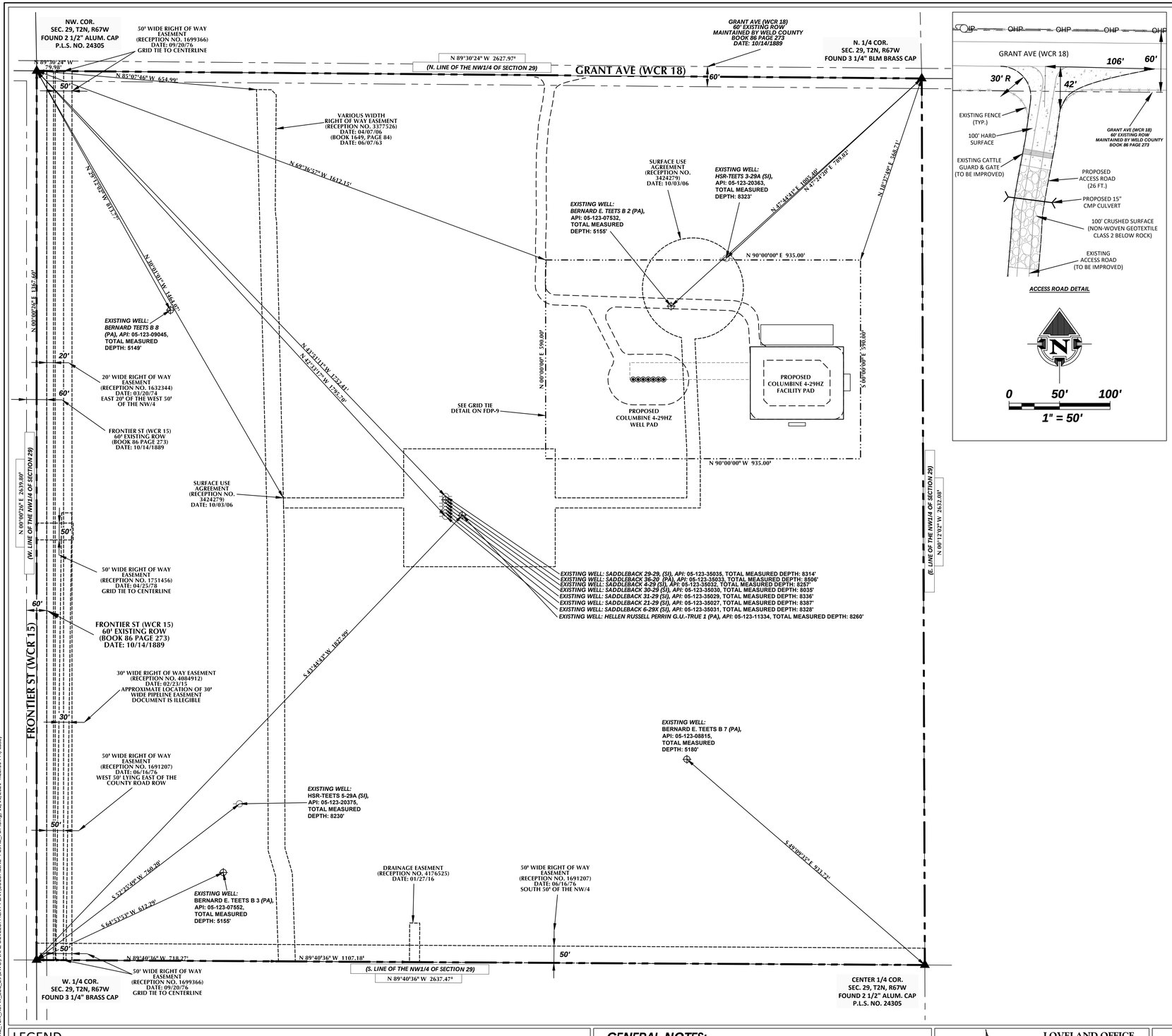
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-013 / FDP21-013

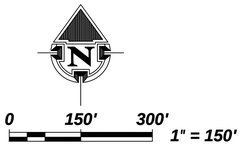
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SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
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- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

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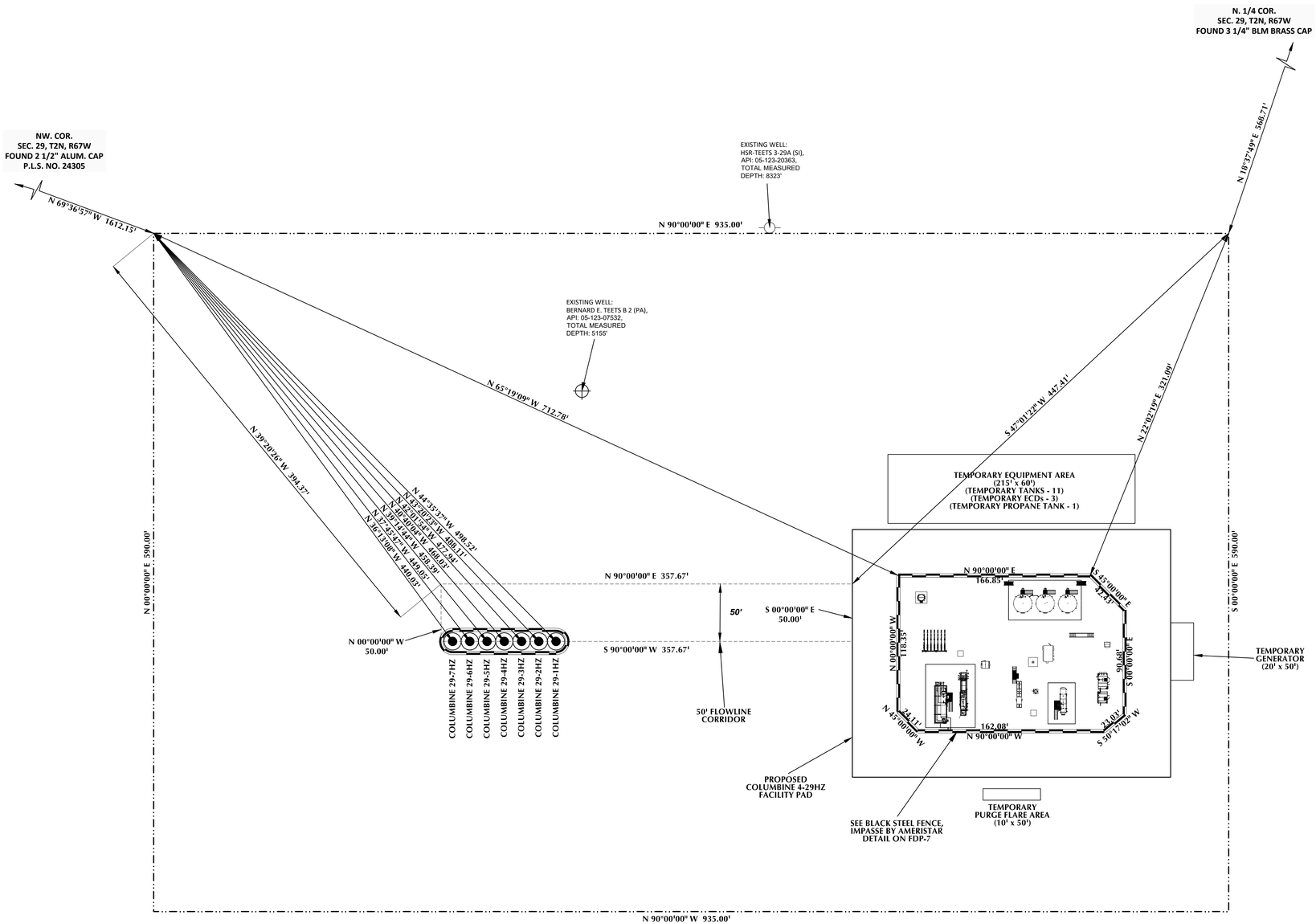
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-013 / FDP21-013

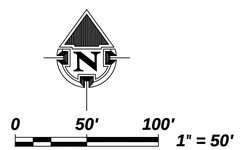
SCALE:	1" = 150'	SHEET:	FDP-8
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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COLUMBINE 4-29HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore L.P.
COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-013 / FDP21-013





LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

COLUMBINE 4-29HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-013 / FDP21-013

SCALE:	1" = 50'	SHEET:	FDP-9
SURVEY DATE:	6/18/2020	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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Section 17

Alta Survey

Columbine 4-29HZ Well Pad and Facility

Township 2N, Range 67W: Section 29, NENW
Firestone, Colorado

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTHWEST 1/4 OF SECTION 29

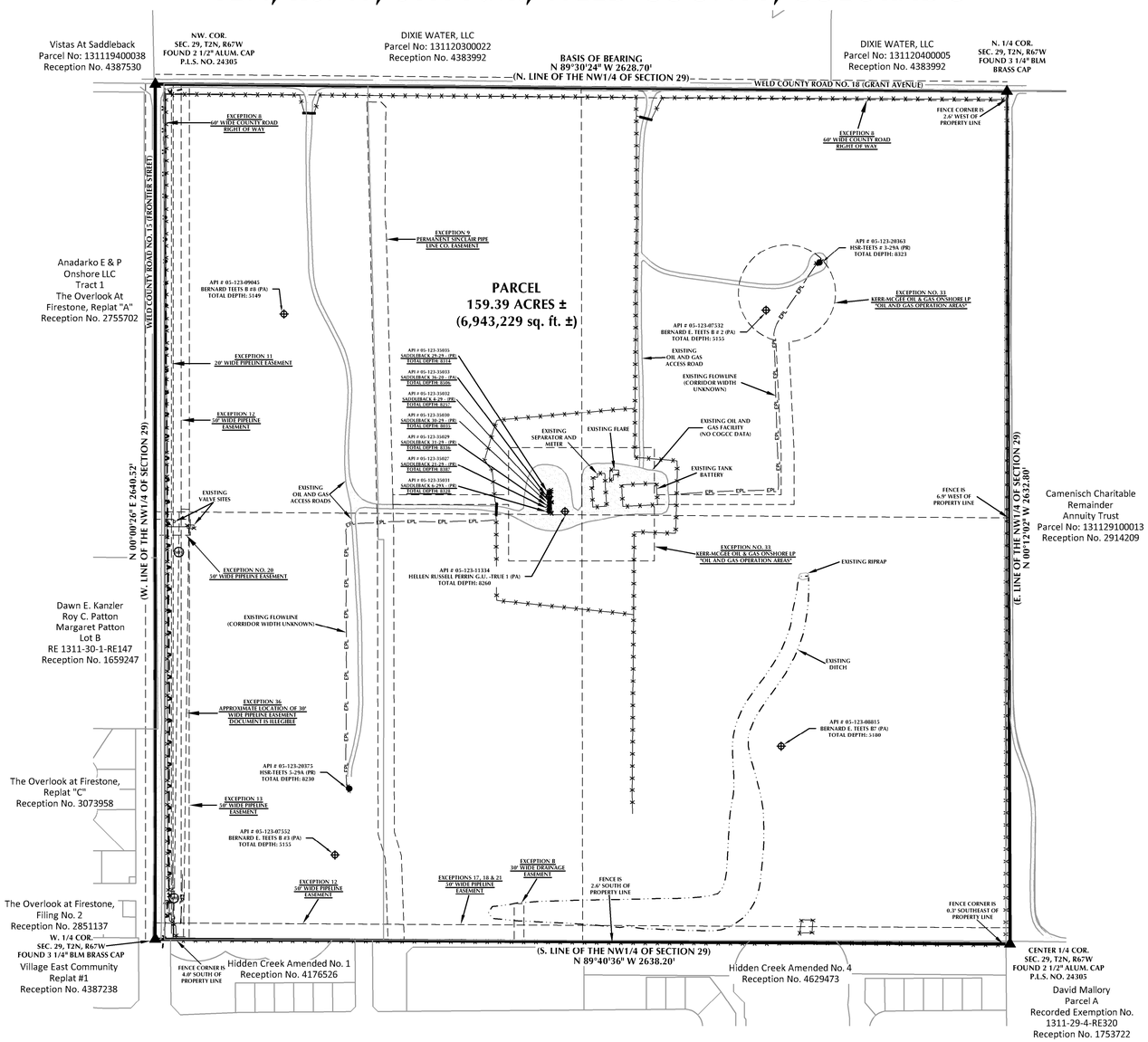
T2N, R67W, 6TH P.M., WELD COUNTY, COLORADO

EXCEPTIONS PER TITLE COMMITMENT, ORDER NUMBER FCC25129139-2:

8. RIGHT OF WAY FOR COUNTY ROADS 30 FEET ON EITHER SIDE OF SECTION AND TOWNSHIP LINES, AS ESTABLISHED BY THE BOARD OF COUNTY COMMISSIONERS FOR WELD COUNTY, RECORDED OCTOBER 14, 1889 IN BOOK 86 AT PAGE 273. PLOTTED HEREON.
9. RIGHT OF WAY EASEMENT AS GRANTED TO SINCLAIR PIPE LINE CO. IN INSTRUMENT RECORDED JUNE 07, 1963, IN BOOK 1649 AT PAGE 84 AND AMENDMENT RECORDED APRIL 7, 2006 AT RECEPTION NO. 3377526. PLOTTED HEREON.
10. SUBJECT TO OIL AND GAS LEASE RECORDED APRIL 03, 1970 UNDER RECEPTION NO. 1544892 IN BOOK 623 AND ANY AND ALL ASSIGNMENTS THEREOF, OR INTEREST THEREIN. NOTE: EXTENSION OF THE ABOVE LEASE AS CLAIMED BY AFFIDAVIT OF PRODUCTION WAS RECORDED MARCH 18, 1971 UNDER RECEPTION NO. 1578841 IN BOOK 657. NOT PLOTTABLE.
11. RIGHT OF WAY EASEMENT AS GRANTED TO CENTRAL WELD COUNTY WATER DISTRICT IN INSTRUMENT RECORDED MARCH 20, 1974, UNDER RECEPTION NO. 1632344 IN BOOK 710. PLOTTED HEREON.
12. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED JUNE 16, 1976, UNDER RECEPTION NO. 1691207 IN BOOK 769. PLOTTED HEREON.
13. RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPE LINE CO. IN INSTRUMENT RECORDED SEPTEMBER 20, 1976, UNDER RECEPTION NO. 1699366 IN BOOK 777. PLOTTED HEREON.
14. RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED OCTOBER 12, 1976, UNDER RECEPTION NO. 1701003 IN BOOK 779 AND RECORDED DECEMBER 1, 1976 AT RECEPTION NO. 1704793 IN BOOK 783. SUBJECT TO RECEPTION NO. 1701003. BASED ON THE DESCRIPTION CONTAINED IN THE RECORD DOCUMENT - DOES NOT AFFECT.
15. SUBJECT TO MINERAL RESERVATIONS AND INTERESTS AS SET FORTH IN DEED RECORDED JULY 31, 1958 IN BOOK 1456 AT PAGE 536. NOT PLOTTABLE.
16. SUBJECT TO UNDIVIDED 90 INTEREST IN ALL OIL, GAS AND OTHER MINERALS LYING IN, ON OR UNDER SUBJECT PROPERTY AND RESERVATION OF EASEMENT AS CONVEYED IN INSTRUMENT RECORDED MARCH 03, 1960 IN BOOK 1552 AT PAGE 264. COAL MINE ACCESS EASEMENT LOCATION CANNOT BE DETERMINED FROM THE RECORD DOCUMENT.
17. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED JUNE 16, 1976, UNDER RECEPTION NO. 1691200 IN BOOK 769. PLOTTED HEREON.
18. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED SEPTEMBER 01, 1976, UNDER RECEPTION NO. 1697790 IN BOOK 776. PLOTTED HEREON.
19. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED SEPTEMBER 03, 1976, UNDER RECEPTION NO. 1698045 IN BOOK 776. BLANKET EASEMENT.
20. RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPELINE CO. IN INSTRUMENT RECORDED APRIL 25, 1978, UNDER RECEPTION NO. 1751456 IN BOOK 829. PLOTTED HEREON.
21. RIGHT OF WAY EASEMENT AS GRANTED TO AMOCO PRODUCTION CO. IN INSTRUMENT RECORDED OCTOBER 13, 1978, UNDER RECEPTION NO. 1769650 IN BOOK 848. PLOTTED HEREON.
22. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO PANHANDLE EASTERN PIPELINE CO. IN INSTRUMENT RECORDED JANUARY 26, 1984, UNDER RECEPTION NO. 1954198 IN BOOK 1019. BLANKET EASEMENT.
23. RIGHT OF WAY EASEMENT AS GRANTED TO CONTINENTAL PIPE LINE CO. IN INSTRUMENT RECORDED JANUARY 13, 1986, UNDER RECEPTION NO. 2038946 IN BOOK 1099. THE SOUTHWEST 1/4 OF THE NORTHWEST 1/4 OF SECTION 29 IS SUBJECT TO THIS EASEMENT. BLANKET EASEMENT.
24. SUBJECT TO ALL OIL, GAS, MINERALS AND OTHER MINERAL RIGHTS AS RESERVED IN INSTRUMENT RECORDED FEBRUARY 17, 1989, UNDER RECEPTION NO. 2171145 IN BOOK 1224, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN. NOT PLOTTABLE.
25. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF ANNEXATION AGREEMENT RECORDED JULY 21, 1997 AT RECEPTION NO. 2558854 AND AMENDED OCTOBER 4, 2004 AT RECEPTION NO. 3224411. NOT PLOTTABLE.
26. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF NOTICE RECORDED JANUARY 27, 2000 AT RECEPTION NO. 2746643. NOT PLOTTABLE.
27. SUBJECT TO RIGHT OF WAY EASEMENT AS GRANTED TO HS RESOURCES INC. IN INSTRUMENT RECORDED JUNE 11, 2001, UNDER RECEPTION NO. 2856501. LOCATION CANNOT BE DETERMINED FROM THE RECORD DOCUMENT.
28. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED JULY 02, 2002 AT RECEPTION NO. 2966063. NOT PLOTTABLE.
29. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF MEMORANDUM OF AGREEMENT RECORDED JANUARY 02, 2003 AT RECEPTION NO. 3020296. NOT PLOTTABLE.
30. MATTERS AS SET FORTH ON SURVEY RECORDED OCTOBER 10, 2003 AT RECEPTION NO. 3116133. THIS PROPERTY IS PARCEL "B" ON THIS LAND SURVEY PLAT. NOT PLOTTABLE.
31. SUBJECT TO ALL OIL, GAS AND OTHER MINERALS LYING IN, ON OR UNDER SUBJECT PROPERTY AS CONVEYED IN INSTRUMENT RECORDED JULY 26, 2005 UNDER RECEPTION NO. 3306235. NOT PLOTTABLE.
32. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED APRIL 21, 2006 AT RECEPTION NO. 3381135. NOT PLOTTABLE.
33. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF SURFACE USE AGREEMENT RECORDED OCTOBER 03, 2006 AT RECEPTION NO. 3424279. PLOTTED HEREON.
34. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF REQUEST FOR NOTIFICATION RECORDED DECEMBER 21, 2007 AT RECEPTION NO. 3525268. NOT PLOTTABLE.
35. SUBJECT TO TERMS, CONDITIONS AND PROVISIONS OF ORDER RECORDED DECEMBER 27, 2007 AT RECEPTION NO. 3526088. NOT PLOTTABLE.
36. RIGHT OF WAY EASEMENT AS GRANTED TO KERR-MCGEE GATHERING LLC IN INSTRUMENT RECORDED FEBRUARY 23, 2015, UNDER RECEPTION NO. 4084912. PLOTTED HEREON.

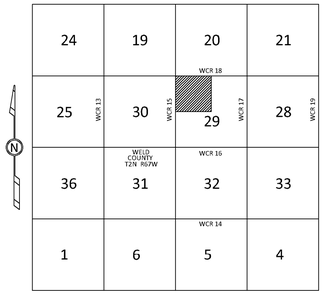
EXCEPTIONS PER ENDORSEMENT: ORDER NUMBER 25129139:

A. SPECIAL WARRANTY DEED RECORDED NOVEMBER 23, 2015 AT RECEPTION NO. 4160011. NOT PLOTTABLE.
B. TERMS, CONDITIONS AND PROVISIONS OF DRAINAGE EASEMENT RECORDED JANUARY 27, 2016 AT RECEPTION NO. 4176525. PLOTTED HEREON.



LEGEND:

- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- PROPERTY LINE
- EDGE OF DIRT ROAD
- EXISTING PIPELINE (EPL)
- EXISTING WATERLINE
- EXISTING EASEMENT
- FENCE
- DITCH
- CATTLE GUARD
- PRODUCING OIL/GAS WELL (PR)
- PLUGGED & ABANDONED OIL/GAS WELL (PA)
- MANHOLE
- FOUND SECTION CORNER MONUMENT AS INDICATED
- GRAVEL/DIRT



LOCATION MAP
NOT TO SCLAE

DESCRIPTION PER TITLE REPORT

THE NORTHWEST 1/4 OF SECTION 29, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M., COUNTY OF WELD, STATE OF COLORADO.

Notes:

1. Easements and exceptions shown hereon are based on Old Republic National Title Insurance Company Commitment, Order Number: FCC25129139-2, with an effective date of February 23, 2015, at 5:00 p.m. and Old Republic National Title Insurance Company Order Number: 25129139, with an effective date of August 7, 2020.
2. Bearings are based on the North line of the Northwest 1/4 as being N89°30'24" W. Monumented as shown.
3. Basis of bearing derived from Colorado Coordinate System NAD83, North Zone.
4. This parcel contains 6,943,229 square feet or 159.39 acres, more or less.
5. Utilities shown hereon are those which were visible on the surface of the ground and were located with paint and flags at the date of the survey.
6. Oil and gas well names and data taken from COGCC website.
7. Distances are U.S. Survey Foot.
8. Address: Vacant Land Firestone.
9. Adjoiner property owner information taken from Weld County, Colorado GIS map server.
10. According to Colorado state law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date on the certification shown hereon.
11. There are no buildings on the property.

Surveyor's Certificate

To: Town of Firestone.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 4, 8, and 11 of Table A thereof. The field work was completed on April 28, 2021.

COLORADO LICENSED
RANDALL K. FRENCH
38512
10/6/21
PROFESSIONAL LAND SURVEYOR

Randall K. French

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

0 200' 400'
SCALE: 1" = 200'

REVISIONS:
10/6/21 - ADD WELL INFORMATION

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTHWEST 1/4 OF SECTION 29, T2N, R67W, 6TH P.M., WELD COUNTY, COLORADO

609 CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY:	
RZP	
CHECKED BY:	
RKF	
DATE:	JOB:
6/22/21	16-98

SHEET NO: 1 OF 1

K:\JOBS\16-98\SURVEY\16-98_ALTA_NSPS_TITLE_SURVEY_FCC25129139-2_10-6-21.dwg, 10/6/2021 3:33:05 PM, rkf

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COOPERATIVE DEVELOPMENT PLAN AGREEMENT

This Cooperative Development Plan Agreement ("Agreement") is made and entered into this 14th day of April, 2021 (the "Effective Date"), by and between the Town of Firestone, a Colorado municipal corporation ("Firestone" or "Town"), whose address is 151 Grant Ave, P.O. Box 100, Firestone, Colorado 80520, Kerr-McGee Oil & Gas Onshore LP ("Kerr-McGee"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202, and Anadarko E&P Onshore LLC, a Delaware limited liability company ("AEP"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202. Kerr-McGee, AEP, and Firestone or Town may be referred to individually as a "Party" or collectively as the "Parties."

BACKGROUND

Firestone and Kerr-McGee recognize the importance of the public health, safety and welfare, as well as the environment and wildlife resources to Colorado's economy and culture, including the citizens of Firestone. The Parties also recognize that responsible and orderly development of oil and gas resources in the Town must be consistent with and subject to Firestone's land use authority and general police powers to protect the health, safety, and welfare of the Town's residents, including the protection of the environment and wildlife resources, to prevent waste in the production and utilization of oil and gas, and to avoid or minimize any adverse impacts to public health, safety and welfare and the environment associated with oil and gas development. To achieve such mutual objectives in a cooperative manner, Firestone and Kerr-McGee enter into this Agreement to accomplish the following:

1. To site new well pads and associated facilities and rights-of-way that Kerr-McGee plans to develop within Firestone at locations that will protect public health, safety, and welfare and the environment by avoiding impacts associated with oil and gas operations and minimizing and mitigating the extent and severity of those impacts that cannot be avoided, consistent with Firestone's land use authority and general police powers;

2. To further minimize and mitigate the unavoidable impacts and other land use effects associated with this type of development, by developing oil and gas operational standards needed for responsible development, including requirements for odor mitigation, noise mitigation, lighting installation, road maintenance, and landscape restoration that supplement state environmental requirements in an efficient and cost-effective manner, all to benefit the Town and its residents; and

NOW THEREFORE, the Parties agree as follows:

ARTICLE I. GENERAL PROVISIONS

1. Intent to Supplement State Rules and Regulations. The Parties recognize that pursuant to the Colorado Oil and Gas Conservation Act, Colo. Rev. Stat. § 34-60-101 et seq., as amended, the Colorado Oil and Gas Conservation Commission ("COGCC") regulates the development and

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production of oil and gas resources in Colorado, and the Act authorizes the COGCC to adopt statewide rules and regulations, which the COGCC has done. The Operational Standards developed jointly by the Parties and identified in this Agreement are not intended to abrogate, repeal or impair any state rules and regulations, but instead are intended to supplement any existing or future state rules and regulations. The Parties acknowledge that the Operational Standards set forth herein are subject to future rulemaking by the COGCC; thus, in the event of a conflict or overlap between any Operational Standards set forth herein and any existing or future rule or regulation promulgated by the COGCC, whichever standard, rule, or regulation imposes the more stringent restriction shall prevail, and Kerr-McGee shall abide by the more stringent restriction.

2. **Exercise of Local Land Use Authority**. The Parties further recognize that Firestone, through its land-use authority and general police powers, can regulate various aspects of oil and gas operations in a reasonable manner as specified in C.R.S. § 29-20-104(1)(h)(I)-(IV) and to protect and minimize adverse impacts to public health, safety and welfare and the environment. Furthermore, the Parties recognize that to implement the powers and authority granted in C.R.S. § 29-20-104(1)(h), Firestone has the authority to inspect facilities, impose fines for leaks, spills and emissions, and impose fees to cover the costs of permitting and regulating oil and gas operations within its boundaries, in accordance with C.R.S. § 29-20-104(2). Provided, however, the Town will comply with any and all written or oral safety requirements when entering Kerr-McGee facilities, including, but not limited to, complying with the use of personal protective equipment and complying with necessary distance restrictions. Finally, the Parties also recognize that Kerr-McGee must apply for, and obtain approval from, Firestone for siting oil and gas surface locations before it can obtain approval for, an Application for Permit to Drill or Spacing Unit Applications, as set forth in C.R.S. § 34-60-106(f)(I)(A).

3. **Applicability.** This Agreement and the Operational Standards will apply to all new wells that Kerr-McGee drills on the Identified Well Pads during the Term of this Agreement. This Agreement will not apply to any wells for which Kerr-McGee is not the operator.

4. **Term.** This Agreement shall commence on the Effective Date, and shall expire four (4) years from the Effective Date ("Term"). The Term may be extended by mutual written agreement of the Parties.

5. **Effect of Termination on Special Use Permit Approval.** Termination of this Agreement by either Party shall in no way affect or limit either Parties' legal or equitable remedies it may have under the Code (defined below) or at law or in equity. In the event this Agreement expires or is otherwise terminated, such expiration or termination shall not prevent any operations and/or development of the Identified Well Pads and well(s) that were previously permitted or otherwise approved by the Town prior to the expiration or termination of this Agreement, nor shall expiration or termination of this Agreement exempt such operations and/or development of the Identified Well Pads, new wells drilled at the Identified Well Pads during the Term of this Agreement, or previously approved wells from any applicable Town development review regulations and processes. Additionally, such expiration or termination shall in no way affect or limit the Town's right in the future to refuse to grant a special use permit, or suspend any special use permit for oil and gas wells requested by or granted to Kerr-McGee pursuant to the Code. Nothing in this Agreement shall be construed as granting or creating any statutory vested development rights at the Identified Well Pads.

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6. **Drilling and Development Schedule.** In consultation with Firestone, Kerr-McGee has developed a Drilling and Development Schedule that includes: McGavin and Columbine well pad sites (the "Identified Well Pads"); and (ii) the operational standards that will apply to such development. The operational standards are listed in Exhibit A ("Operational Standards"), and the Identified Well Pads are depicted in the Cooperative Development Area and Land Contribution Map attached as Exhibit B. Kerr-McGee will not drill more than thirty-three (33) wells total from the two identified well pad sites collectively.

ARTICLE II. APPROVAL PROCESS, OPERATIONS, AND CONSIDERATION

1. **Special Review Use and Final Development Plan Submission Requirements.** For each new oil and gas well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will follow the requirements, procedures, and application elements outlined in Section 7.11, Special Review Use and Section 7.10, Final Development Plan of the Firestone Development Code (the "Code"), as amended, for special review use and final development plan approvals. The Town's Board of Trustees will review the applications using the criteria outlined in Section 7.11 and Section 7.10 of the Code, as amended. If Section 7.11 and Section 7.10 of the Code are amended and any such ordinance amending Section 7.11 and Section 7.10 of the Code is legally pending on the date of a special review use and final development plan application submissions, Kerr-McGee will comply with the amended requirements and procedures for its operations established in such ordinance. The Town recognizes that time is of the essence with respect to approval of special review use and final development plans, and will use its best efforts to process Kerr-McGee's applications submitted pursuant to this Article II, Section 1 in a prompt and timely manner. To that end, the Town agrees that staff review of the applications will take no longer than ninety (90) calendar days after the Town determines the application is complete.

2. **Incorporation of Operational Standards as Conditions of Special Review Use and Final Development Plan.** Each application for special review use and final development plan approval for an oil and gas well that Kerr-McGee submits shall include, as part of the application elements required under the Code, the Operational Standards set forth on Exhibit A, and each special review use and final development plan granted by the Town shall contain the Operational Standards as conditions of operations for such special review use and final development plan.

3. **Kerr-McGee's Operations.** For each new well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will operate such well in compliance with the Operational Standards as set forth in Exhibit A, the Code, as amended, and any other conditions or requirements of the special review use and final development plan approvals issued by the Town for such well.

4. **Kerr-McGee's Contributions.** To minimize and mitigate potential impacts from the Identified Well Pads and associated wells, and to otherwise foster future development opportunities for the Town, AEP, on behalf of Kerr-McGee, shall make contributions to the Town as follows:

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a. Land Contribution.

(i) Within sixty days of Kerr-McGee receiving all necessary local and state permits, approvals, and all necessary easements, Anadarko E&P Onshore LLC ("AEP or Grantor") shall convey to the Town by special warranty deed good, marketable, title (the "Interest"), but specifically reserving and excluding any mineral interest, to approximately seventy-eight (78) acres of real property generally located at the southwest corner of Grant Avenue and Frontier Street and west of the Columbine well pad site ("Grant and Frontier Parcel"), as depicted on Exhibit B (. The Parties agree that the Town may obtain title insurance for the Interest at its own cost, expense, and risk.

The Interest. The Interest includes all of AEP's rights, title and interest, if any, in and to all appurtenances thereto, including but not limited to any fences, buildings, landscaping, and other improvements now located thereon, including all fixtures of a permanent nature, but specifically excluding any fixtures used for or associated with oil and natural gas development, if any, but shall specifically exclude any and all interests or ownership of AEP in any and all minerals in place or under the entirety of the Grant and Frontier Parcel ("Mineral Interest"). The Parties acknowledge and agree that the Mineral Interest shall be reserved to the Grantor in the deed of conveyance executed by AEP and delivered to the Town. The Interest shall also include all of AEP's right, title and interest, if any, in and to all strips and gores of land lying between the Interest and adjoining property or streets, roads or highways, open or proposed. Finally, the Interest shall include all surface and subsurface water and water rights, ditches and ditch rights, ponds and pond rights, springs and spring rights, wells and well rights, whether decreed or not, if any, attached or appurtenant to or used in connection with the Grant and Frontier Parcel and owned by AEP and any title, interest, or right that AEP may have to convey water to the Grant and Frontier Parcel.

Title and Taxes. AEP shall deliver to the Town a special warranty deed, in the form set forth on Exhibit C, attached hereto, duly executed and acknowledged by an authorized corporate representative or officer, sufficient to convey good and marketable title to the Grant and Frontier Parcel to the Town, but reserving to AEP the Mineral Interest described above, free and clear of all liens, tenancies and encumbrances except only those permitted exceptions mutually agreed upon by the parties. Neither Kerr-McGee nor AEP shall not, after the Effective Date hereof, sell, convey, option or contract to do any of the foregoing or otherwise convey, abandon, relinquish, cloud or encumber title to the Grant and Frontier Parcel or any part thereof or contract to do any of the foregoing in a manner which would survive delivery of the special warranty deed. AEP shall be responsible for all real and personal property taxes on the Grant and Frontier Parcel, prorated to the date of

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delivery of the special warranty deed based on the most recent assessed valuations and mill levy available, which proration shall be deemed a final settlement between the parties.

(ii) AEP hereby agrees to grant to the Town a right of first refusal to acquire approximately fifteen (15) acres of real property generally located at the southeast corner of Colorado Boulevard and Pine Cone Avenue and west of the McGavin Well Pad (the "Pine Cone Parcel") as generally depicted on Exhibit B, subject to the terms and conditions specified herein.

Right of First Refusal. For a period of five years from the date of execution of this Agreement, AEP will not sell the Pine Cone Parcel, or any part thereof, without first offering it to the Town for purchase. The right of first refusal granted to the Town shall be honored by AEP and exercised in the following manner:

(1) If, during the period of the right of First Refusal, AEP receives a third-party offer to purchase or otherwise acquire title to the Pine Cone Parcel, or any part thereof, any contract which may be entered into between AEP and such purchaser shall specifically provide that the transaction shall be subject to the right of first refusal set forth in this Agreement.

(2) In the event that AEP enters into such contract with a third-party purchaser, the Town shall have the prior right to purchase and acquire title to the Pine Cone Parcel, or the portion thereof described in such contract, upon the same terms and conditions as therein provided or, at the Town's option, for cash.

(3) AEP shall submit to the Town a term sheet, containing the same terms and conditions as the purchase and sale contract with the third-party purchaser. If, after the receipt of such documents, the Town shall fail to exercise the Town 's right of first refusal by signing and returning to AEP within thirty (30) days of receipt, a signed copy of a contract, together with the earnest money payment therein provided, AEP shall have the right to conclude the proposed sale and conveyance on the same terms and conditions, and no other, as in a contract reflective of the term sheet with the bona fide third-party purchaser.

(4) The Town's failure to exercise the Town's right of first refusal, or the Town 's written disclaimer of such right, shall be deemed a waiver and cancellation of such right of first refusal if the proposed sale and conveyance to the same bona fide third party purchaser is consummated. If the proposed sale and conveyance to the same bona fide third-party purchaser is not consummated, the right of first refusal herein set forth shall not be deemed waived or cancelled, but shall remain in full force and effect.

(5) If any offer made by AEP according to the terms and conditions herein stated is rejected or is allowed to expire without acceptance by

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the Town, the Town agrees, within 10 days after receipt of a written request from AEP, to give to AEP or to any third person AEP shall designate, a written statement properly signed and acknowledged in recordable form that: i) an offer has been made by AEP in accordance with the terms and conditions of this Agreement, together with disclosure of the offering price and the terms and conditions of a proposed sale; ii) said offer has been rejected by the Town or has been allowed to expire; and AEP or any designated third person may rely upon such statement by the Town as evidence of the submission and rejection or expiration of a valid offer made to the Town pursuant to and in accordance with this Agreement.

(6) This right of first refusal shall apply to all transactions involving a conveyance of title to the Pine Cone Parcel, or any portion thereof, including but not limited to a purchase, an exchange, or any other transfer of an interest in the Pine Cone Parcel for consideration, other than a lease of no more than three years' duration.

Exempt Transfers. The parties agree that a transfer of the Pine Cone Parcel, or any portion thereof, shall be made only after compliance with all of the provisions of this Agreement, except that the following transfers shall be exempt from the terms and conditions of this Agreement to the extent herein provided and subject to all the other terms and conditions of this Agreement:

(1) A transfer to one or more corporations, partnerships, limited liability companies, trusts, or other entities in which AEP or AEP's heirs, successors, or assigns have sufficient control to be able to cause said entities at any time to transfer the Pine Cone Parcel or portion thereof to the Town and fulfill the other obligations of AEP under the terms and conditions of this Agreement; further, AEP's covenants that during the existence of this Agreement, AEP or AEP's heirs, successors, or assigns will continue to retain sufficient control of said entities to be able to cause said entities to transfer the Pine Cone Parcel or portion thereof, as aforesaid, and to fulfill all of AEP's obligations under this Agreement; and all certificates evidencing ownership of said entities shall be issued bearing a notation thereon that the transfer thereof is restricted and subject to the terms and conditions of this Agreement.

(2) A transfer by foreclosure or deed in lieu of foreclosure to any bona fide mortgagee or deed of trust beneficiary holding a first or second lien on the Pine Cone Parcel, provided that any subsequent sale and conveyance of the Pine Cone Parcel or any part thereof by such lien or shall be restricted and subject to the terms and conditions of this Agreement.

(3) If an exempt transfer is made, the transferee(s) shall be bound by all the covenants, terms, and conditions of this Agreement to the same extent as AEP.

Term. All rights and interests herein created and set forth in this Agreement shall

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remain in existence and shall constitute a valid encumbrance upon the Pine Cone Parcel for a term of five (5) years, commencing on the Effective Date; except that the same shall be extinguished by the occurrence of any one or more of the following events:

(1) a sale of the entire Pine Cone Parcel to the Town pursuant to the exercise of the right of first refusal, as herein provided, and upon compliance by AEP with all of the terms and conditions of this Agreement; or

(2) a sale of the entire Pine Cone Parcel to any person other than the Town or those persons mentioned in exempt transfers above pursuant to and upon compliance by AEP with all of the terms and conditions of this Agreement.

Binding Effect. This right of first refusal shall be binding upon, and inure to the benefit of, the parties and their respective heirs, assigns, legal representatives, and successors.

5. **Submissions to the COGCC.** Provided that they are in conformity with the terms of this Agreement, the Town will not object to any of Kerr-McGee's submissions to the COGCC pertaining to the Identified Well Pads and the wells located thereon. Furthermore, upon Town approval of operations pertaining to a new well, Town will promptly notify the COGCC in writing that the Town has approved such operations under its land use review procedures and pursuant to this Agreement.

ARTICLE III. OTHER PROVISIONS

1. No Waiver of Rights. The Parties acknowledge and agree that this Agreement will not be used as evidence that either Party has waived any rights to assert its claims concerning the validity of Firestone's land use authority or jurisdiction or Kerr-McGee's rights to develop its mineral resources. Nothing herein will be construed as an admission by either Party of any legal right or obligation.

2. Force Majeure. Neither Party will be liable for any delay or failure in performing under this Agreement in the event and to the extent that the delay or failure arises out of causes beyond a Party's reasonable control, including, without limitation, war, civil commotion, act of God, strike or other stoppage (whether partial or total) of labor, any law, decree, regulation or order of any government or governmental body (including any court or tribunal), or inability to obtain permits, licenses, consents, easements, or rights-of way. If any Party is rendered, wholly or in part, unable to carry out its obligations under this Agreement due to any such force majeure event, it is agreed that, upon the affected Party's giving notice and a description of such delay in reasonable detail in writing to the other Party as soon as reasonably possible after the occurrence of the causes relied on, the obligation of the Party giving such notice, so far as it is affected by such condition or event, will be suspended and any time periods will be extended for a period equal to the period of the continuance of the event or condition.

3. **Authority to Execute Agreement.** Each Party represents that it has the full right and authority to enter into this Agreement.

4. **Governing Law.** This Agreement will be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of law's provisions.

5. **No Third-Party Beneficiaries.** This Agreement is not intended to, and does not, create any right, benefit, responsibility or obligation that may be enforced by any non-party. Additionally, nothing in this Agreement will entitle any third party to any claims, rights or remedies of any kind.

6. **Notices.** All notices and other correspondence related to this Agreement will be in writing and will be delivered by: (i) certified mail with return receipt, (ii) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.), (iii) fax transmission if verification of receipt is obtained, or (iv) email with return receipt, to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

Firestone: Town of Firestone
151 Grant Ave
P.O. Box 100
Firestone, Colorado 80520
Attn: Town Manager
Telephone: 303.833.3291
Fax: 303.833.4863
Email: [_____]

Kerr-McGee: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Danielle Piernot
Telephone: 720-929-6157
Fax:
Email: danielle_piernot@oxy.com

AEP: Anadarko E&P Onshore LLC
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Surface Land Manager
Telephone: 720-929-6026
Fax:
Email: Don_Jobe@oxy.com

With a copy to:

Robert C. Mathes

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Managing Counsel – Rockies
Telephone: 720-929-4326
Email: Robert_Mathes@Oxy.com

7. **No Presumption.** The Parties to this Agreement and their attorneys have had a full opportunity to review and participate in the drafting of the final form of this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction against the Party causing the Agreement to be drafted.

8. **Severability.** If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws. If any section, paragraph, provision, or portion thereof of this Agreement is held by any Court to be void and/or unenforceable for any reason, such section, paragraph, provision, or portion thereof shall be excised from the Agreement and shall be replaced with terms and provisions that are most consistent with, and which reflect, the Parties' intention. All remaining sections, paragraphs, provisions, or portions thereof shall remain in full force and effect.

9. **Dispute Resolution.** If either Party believes that the other Party has violated any provision of this Agreement, the Party claiming that a violation has occurred will send written notice to the other Party, identifying the violation and invoking the dispute resolution process in this Section. Upon receiving such written notice, the other Party will have thirty (30) calendar days to remedy the alleged violation, unless such violation involves operations at a well pad site, in which case the time period will be ten (10) days. If the other Party denies the alleged violation, then the Parties will meet to resolve the alleged violation within ten (10) or thirty (30) calendar days (as the case may be) of the date of delivery of the initial written notice. If a resolution of the matter cannot be achieved at the meeting, both Parties agree to make a reasonable effort to work through and with a mutually acceptable mediator to attempt to resolve the dispute. Notwithstanding the foregoing, if either Party believes that the dispute will not otherwise be resolved in a sufficiently prompt and effective manner, such Party may, at its discretion, institute a legal proceeding in a court of proper jurisdiction to seek appropriate remedies. Such remedies may include, without limitation, an injunction to stop an alleged violation or an order requiring the performance of all acts and things required by the Agreement. Provided, however, that no such legal proceeding will be initiated for a period of at least thirty (30) calendar days after delivery of the initial written notice.

10. **Amendments to Agreement.** No changes, alterations or modifications to any of the provisions hereof will be effective unless contained in a written agreement signed by both Parties.

[*Signature page follows.*]

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by a duly authorized representative on the day and year first above written.

FIRESTONE:

THE TOWN OF FIRESTONE

By: Bobbi Sindelar
Name: Bobbi Sindelar
Title: Mayor
Date: April 14, 2021

KERR-MCGEE:

Kerr-McGee Oil & Gas Onshore LP

DocuSigned by:
By: Danielle Piernot
DCF1AB1984DD497...
Name: Danielle Piernot
Title: Regulatory Affairs Director
Date: 3/29/2021

Anadarko E&P Onshore LLC

DocuSigned by:
By: David J. Woest
794A124B0778445...
Name: David J. Woest
Title: Attorney-in-fact
Date: 3/29/2021

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EXHIBIT A
OPERATIONAL STANDARDS FOR IDENTIFIED WELL PADS

1. **Odor Mitigation**: Kerr-McGee will suppress odors, to the maximum extent practicable, through the use of closed loop systems. Odor emissions from Well Pads must be controlled as soon as reasonably practicable with utmost diligence and dispatch. Kerr-McGee will minimize odors by proactively addressing citizen concerns within 24 hours. Kerr-McGee will add additives to drilling fluids to minimize odors using natural odor neutralizing compounds, not masking agents. In order to meet the provisions of this section, Kerr-McGee will implement the following measures:

   A. Utilization of certain additives to drilling mud to neutralize odors using a specific designed blend of essential oils from natural plant extracts;

   B. Continue to evaluate different additive formulations that have the potential to better suppress odors, including but not limited to non-diesel-based additives;

   C. During flowback and well completions, utilize closed-loop green completion techniques to the maximum extent practicable to minimize emissions and the flaring of natural gas;

   D. Wiping down the drill pipe, to the extent practicable without creating a safety hazard or unsafe work condition, each time that the drilling operation "trips" out of the hole; and

   E. Drill cuttings, while temporarily on location, will be run through a centrifugal dryer to remove residual drilling fluid to the maximum extent practical prior to transportation for disposal.

2. **Noise Mitigation.** To reduce the noise effects on the Town and its residents during drilling, and to provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

   A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

   B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

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C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at least 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based noise mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

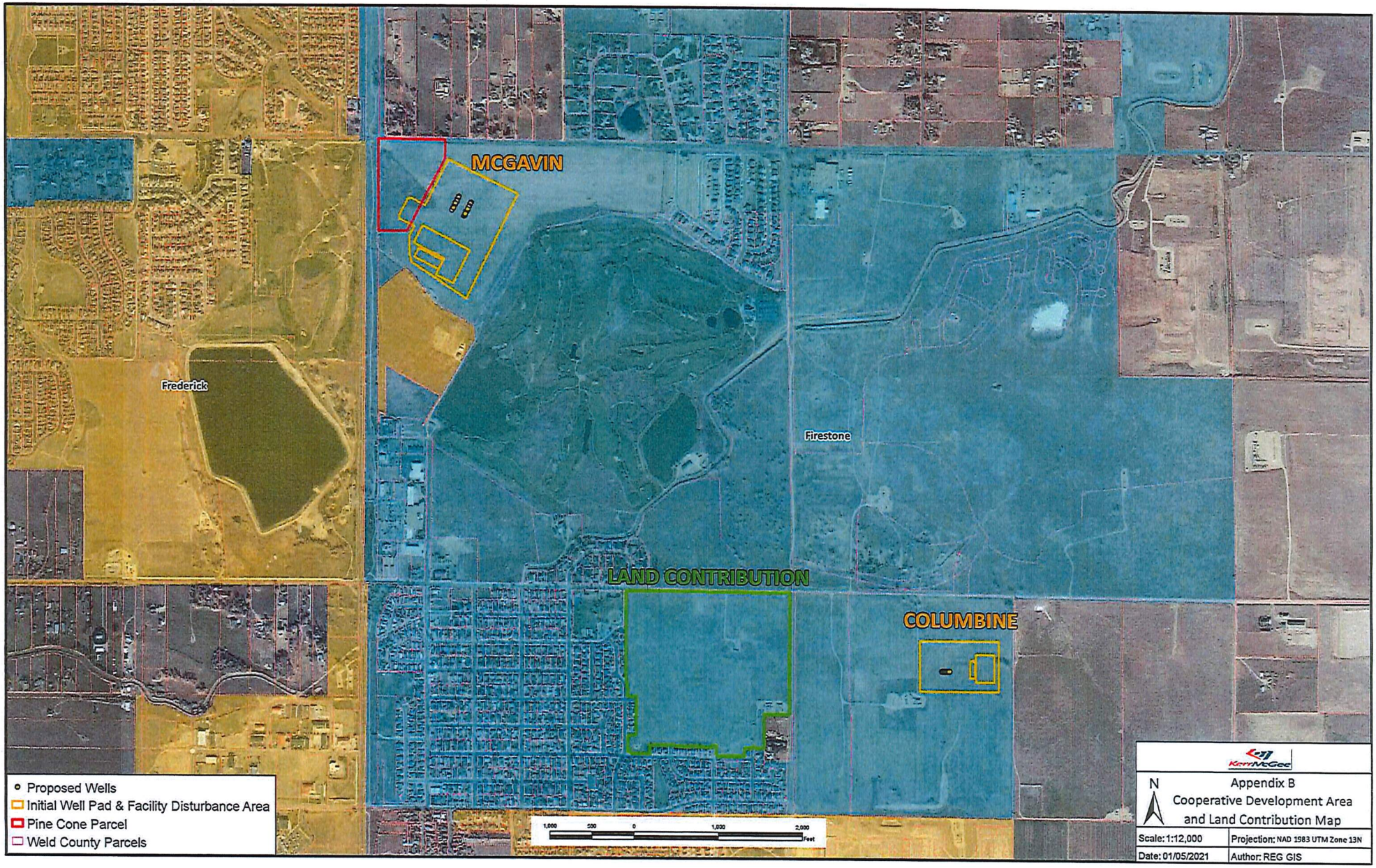
3. **Lighting.** Kerr-McGee will install down cast lighting or some other form of lighting that mitigates light pollution and spill-over onto adjacent properties; provided, however, that Kerr-McGee may still use lighting that is necessary for public and occupational safety.

4. **Road Repairs.** The Parties recognize that truck traffic accessing the Identified Well Pads may cause damage to Firestone roads and that road repairs may be needed to mitigate such damage. Kerr-McGee will arrange for a qualified outside consultant to perform a road impact study for all Firestone roads that are used to access an Identified Well Pad during the Term. The consultant will conduct the first part of the study prior to Kerr-McGee's drilling phase of operations at such Identified Well Pad and the second part of the study after Kerr-McGee completes all drilling, completions, and reclamation activities at such Identified Well Pad. The Parties will use these studies to determine the extent of any damage accruing to the road during the study period. Kerr-McGee will then promptly pay proportionate share to Firestone to repair such damage or else arrange and pay the cost of such repairs itself based on Firestone's preference.

5. **Drilling Pipe and other Large Tubulars Loading.** Kerr-McGee will make all attempts possible to avoid loading large tubulars between 10:00 pm and 7:00 am Mountain Time.

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EXHIBIT B
COOPERATIVE DEVELOPMENT AREA AND LAND CONTRIBUTION MAP


MCGAVIN
Frederick
Firestone
LAND CONTRIBUTION
COLUMBINE
Proposed Wells
Initial Well Pad & Facility Disturbance Area
Pine Cone Parcel
Weld County Parcels
1,000 500 0 1,000 2,000
Feet
N
Appendix B
Cooperative Development Area
and Land Contribution Map
Scale: 1:12,000
Projection: NAD 1983 UTM Zone 13N
Date: 01/05/2021
Author: REG GIS

Firestone Neighborhood Meeting Summary
McGavin 6-19HZ and Columbine 4-29HZ Oil and Gas Applications

Kerr McGee Oil & Gas Onshore, LP (KMOG), a subsidiary of Occidental, conducted a virtual neighborhood meeting on Wednesday, August 25th from 6-7:00 p.m. for stakeholders within close proximity to the proposed McGavin 6-19HZ and Columbine 4-29HZ pads. The purpose of the meeting was for KMOG's subject matter experts to provide an overview of the proposed projects, listen to feedback, and provide answers to stakeholder questions. On August 9th, KMOG mailed invitations to all owners and tenants within 300 feet of the property boundaries, those within 2,000 feet of the working pad surface, and businesses in the shopping center south of the McGavin 6-19HZ pad. Additionally, neighborhood meeting signs were posted on both properties on August 9th.

Fifty-three stakeholders and seven local and state government representatives registered for the meeting. Thirty-five stakeholders, four unknown cell phone numbers, plus fourteen KMOG panelists participated in the neighborhood meeting. Please see the list below including names of attendees. KMOG extended the meeting from 7:00 to 7:15 to finish addressing the ninety-nine questions and comments submitted by twenty-two stakeholders. KMOG uploaded the meeting slide deck to our website (OxyColoradoStakeholder.com) on August 26th and emailed the deck to stakeholders on August 30th. KMOG's Stakeholder team, a dedicated resource for community members, will continue to work with owners and residents to provide frequent and transparent information, answer questions, and seek feedback.

Meeting Attendees:

1. Sheryl Adam
2. Scott Anderson
3. Garrett B
4. Garold Bell
5. Kate Cloud
6. Steven & Alene Colvin
7. Donna Dansdill
8. William Deegan
9. Carl Enright
10. Kris Escalante
11. Beth Faller
12. Belinda Hanke
13. Kari Hebert
14. Bill Hohs
15. Suzanne Johnson
16. Marty Lagae
17. Robert Landrey
18. Michele Martinez
19. Randy Matsushima
20. William McGehee
21. Lisa McGehee
22. Kristin Mercer
23. D Okada
24. Ellen & Gary Pakel
25. Kristin Peart
26. Debra Pierce
27. Dave Rossiter
28. Cody Scott
29. Pat Seifert
30. Paul Seyler
31. Jeannette Sisario
32. Randal Smith
33. Crystal Soderman
34. Bret & Amy Ward
35. Susan Whittaker

Agency Attendees:

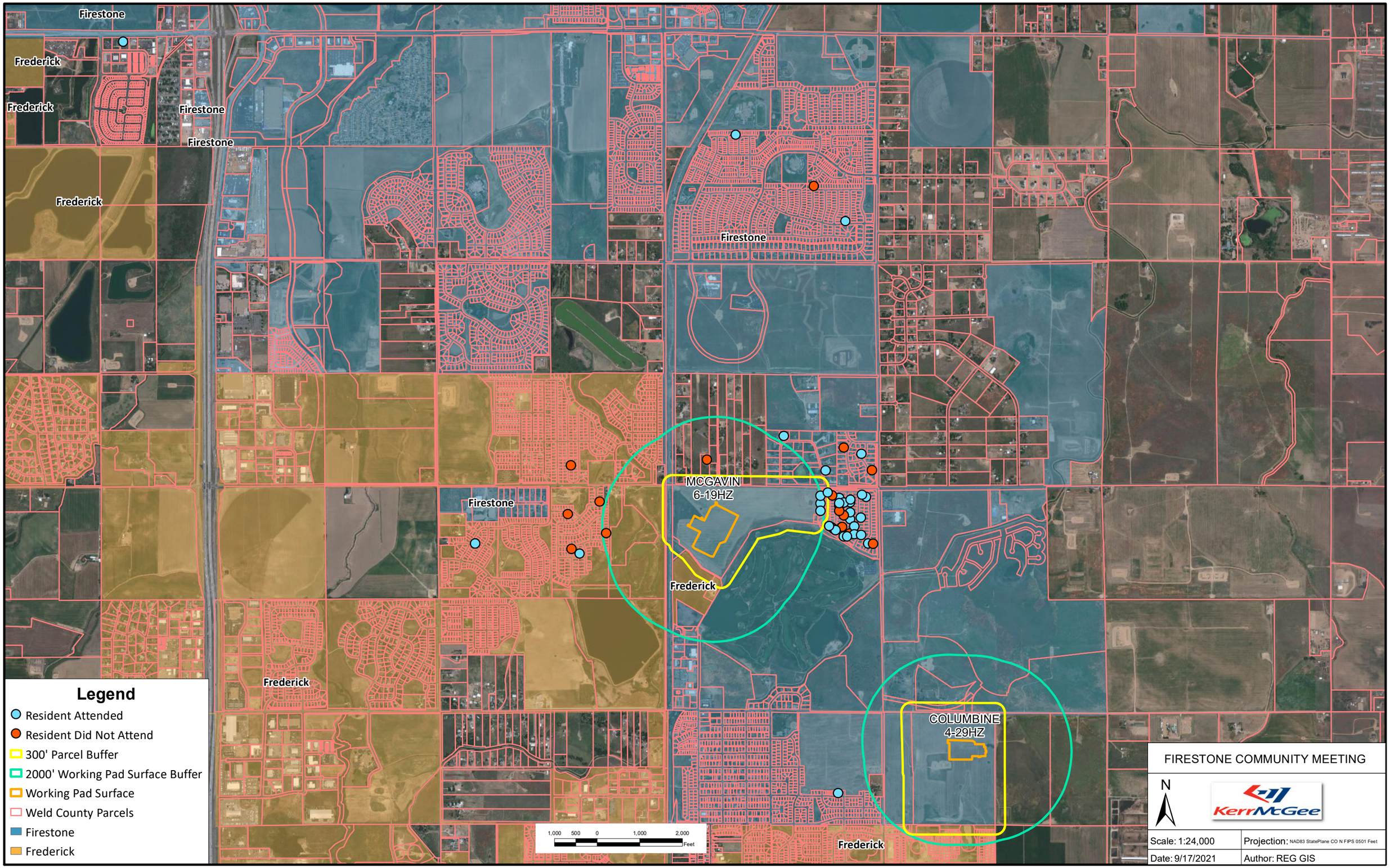
36. Weld County
37. Firestone
38. COGCC
39. Frederick

Other Attendees:
Four additional attendees called in on cell phones

KMOG Panelists:

1. Andy Lytle
2. Anthony Rader
3. Beth Bosworth
4. Chad Schlichtemeier
5. Dani Piernot

6. Jay Bridgeman
7. Jennifer Brice
8. Justin Nelson
9. Lisa Denk
10. Moe Felman
11. Rob Mathes
12. Shaye Marshall
13. Stephanie Madrid
14. Tom Crouch



Depicted information is subjective and its accuracy has not been verified. Attendee locations may not be accurate or extend beyond map extent.

Firestone Neighborhood Meeting

August 2021

Welcome

- Please submit your questions anytime using the Q&A button in the control panel at the bottom of your screen
- If you have questions or would like to provide feedback, please reach out to a member of our Stakeholder Relations team at coloradostakeholder@oxy.com or at 1.866.248.9577
- Also visit us at OxyColoradoStakeholder.com for additional information and resources



About Occidental - Commitment to Safety



- Oxy has a 100-year history of operating oil and gas assets in a variety of unique communities
- Our highest priority is the health, safety and welfare of communities, our employees, and the environment
- We are committed to listening, proactively addressing community concerns, and incorporating your feedback into our plans and operations

McGavin 6-19HZ Pad



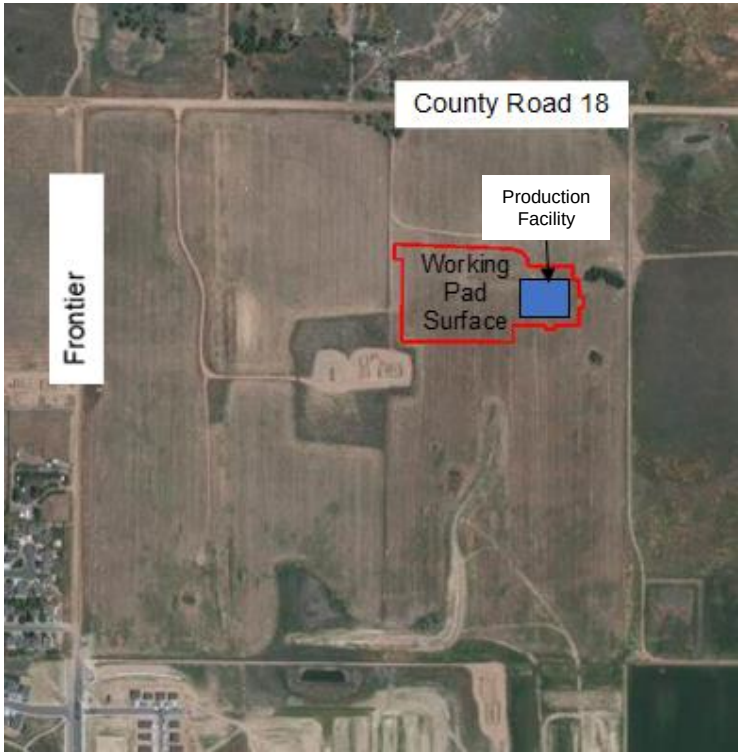
Work Activity	Estimated Timeline
Pad Construction	May 2022 – June 2022
Surface Drilling	June 2022 – July 2022
Horizontal Drilling	August 2022 – January 2023
Well Completions	March 2023 – June 2023
Production Facility	December 2022 – March 2023
Reclamation	November 2023 – December 2023

*For up-to-date timelines
OxyColoradoStakeholder.com

Columbine 4-29HZ Pad

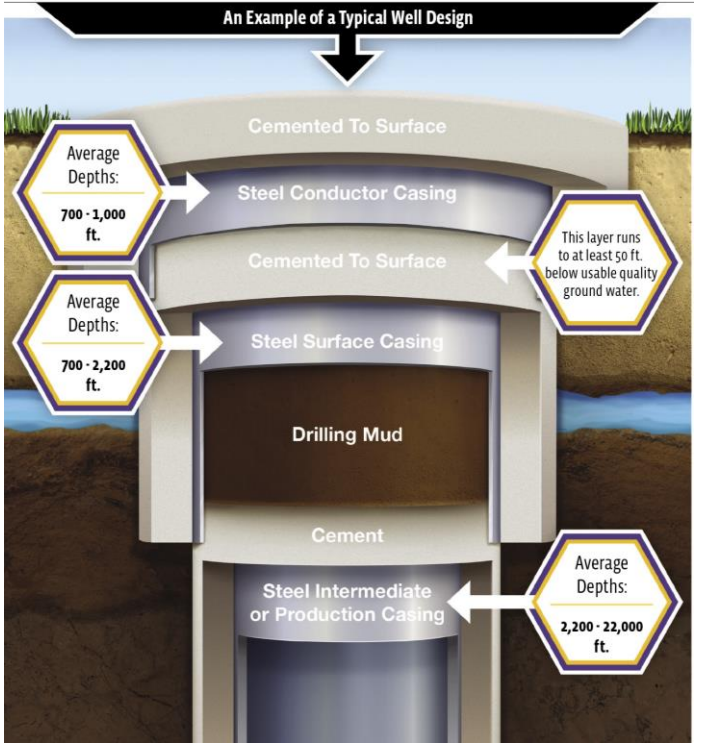
Work Activity	Estimated Timeline
Pad Construction	July 2022 – August 2022
Surface Drilling	August 2022
Horizontal Drilling	September 2022 – November 2022
Well Completions	February 2023 – April 2023
Production Facility	December 2022 – February 2023
Reclamation	June 2023 – August 2023

*For up-to-date timelines
OxyColoradoStakeholder.com



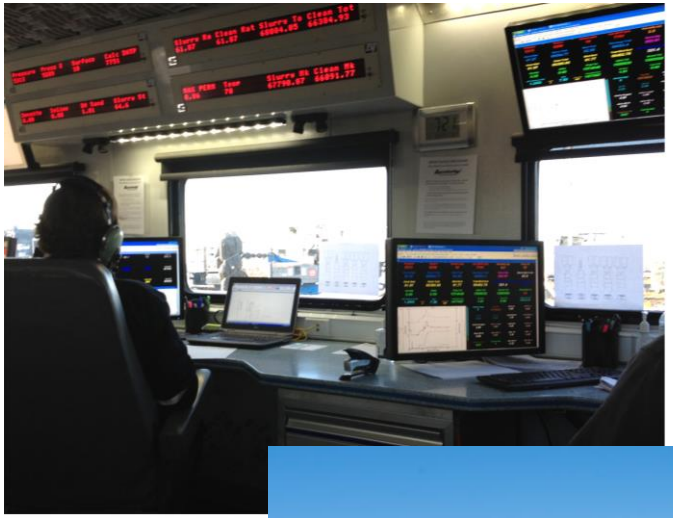
Drilling

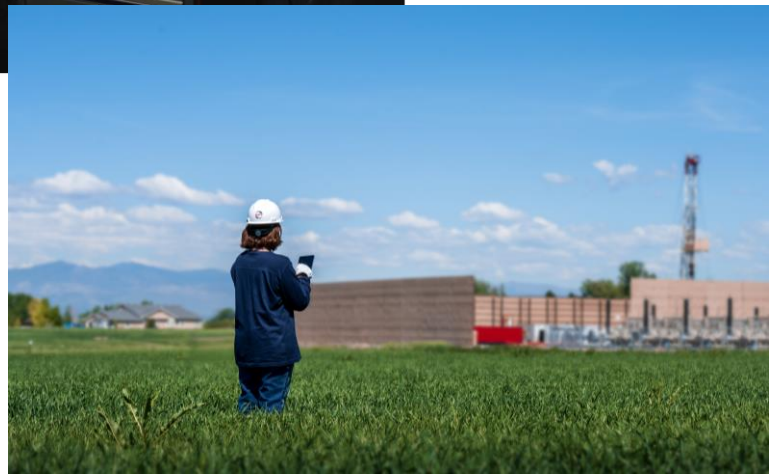


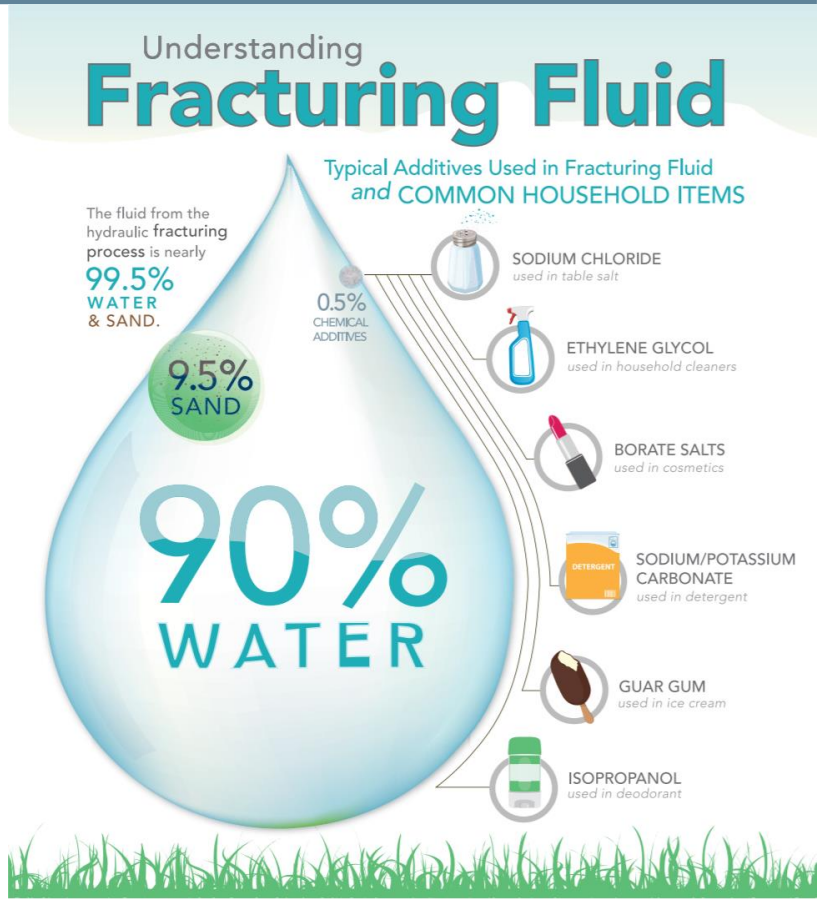


- Surface drilling – Installing casing to protect groundwater
- Horizontal Drilling – Drilling to depth of ~7,000 feet and then horizontally up to 2 miles
- Low emission drilling engines upgraded with noise reducing features

Well Completions







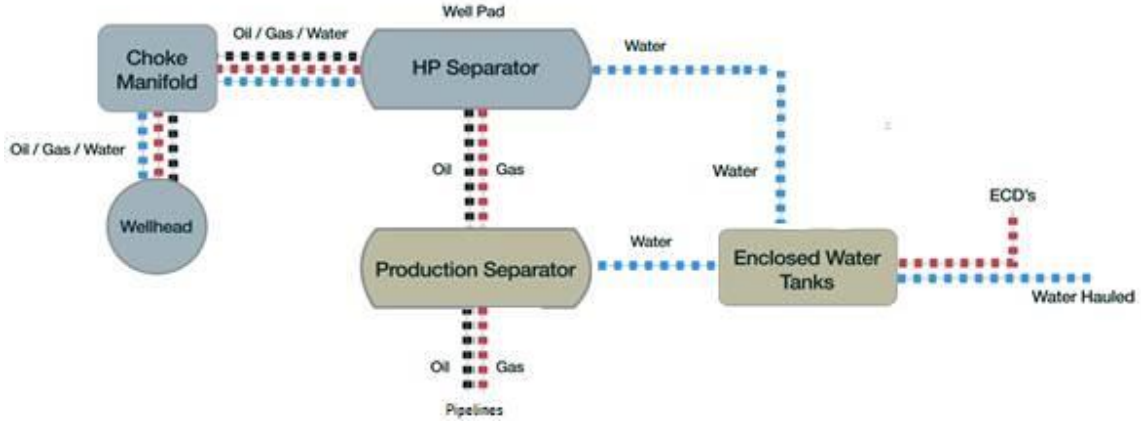
Source: Groundwater Protection Council, API, Energy and Communities (2017)

Production

- Zero routine flaring
- Tankless design, no hydrocarbons stored on-site
- 24-hour monitoring
- Reclaimed to match existing landscape

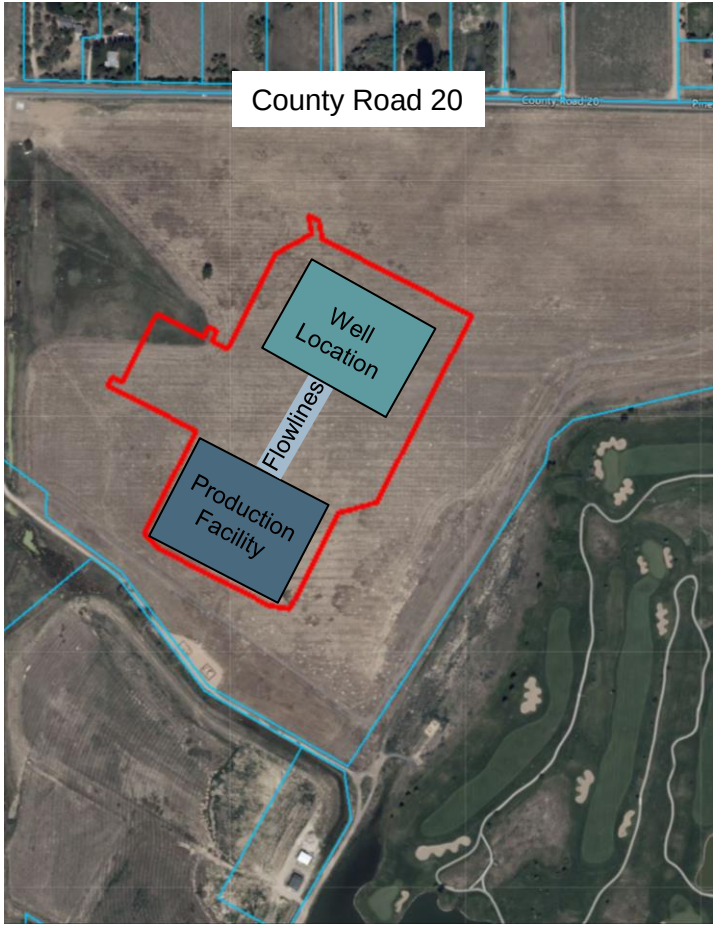


Production facility



Flowlines and Pipelines

- Oil and gas flow from the well heads to the production facility
- Each well has one, 2” steel flowline pipe
- Flowlines are continuously monitored by our Integrated Operations Center and undergo yearly pressure tests
- Exact pipeline locations are still under review and will be owned and operated by Western Midstream (WES)



Reclamation





- When development work is completed, the well pad footprints will be reduced
  - McGavin from 25.63 acres to 7.08 acres
  - Columbine from 12.66 acres to 2.76 acres
- To screen the locations, we plan to install berms and black steel fences around the facilities and wells
- We are evaluating 39 wells for potential retirement near the development area
  - Approximately 1.5 acres are restored and revegetated per well that is retired

Good Neighbor Commitment – Noise, Light, Odor



Noise: State of the art sound walls and continuous sound monitors will be installed

Light: LED lights strategically oriented downward and away from nearby homes

Odor: Odor neutralizer used as part of Oxy's standard drilling system

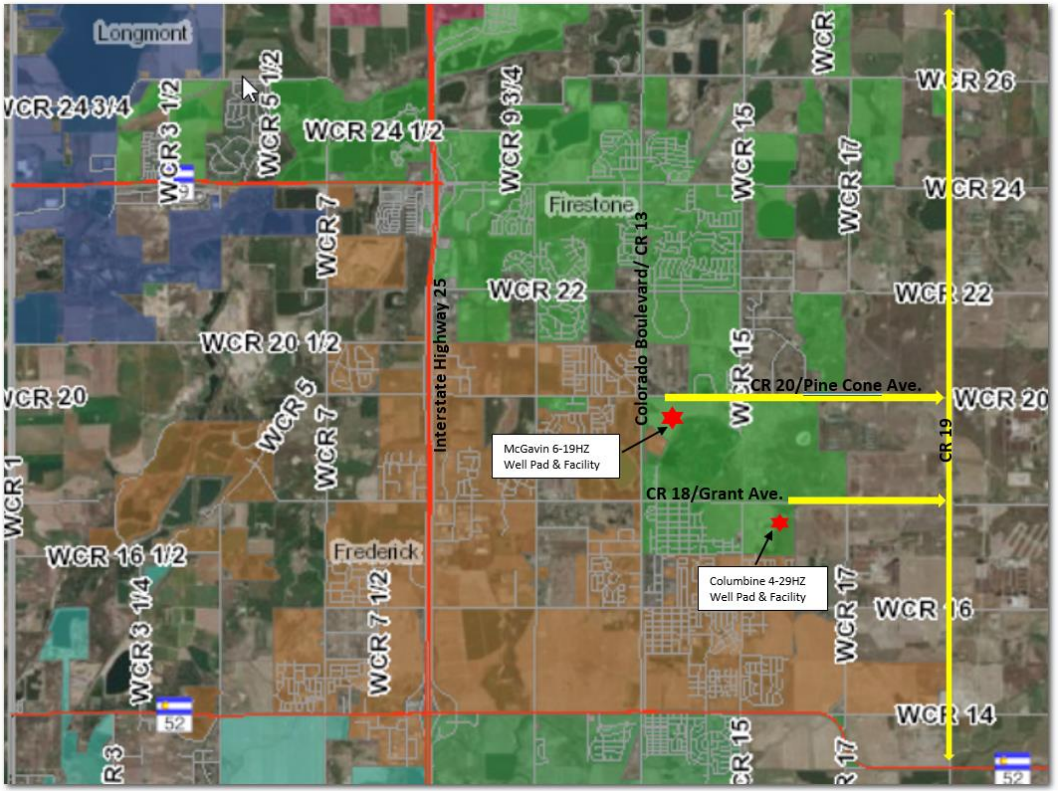
Good Neighbor Commitment – Air Quality

- Continuous air monitoring during drilling and completion activities
- Air monitoring data will be available at OxyColoradoStakeholder.com
- Low emission drilling and completion equipment
- Zero routine flaring
- Tankless design



Good Neighbor Commitment – Traffic

- Comprehensive Traffic Management Plan
  - Plan includes pre/post road studies
- Water-on-demand system, consisting of over 180 miles of underground pipelines, will be utilized to source and transport water
  - This system eliminates more than 2,000 truck trips per day
  - The traffic reduction greatly reduced noise, dust and emissions



State and Local Permitting Process

Permitting milestones
Cooperative Development Agreement - **Completed**
Submit Local Permits - **Submitted**
Submit State Permits - **Submitted**
Planning Commission Hearing
Board of Trustees Hearing
State Public Comment Period
State Public Hearing Date

*For up-to-date timelines
OxyColoradoStakeholder.com

Contacts





Stakeholder Relations Team
1099 18th Street, 7th floor
Denver, CO 80202
866.248.9577
ColoradoStakeholder@oxy.com
OxyColoradoStakeholder.com

Integrated Operations Center (IOC)
970.515.1500

- Real-time monitoring of wells, water tanks, and production facilities
- 24 hours a day, 365 days a year

Q&A

- Please submit your questions using the Q&A button
- We will send you a survey via email and welcome your feedback and questions



www.oxycoloradostakeholder.com

Thank you for joining!



AGENDA INFORMATION MEMORANDUM

TOWN OF FIRESTONE
PLANNING AND ZONING COMMISSION

AIM#: 6.c

Public Hearings

Meeting Date: January 6, 2022

Initiated By: Marty Ostholthoff

Dept: Planning & Development

AGENDA TITLE

PUBLIC HEARING: Resolution PC-22-03: A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

SUMMARY

The McGavin 6-19HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate twenty-six (26) horizontal oil and gas wells and associated production facilities within the Town.

HISTORY AND PREVIOUS BOARD ACTION

The Town of Firestone approved a Cooperative Development Plan Agreement with Kerr-McGee Oil & Gas Onshore LP on April 14, 2021.

RECOMMENDATION

Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-03, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

1. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.
2. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.
3. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.
4. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.
5. Applicant shall be responsible for construction and installation of certain public improvements required to serve the McGavin 6-19HZ Pad and Production Facility, including but not limited to sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.
6. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.
7. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Pine Cone Avenue as determined by the Town.
8. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

ATTACHMENTS

1. McGavin PC Staff Report
2. Resolution PC-22-03

3. McGavin FDP Maps
4. McGavin SRU/FDP Application Materials
5. KMOG Cooperative Development Plan Agreement
6. Neighborhood Meeting Summary-Materials

Staff Report

McGavin 6-19HZ Pad and Production Facility

Special Review Use
and
Final Development Plan

Prepared by the
Town of Firestone for the
Planning and Zoning Commission

January 6, 2022

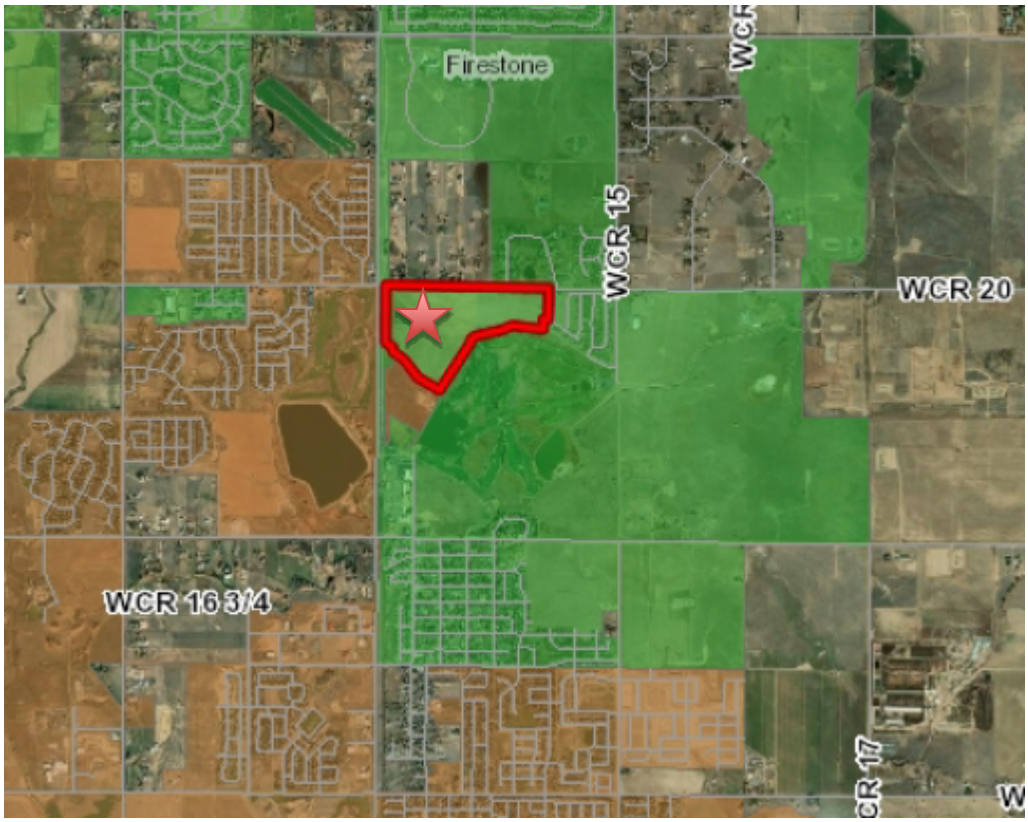
GENERAL INFORMATION

Purpose: This staff report is for the McGavin 6-19HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate twenty-six (26) horizontal oil and gas wells and associated production facilities within the Town.

Applicant: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, CO 80202

Surface Owner: Anadarko E & P Onshore LLC
1099 18th Street
Denver, CO 80202

Location: The proposed well pad is located south of Pine Cone Avenue (WCR 20) and east of Colorado Boulevard (WCR 13).



Existing Conditions:

Existing Zoning:	R-B (Residential-B)
Existing Use:	Vacant land and oil/gas operations

Adjacent Land Use/Zoning:

	ZONING	LAND USE
NORTH	A – Agricultural (Weld County)	Single-family residential + animal hospital
SOUTH	R-C – Residential-C OS – Open Space	Vacant land + oil/gas operations Saddleback golf course
EAST	R-B – Residential-B R-C – Residential-C	Single-family residential Single-family residential
WEST	R-C – Residential-C P – Public (Town of Frederick)	Vacant land + oil/gas operations Bella Rosa golf course

State Oil and Gas Regulations:

The Colorado Oil and Gas Conservation Commission (COGCC) governs the permitting and regulation of oil and gas wells throughout the state.

Town of Firestone Oil and Gas Regulations:

The Town of Firestone Development Code regulates siting, access roads, fencing and color of oil and gas wells and associated above ground production facilities through the review of the required Special Review Use and Final Development Plan applications for proposed oil and gas facilities. Other operational aspects of and oil and gas facility are regulated by the COGCC.

McGavin 6-19HZ Pad and Production Facility Analysis:

The proposed McGavin 6-19HZ Pad and Production Facility consists of twenty-six (26) horizontal wells, well heads, well related equipment and facilities (combustors/separators, etc.), meter houses, access roads, drainage facilities and pipelines.

Pad Size:

- Approximately 25.6 acres of the site will be used for drilling and completions operations. When drilling and completions activities are finished, a large portion of the disturbed area will be reclaimed, leaving approximately 7.1 acres of disturbed area while the site is in the production phase.
- Construction of the pad site and improvements to the existing access road will take approximately 6 weeks to complete.
- When the wells have reached the end of production, the wells will be plugged and abandoned and the site will be reclaimed, including the removal of flowlines.

Access:

- Access into the McGavin pad will be from a new access drive off of Pine Cone Avenue.

- Per the FDC, the applicant will be required to pave (asphalt or concrete) the first 100-feet of the access road from Pine Cone Avenue.
- Per standards in the Cooperative Development Plan Agreement, the applicant will be responsible for any damage caused to Town roads.
- Per a condition of approval, the applicant will be responsible for sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard.

Drilling Operations:

- Each well will take approximately 5 to 6 days to drill.
- Drilling occurs 24 hours per day.
- Well completions will occur after the drilling phase and takes approximately 4 to 6 days per well.
- Permanent production facilities installed after drilling and completions are completed.
- Interim reclamation of the site from 25.6 acres to 7.1 acres.

Mitigation Measures:

- Temporary 32-foot sound walls will be installed to control sound to the maximum extent practicable.
- Shrouding of lighting to the maximum extent practicable.
- Closed loop water system will be utilized to reduce truck trips and minimize site disturbance.
- Tankless facility is proposed to eliminate hydrocarbon storage tanks and associated emissions and to reduce truck trips.
- Air monitoring during pre-production and during the first six months of production.

Production Equipment/Facilities:

- All production equipment and facilities on the pad will be fenced and painted according to FDC requirements.
- No permanent liquid hydrocarbon tanks are included at this facility as the liquid hydrocarbons from the wells will be piped off-site.

Pipelines:

- Flowlines are proposed from the well heads to the production equipment and are internal to the pad. No flowlines are proposed outside of the pad area.

APPROVAL CRITERIA AND STAFF ANALYSIS

Special Review Use Approval Criteria and Staff Analysis:
The Special Review Use application for the McGavin 6-19HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.11 of the FDC. Staff makes the following findings.

A. The proposed use is generally consistent with the Town's Comprehensive Master Plan and all applicable provisions of this FDC and applicable State and Federal regulations;

Staff: *The proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan and Section 16.6.14 of the FDC. In addition,*

the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.

B. The proposed use is generally consistent with the purpose and intent of the zoning district in which it is located;

Staff: *The proposed use is consistent with the purpose and intent of the R-B zone district in that "Mining and Mineral Extraction" is permitted within the R-B zone district under the Special Review Use regulations of the Town.*

C. The proposed use is generally consistent with any applicable use-specific standards set forth in Section 3.2;

Staff: *There are no use-specific standards for "Mining and Mineral Extraction" within Section 3.2, however, the proposed use is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

D. The proposed use is compatible with adjacent uses in terms of scale, site design, and operating characteristics (hours of operation, traffic generation, lighting, noise, odor, dust, and other external impacts);

Staff: *The proposed use is compatible with adjacent uses in that the applicable development and design standards set forth in Section 16.6.14 of the FDC are met. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

E. Any significant adverse impacts anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable;

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. Facilities and services (including sewage and waste disposal, water, gas, election, police and fire protection, and streets and transportation, as applicable) will be available to serve the subject property while maintaining adequate levels of service for existing development;

Staff: *The proposed pad and production facility will not have a significant impact on any Town facilities or other utility providers.*

G. Adequate assurances of continuing maintenance have been provided; and

Staff: *The applicant will be responsible for the ongoing maintenance of the well pad and production facilities, including the reclamation of disturbed areas. In addition, all wells and production facilities are remotely monitored 24 hours/7 days a week.*

H. Any significant adverse impacts on the natural environment will be mitigated to the maximum extent reasonably practicable.

Staff: *The applicant will meet Town and State regulations relative to impacts on the natural environment to the maximum extent practicable. In addition, the*

applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.

Final Development Plan Approval Criteria and Staff Analysis:
The Final Development Plan application for the McGavin 6-19HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.10 of the FDC. Staff makes the following findings.

A. The Final Development Plan is generally consistent with the Town's Comprehensive Master Plan;

Staff: *The FDP showing the proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan.*

B. The Final Development Plan is generally consistent with any previously approved subdivision plat, planned development, or any other precedent plan or land use approval as applicable;

Staff: *The FDP is consistent with previously approved land use actions for the subject property.*

C. No buildings or structures infringe on any easements so as to impact the full use of the easement;

Staff: *No buildings or structures proposed on the FDP will infringe on any easements.*

D. The Final Development Plan complies with all applicable development and design standards set forth in this FDC;

Staff: *The FDP is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

E. Any significant adverse impacts reasonably anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable; and

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. The development proposed on the Final Development Plan and its general location is or will be compatible with the character of surrounding land uses.

Staff: *The proposed pad and production facility meets applicable Town setback standards. In addition, the applicant is also the surrounding land owner and in control of any surface development in and around the pad and production facility.*

NEIGHBORHOOD MEETING

As required by the Firestone Development Code, a Neighborhood Meeting was held on August 25, 2021 at 6:00 pm as a virtual neighborhood meeting. The required notice for the Neighborhood Meeting was provided.

PUBLIC NOTICE

Notice of the Public Hearings has been provided as follows:

Published in the Longmont Times Call:	December 22, 2021
Property Posted:	December 20, 2021
Letters to Adjacent Property Owners:	December 20, 2021

RECOMMENDATIONS

Special Review Use:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-03, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

a. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the McGavin 6-19HZ Pad and Production Facility, including but not limited to sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Pine Cone Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

Final Development Plan:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-04, a resolution recommending approval of the Final Development Plan application to the Board of Trustees with conditions:

a. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

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f. Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Pine Cone Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

FIRESTONE PLANNING AND ZONING COMMISSION

RESOLUTION NO. PC-22-03

A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A SPECIAL REVIEW USE APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, who is the owner of certain real property located in the Town of Firestone, having a legal description of NW ¼ of Section 19, 2N, 67W ("Property"), has submitted an application for Special Review Use review to construct and operate a new oil and gas well pad, including 26 wells and one production facility, to be known as the "McGavin 6-149HZ Well Pad and Facility," on the Property, (the "Application"); and

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, has also submitted an application for a Final Development Plan relating to such special review use; and

WHEREAS, the Firestone Planning and Zoning Commission has conducted a public hearing on the Application, and has considered all the evidence presented at the public hearing, the relevant standards to accommodate oil and gas wells and facilities set forth in Sections 16.6.14 of the Firestone Development Code ("Code") and the special review use criteria set forth in Step 9, Section 16.7.11.C of the Code; and

WHEREAS, the Firestone Planning and Zoning Commission wishes to make a recommendation to the Board of Trustees regarding the Application.

NOW, THEREFORE, BE IT RESOLVED BY THE FIRESTONE PLANNING AND ZONING COMMISSION:

1. That the Firestone Planning and Zoning Commission recommends approval of the Application, with the following conditions:

a. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the McGavin 6-19HZ Pad and Production Facility, including but not limited to sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Pine Cone Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

PASSED AND ADOPTED this ____ day of _____, 2022.

_____
Chairperson

ATTEST:

_____
Lisa Bartley, Secretary

EXHIBIT A
Cooperative Development Plan Agreement

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE MCGAVIN 6-19HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

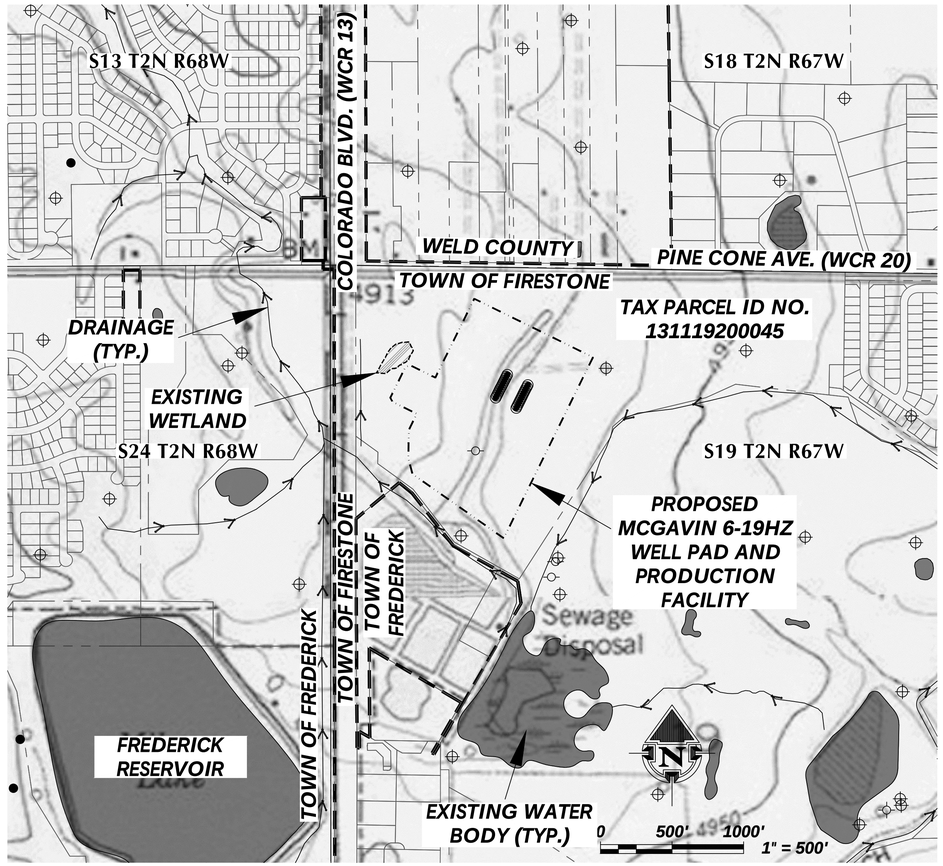
_____ MAYOR

ATTEST_____ TOWN CLERK

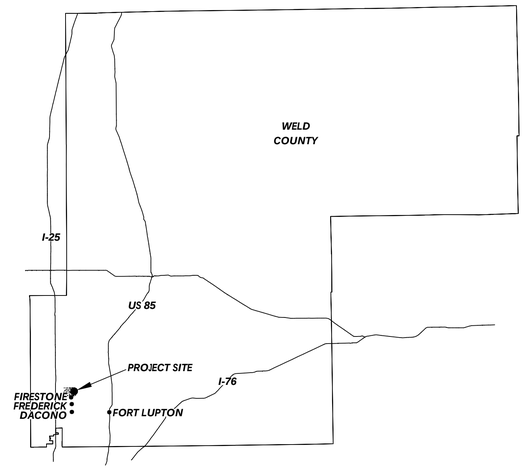
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- *CONSTRUCTION LIMITS OF DISTURBANCE*
- *PROPOSED WELL*
- *EXISTING WELL (PRODUCING)*
- *EXISTING WELL (PLUG & ABANDONED)*
- *EXISTING WELL (SHUT IN)*
- *EXISTING WELL (DRY AND ABANDONED)*
- *EXISTING WELL (TEMPORARILY ABANDONED)*
- *TOWN LIMITS*
- *WATER BODY*
- *PROPERTY LINE*
- *EXISTING DITCH / STREAM*

GENERAL NOTES:
- *ORIGINAL DOCUMENT SIZE: 24" x 36"*

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-014 / FDP21-014

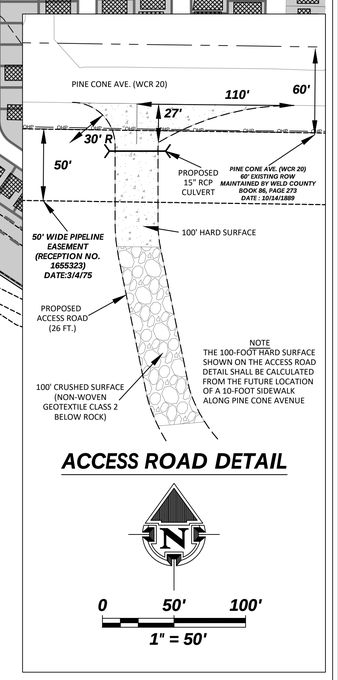
SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_6-19HZ_FDP_COVER.dwg, 12/13/2021 10:08:02 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

SUBDIVISION: NONAME CREEK WEST
SUBDIVISION: NO NAME CREEK ESTATES
S13 T2N R68W
OWNER: FALK GREGORY A & VELUSCEK STEVEN (WELD COUNTY PARCEL I.D. 131313000059) ZONING: FREDERICK
SUBDIVISION: CANSANO RANCH
OWNER: TOWN OF FIRESTONE (WELD COUNTY PARCEL I.D. 131118000060) ZONING: FIRESTONE
OWNER: DUSO PEGGY DIVING TRUST (WELD COUNTY PARCEL I.D. 131118300009) ZONING: AG-A
OWNER: TYMOCZKO DARRELL R & TYMOCZKO NOLA M (WELD COUNTY PARCEL I.D. 131118000057) ZONING: AG-A
OWNER: KNUDSON ANITA R (WELD COUNTY PARCEL I.D. 131118300016) ZONING: AG-A
OWNER: KNUDSON FAMILY TRUST (WELD COUNTY PARCEL I.D. 131118300019) ZONING: AG-A
OWNER: OCONNOR DANIEL J & OCONNOR NICOLE L (WELD COUNTY PARCEL I.D. 131118300072) ZONING: AG-A
OWNER: KANE JOHN ARTHUR & KANE TRACY LEIGH (WELD COUNTY PARCEL I.D. 131118300071) ZONING: AG-A
OWNER: LAM CRAIG A & (WELD COUNTY PARCEL I.D. 131118300013) ZONING: AG-A
OWNER: GRAY JENNIFER L & GRAY DANIEL P (WELD COUNTY PARCEL I.D. 131118300011) ZONING: AG-A
OWNER: DVORAK KATHERINE M (WELD COUNTY PARCEL I.D. 131118300014) ZONING: AG-A
OWNER: ALDERFER LOWELL M & ALDERFER BETTY L (WELD COUNTY PARCEL I.D. 131118000035) ZONING: AG-A
WELD COUNTY
TOWN OF FIRESTONE
PINE CONE AVE. (WCR 20)
SUBDIVISION: OWL LAKE ESTATES SUB
S18 T2N R67W
PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK HEIGHTS
SUBDIVISION: LAWSON SUB
OWNER: PETRAS TIMOTHY (WELD COUNTY PARCEL I.D. 131324000064) ZONING: AG-A
OWNER: CLEVER LARRY C & CLEVER SUSAN K (WELD COUNTY PARCEL I.D. 131313000048) ZONING: AG-A
CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01
DRAINAGE (TYP.)
EXISTING WATER BODY
COLORADO BLVD. (WCR 13)
COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK
SUBDIVISION: MOORE FARM
EXISTING WATER BODY (BELLA ROSA POND)
S24 T2N R68W
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324411017) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000054) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000050) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000028) ZONING: FREDERICK
EXISTING WATER BODY (FREDERICK RESERVOIR)
100-YEAR FLOODPLAIN
TOWN OF FREDERICK
TOWN OF FIRESTONE
TOWN OF FREDERICK
OWNER: BEILAND KATHRYN & BEILAND KEVIN D (WELD COUNTY PARCEL I.D. 131118300076) ZONING: AG-A
APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93
30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08
SEE ACCESS ROAD DETAIL
OWNER: YEAGER JUDITH E (WELD COUNTY PARCEL I.D. 131118300066) ZONING: AG-A
PROPOSED ACCESS ROAD
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)
16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01
OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE
EXISTING FACILITY
30' WIDE PIPELINE EASEMENT (RECEPTION NO. 2238664) DATE: 1/17/91
50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75
VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08
EXISTING ACCESS ROAD
COAL MINE BOUNDARY
EXISTING WETLANDS
PROPOSED MLVT
PROPOSED MCGAVIN 6-19HZ WELL PAD
TEMPORARY EQUIPMENT AREA (328' X 60')
EXISTING WALKING/BIKE PATH
PROPOSED MCGAVIN 6-19HZ FACILITY PAD
TEMPORARY EQUIPMENT AREA (150' X 60')
35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
S19 T2N R67W
VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05
SUBDIVISION: ST. VRAIN SANITATION DISTRICT MINOR SUBDIVISION 1
EXISTING FACILITY
OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK
100-YEAR FLOODPLAIN
OWNER: ST VRAIN SANITATION DISTRICT (WELD COUNTY PARCEL I.D. 131119209002) ZONING: FREDERICK
EXISTING WATER BODY
EXISTING WATER BODY
EXISTING WATER BODY



LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- SS — EXISTING SANITARY SEWER LINE
- ROAD PRIMITIVE
- EPL — EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE***

609 CONSULTING, LLC
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6706 North Franklin Avenue
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SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

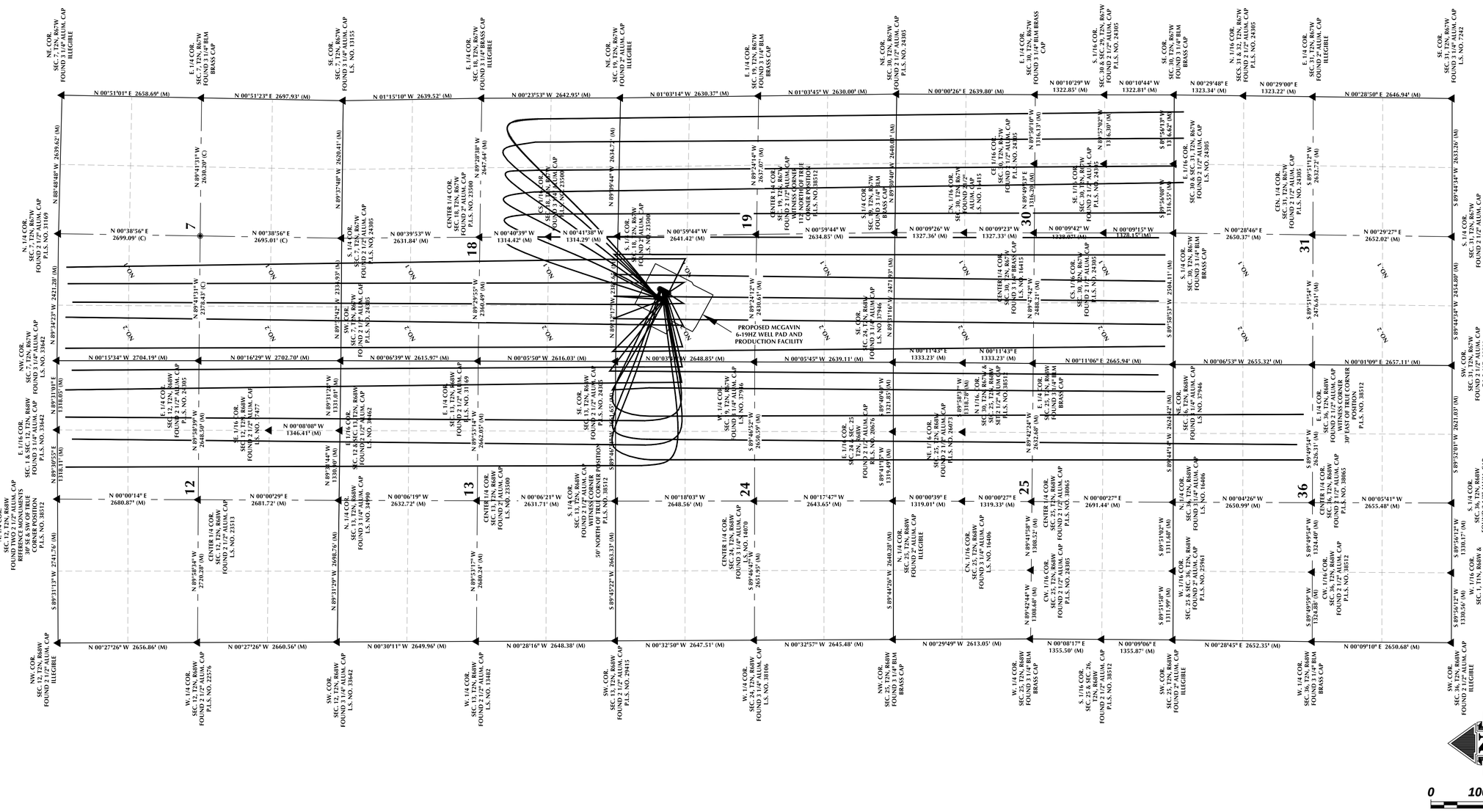
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-014 / FDP21-014

SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.
2. ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972362 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.

GENERAL NOTES:
- ORIGINAL DOCUMENT SIZE: 24" x 36"
- SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE

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MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-014 / FDP21-014

SCALE:	1" = 1000'	PAGE:	FDP-3
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

S18 T2N R67W

S24 T2N R68W

S19 T2N R67W

WELD COUNTY

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

COLORADO BLVD. (WCR 13)

TOWN OF FREDERICK

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

SEDIMENT TRAP

PROPOSED SOUND WALL

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

PROPOSED MLVT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 19-1HZ
MCGAVIN 19-2HZ
MCGAVIN 19-3HZ
MCGAVIN 19-4HZ
MCGAVIN 19-5HZ
MCGAVIN 19-6HZ
MCGAVIN 19-7HZ
MCGAVIN 19-8HZ
MCGAVIN 19-9HZ
MCGAVIN 19-10HZ
MCGAVIN 19-11HZ
MCGAVIN 19-12HZ
MCGAVIN 19-13HZ

MCGAVIN 19-14HZ
MCGAVIN 19-15HZ
MCGAVIN 19-16HZ
MCGAVIN 19-17HZ
MCGAVIN 19-18HZ
MCGAVIN 19-19HZ
MCGAVIN 19-20HZ
MCGAVIN 19-21HZ
MCGAVIN 19-22HZ
MCGAVIN 19-23HZ
MCGAVIN 19-24HZ
MCGAVIN 19-25HZ
MCGAVIN 19-26HZ

50' FLOWLINE CORRIDOR

TOPSOIL STOCKPILE

PROPOSED CULVERT

EXISTING WALKING/BIKE PATH

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 328021

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N, (DJ) API: 05-123-34478, TOTAL MEASURED DEPTH: 9240'

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

SEDIMENT TRAP

TEMPORARY EQUIPMENT AREA (328' X 60') & (350' X 60')
(TEMPORARY TANKS - 44)
(TEMPORARY ECDs - 13)
(TEMPORARY PROPANE TANK - 2)

TEMPORARY GENERATOR (50' x 20')

TEMPORARY PURGE GAS AREA (10' x 30')

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666, TOTAL MEASURED DEPTH: 5026'

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318, TOTAL MEASURED DEPTH: 5094'

COAL MINE BOUNDARY

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 1311190000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

4910'

4915

4920

4925

4930

4935

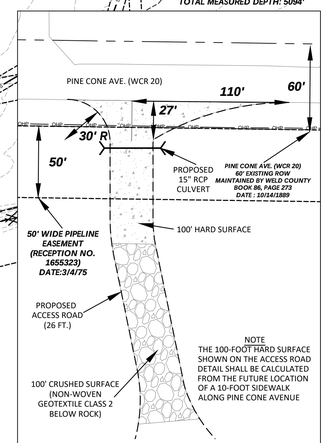
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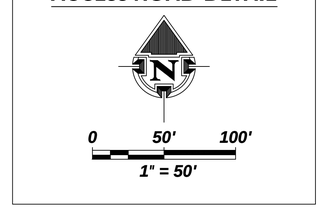
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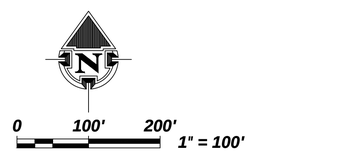
4950

4930'

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- PROPOSED SLOPE PROTECTION
- DIVERSION DITCH

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"

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MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
CONSTRUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

WELD COUNTY

S18 T2N R67W

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

COLORADO BLVD. (WCR 13)

STORMWATER STORAGE BERM

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED CULVERT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 18-1HZ
MCGAVIN 18-2HZ
MCGAVIN 18-3HZ
MCGAVIN 18-4HZ
MCGAVIN 18-5HZ
MCGAVIN 18-6HZ
MCGAVIN 18-7HZ
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MCGAVIN 18-20HZ
MCGAVIN 18-21HZ
MCGAVIN 18-22HZ
MCGAVIN 18-23HZ
MCGAVIN 18-24HZ
MCGAVIN 18-25HZ
MCGAVIN 18-26HZ

OFF-SITE FLOW DEFLECTION

STORMWATER STORAGE BERM

50'

50' FLOWLINE CORRIDOR

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNW COGCC LOCATION NUMBER: 320821

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SU) API: 05-123-24478, TOTAL MEASURED DEPTH: 9249'

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

SEE VISUAL MITIGATION BERM CROSS SECTION ON FDP-7

WEIR & SPILLWAY

OUTLET PIPE

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

EXISTING WALKING/BIKE PATH

S24 T2N R68W

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

TOWN OF FREDERICK

TOWN OF FIRESTONE

TOWN OF FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

SEE MASONRY WALL DETAIL ON FDP-7

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

COAL MINE BOUNDARY

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666 TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318 TOTAL MEASURED DEPTH: 5094'

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

S19 T2N R67W

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

4910'

4920

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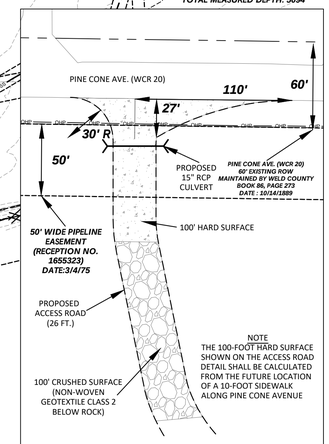
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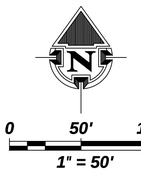
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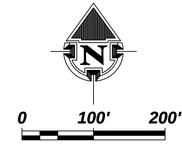
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4950

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EPL — EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- (PS) PROPOSED PERMANENT SEEDING
- MASONRY WALL
- DIVERSION DITCH

GENERAL NOTES:

- *ORIGINAL DOCUMENT SIZE: 24" x 36"*
- *SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6*

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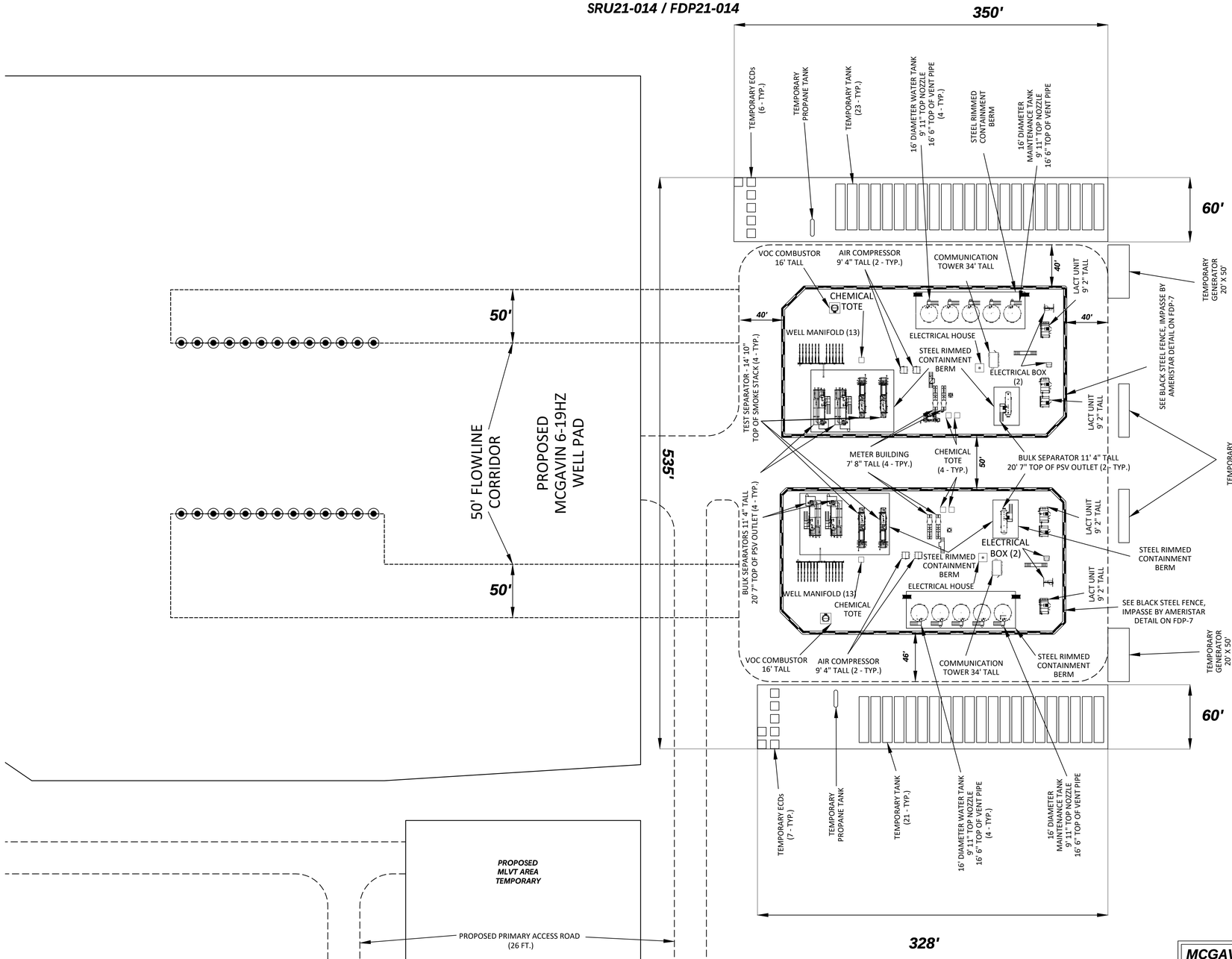
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



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GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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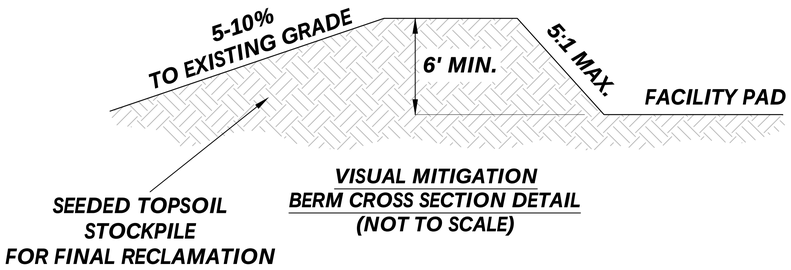
Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-014 / FDP21-014

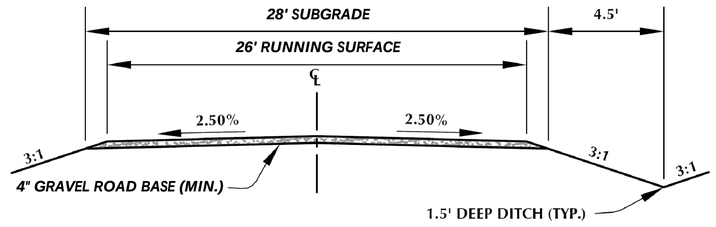
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SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

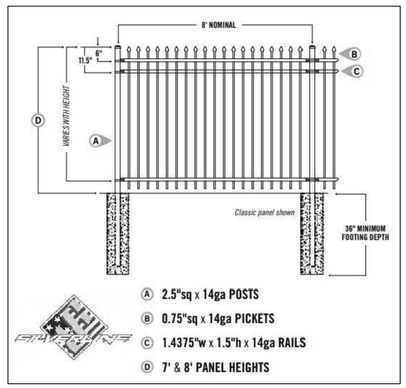
Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



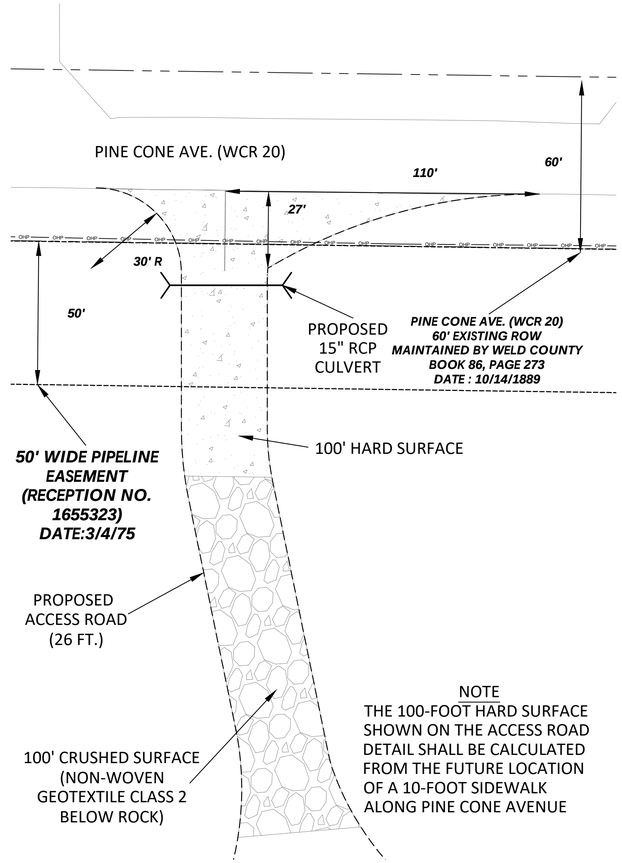
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



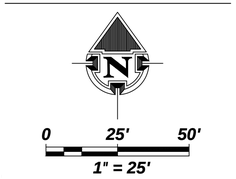
TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



TYPICAL MASONRY WALL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE MCGAVIN 6-19HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC
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Phone 970-776-4331
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Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-014 / FDP21-014

SCALE:	VARIOUS	SHEET:	FDP-7
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-014 / FDP21-014

NW. COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
P.L.S. NO. 24305

N. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2" ALUM. CAP
L.S. NO. 23500

N 89°12'17" W 2387.65'
(N. LINE OF THE NW1/4 OF SECTION 19)

N 89°09'45" W 927.97'
N 89°09'45" W 282.70'
N 83°43'12" W 316.62'

60' PINE CONE AVE. (WCR 20)

PINE CONE AVE. (WCR 20)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

SEE ACCESS ROAD DETAIL

N 83°09'44" W 279.51'
N 83°30'43" W 243.86'

50' WIDE PIPELINE EASEMENT
(RECEPTION NO. 1655323)
DATE: 3/4/75
GRID TIE TO CENTERLINE

CL OF PIPELINE ROW
(RECEPTION NO. 2843044)
DATE: 4/25/01

50'
30'

30' WIDE SANITARY SEWER
LINE EASEMENT
(RECEPTION NO. 3589233 &
3593372)
DATE: 11/12/08 & 12/5/08

N 71°43'21" W 1157.86'

APPROXIMATE LOCATION
OF 30' WIDE PIPELINE
ROW EASEMENT
(RECEPTION NO. 2857509
& 2323862)
DATE: 6/14/01 & 3/3/93

SEE GRID TIE
DETAIL ON FDP-9

S 63°17'59" E 1160.00'

N 26°42'01" E 479.00'

S 63°17'59" E 240.00'

N 26°42'01" E 179.26'

N 63°17'59" W 384.57'

N 26°42'01" E 437.37'

PROPOSED
MCGAVIN 6-19HZ
WELL PAD

PROPOSED
MCGAVIN 6-19HZ
FACILITY PAD

EXISTING WELL:
ROCKY MOUNTAIN FUEL 19-4H,
(SI), API: 05-123-16476,
TOTAL MEASURED DEPTH: 8248'

N 63°17'59" W 128.00'

N 0°03'41" W 2648.85'
(W. LINE OF THE NW1/4 OF SECTION 19)

COLORADO BLVD. (WCR 13)

35' WIDE PUBLIC TRAIL
(RECEPTION NO. 3299167)
DATE: 6/30/05
GRID TIE TO CENTERLINE

60'

COLORADO BLVD. (WCR 13)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

S 58°16'24" W 1184.18'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA),
API: 05-123-08665,
TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH DRAINAGE
EASEMENT
(RECEPTION NO. 3106304 & 3316421)
DATE: 9/15/03 & 8/24/05

N 35°32'29" E 880.04'
N 34°43'39" E 882.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA),
API: 05-123-08666,
TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY
MOUNTAIN FUEL CO D 12, (PA),
API: 05-123-10318,
TOTAL MEASURED DEPTH: 5094'

16.5'

16.5' WIDE
UTILITY EASEMENT
(RECEPTION NO. 2857509)
DATE: 6/14/01

VARYING WIDTH SANITARY
SEWER LINE EASEMENT
(RECEPTION NO. 3586220)
DATE: 10/27/08

30'

30' WIDE
PIPELINE EASEMENT
(RECEPTION NO. 2238664)
DATE: 1/17/91
GRID TIE TO CENTERLINE

S 0°03'41" E 2648.85'
(E. LINE OF THE NW1/4 OF SECTION 19)
N 00°59'44" W 2641.42'

S 5°56'20" W 740.00'

S 43°13'14" E 2315.64'

S 44°47'25" W 61.65'

S 35°52'40" W 724.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-3 JI,
(PA), API: 05-123-20218,
TOTAL MEASURED DEPTH: 8440'

EXISTING WELL: ROCKY MTN FUEL V 19-5JI, (SI),
API: 05-123-20217,
TOTAL MEASURED DEPTH: 8358'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-6JI, (SI),
API: 05-123-19583,
TOTAL MEASURED DEPTH: 8100'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 13,
(PA), API: 05-123-10317,
TOTAL MEASURED DEPTH: 5076'

S 53°17'52" E 1050.43'
S 54°59'08" E 1048.17'
S 60°56'59" E 1011.11'
S 65°38'39" E 907.33'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 5, (PA),
API: 05-123-08531,
TOTAL MEASURED DEPTH: 8095'

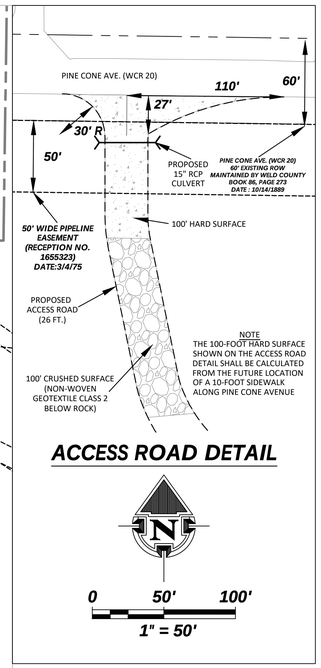
S 68°37'02" W 1175.60'

W. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 3 1/4" ALUM. CAP
L.S. NO. 37946

(S. LINE OF THE NW1/4 OF SECTION 19)
N 89°24'12" W 2430.61'

CENTER 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
WITNESS CORNER
112' NORTH OF TRUE CORNER POSITION
P.L.S. NO. 38512

0 150' 300'
1" = 150'



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

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Phone 970-776-4331

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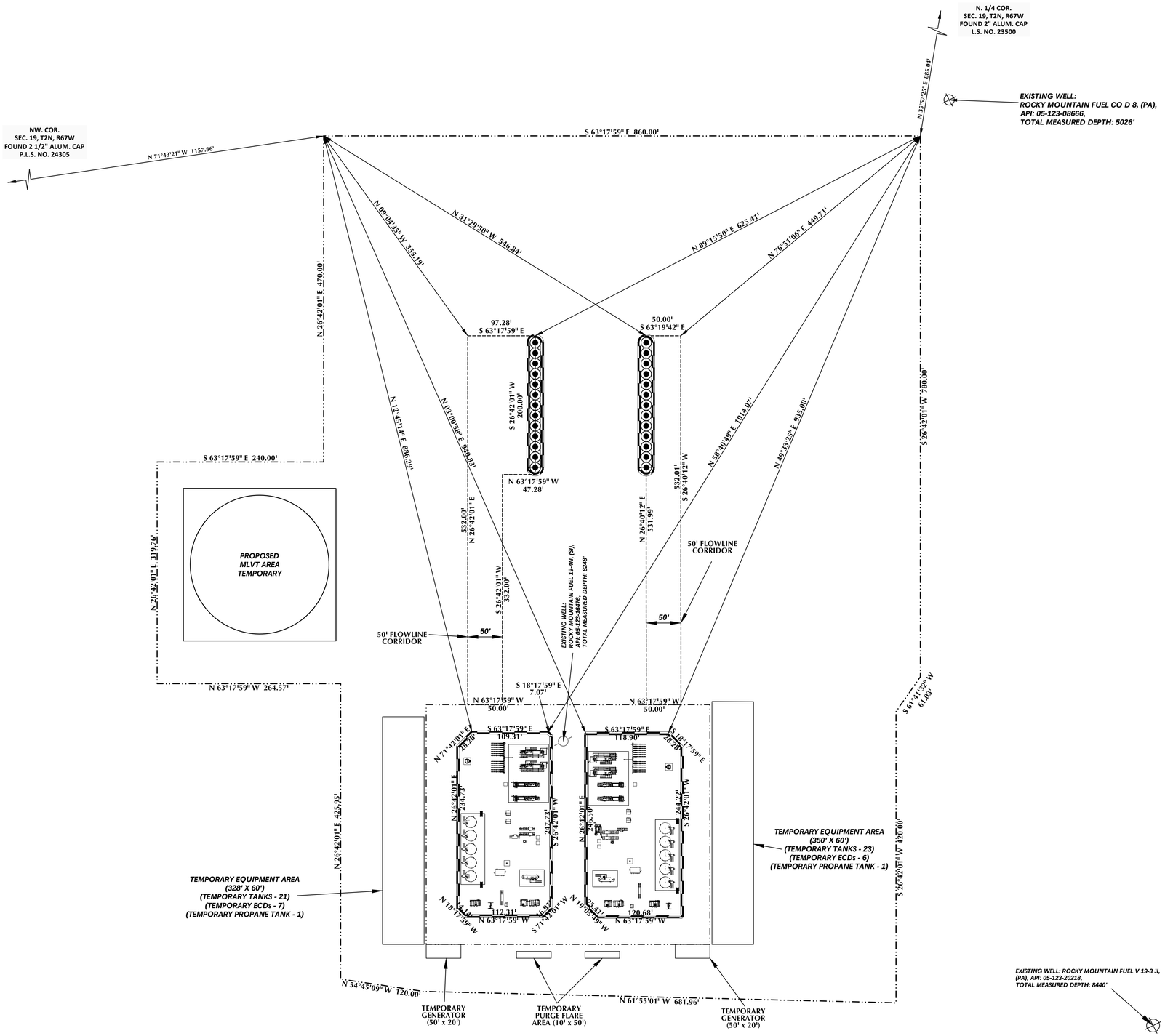
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-014 / FDP21-014

SCALE:	1" = 150'	SHEET:	FDP-8
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR

GENERAL NOTES:

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Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-014 / FDP21-014

SCALE:	1" = 75'	SHEET:	FDP-9
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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Special Review Use Application
Town of Firestone

McGavin 6-19HZ Pad and Production Facility

Township 2 North, Range 67 West, 6th P.M.
Section 19: NW/4
Firestone, Colorado
Parcel # 131119200045
6240 Pine Cone Avenue

Location Lat/Long (NAD 83): 40.127518, -104.938519
Access Road Lat/Long (NAD 83): 40.131307, -104.937875

APPLICANT:

Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Revised December 2021

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Section 1

Application Form

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

TOWN OF FIRESTONE
DEVELOPMENT REVIEW APPLICATION

Incomplete applications will not be processed. Attach additional sheets if necessary. Application fees must accompany application.

PROJECT INFORMATION	
Project Name: McGavin 6-19HZ Well Pad and Facility	
Address/Location: NW/4 of Section 19, 2N 67W	
Brief Project Description: KMOG proposes to construct a new oil and gas well pad including 26 wells and one production facility.	
Date of Pre-Application Conference with Staff: 6/26/2020	
Submittal Check List Attached: Yes	Fee Payment Included with Application: Yes
Mark As Applicable:	
Current Zoning: PUD	Proposed Zoning: No change
Current Use: AG	Proposed Use: N/A
# of Lots Proposed: N/A	Density Proposed: N/A
Gross Floor Area Proposed: N/A	
SITE INFORMATION	
Legal Description: NW/4 of Section 19, 2N 67W	
Location Size: ~25.63 Acres (DA); ~7.08 Acres (Interim Rec)	Floodplain On Site: No
SERVICE PROVIDERS	
Water: N/A	School District: N/A
Sewer: N/A	Fire District: Frederick Firestone Fire District
Gas: N/A	Ditch Company: N/A
Electric: N/A	Other:
Metro District: N/A	Other:
PROPERTY OWNER	**APPLICANT**
Name/Company: ANADARKO E&P ONSHORE LLC	Name/Company: Kerr McGee Oil and Gas Onshore LP
Address: 1099 18TH ST., DENVER CO 80202	Address: 1099 18TH ST., DENVER CO 80202
Phone Number: 720-929-6026	Phone Number: 720-929-6907
Email Address: don_jobe@oxy.com	Email Address: shayelyn_marshall@oxy.com
MINERAL RIGHTS OWNER	**MINERAL LEASE HOLDER**
Name/Company: Please see list attached.	Name/Company: **Please see list attached.**
Contact Information:	Contact Information:

Please see page 2 of this application.

FOR OFFICE USE ONLY	
Date submitted:	Project #:
Fees Paid:	Planner:

ACKNOWLEDGEMENT & AUTHORIZATION

The undersigned is fully aware of the request/proposal being made and the actions being initiated on the referenced property. The undersigned understand that the application must be found to be complete by the Town of Firestone before the request can officially be accepted and the development review process initiated.

The undersigned is aware that the applicant is fully responsible for all reasonable costs associated with the review of the application/request being made to the Town of Firestone. Applicants shall pay all costs billed by the Town for legal, engineering and planning costs incurred by staff, including consultants acting on behalf of staff, necessary for project review. By this acknowledgement, the undersigned hereby certify that the above information is true and correct.

Property Owner Signature: _____ Applicant Signature: Shayelyn Marshall

Digitally signed by: Shayelyn Marshall
DN: CN = Shayelyn Marshall email = shayelyn_marshall@oxy.com C = AD
Date: 2021.06.23 12:53:33 -06'00'

Date: 6/23/2021 Date: 6/23/2021

DEVELOPMENT REVIEW FEE SCHEDULE

	Application Type	Fee	Deposit
Annexation			
☐	Major (10+ Acres)	$4,000	$2,500
☐	Minor (<10 acres)	$2,000	$1,500
Zoning / Rezoning			
☐	Initial Zoning	$1,500+$10/acre	n/a
☐	Rezoning	$1,500+$10/acre	$2,500
☐	PUD Rezoning	$3,000+10/acre	$5,000
☐	Overlay Rezoning	$2,000+10/acre	$2,500
☐	Minor Amendment	$500	n/a
Final Development Plan			
☐	Major Amendment	$1,000	n/a
☐	Minor Amendment	$400	n/a
☐	Residential	$1,400+$10/unit	$5,000
☐	Non-Residential (>10,000 sf)	$2,500	$1,500*
☐	Non-Residential (<10,000 sf)	$1,500	$1,500*
Miscellaneous			
☐	Metro District Service Plan	$10,000	n/a
☐	Other**:		

	Application Type	Fee	Deposit
Comprehensive Plan Amendment			
☐	Major Amendment	$3,000	$1,500
☐	Minor Amendment	$1,000	n/a
Subdivision			
☐	Preliminary Plat	$2,000+$40/lot	$5,000
☐	Final Plat	$2,000+$20/lot	$10,000
☐	Minor Subdivision Plat	$2,000+$20/lot	$1,500
☐	Non-residential Minor Plat	$2,000+$20/lot	$5,000
☐	Minor Plat Amendment	$500	n/a
Special Use Review			
☐	Major	$1,000	n/a
☐	Minor	$500	n/a
☑	Oil & Gas	$1,000 per well	$1,500

*All fees **include** both Town of Firestone Planning & Engineering review. These fees **do not include** referral agency review fees, outside consultant review fees, or review fees incurred by consultants acting on behalf of staff.*

** may be waived at staff's discretion*

*** fee provided at pre-application meeting*

McGavin Surface Location: 2N-67W-19: NW				
Lease Holder	**Address**	**City**	**State**	**Zip**
Kerr-McGee Oil & Gas Onshore LP	PO Box 173779	Denver	CO	80217
Mineral Owner	**Address**	**City**	**State**	**Zip**
Black Stone Minerals Company, L.P.	1001 Fannin Street, Suite 2020	Houston	TX	77002
CMS Minerals II, LLC	1300 Post Oak Blvd., Suite 800	Houston	TX	77056
Unionrock Royalties II, LLC	1999 Broadway, Suite 850	Denver	CO	80202
Oleo Acres Minerals, LLC	5251 DTC Pkwy, Suite 425	Greenwood	CO	80111
Black Magic #2, LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Magic M&R, LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Richard H. Linn Trust for Nancy E Linn	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
RHL 219 LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Gittelman I LLLP	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
TRP Minerals, LLC	1455 West Loop South, Suite 230	Houston	TX	77027
Pinto Investment Partners, LP	1000 Main Street, Suite 3250	Houston	TX	77002

Section 2

Narrative

NARRATIVE

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1.4 Characteristics of Drilling and Completion Operations 4
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2.2 Surface Owner 5

3. Operating Plan 5

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3.3 Water Sources for Activities 6
3.4 Completions Phase 6
3.5 Production Phase 7
3.6 Plugging and Abandonment Phase 8

4. Graphics 10

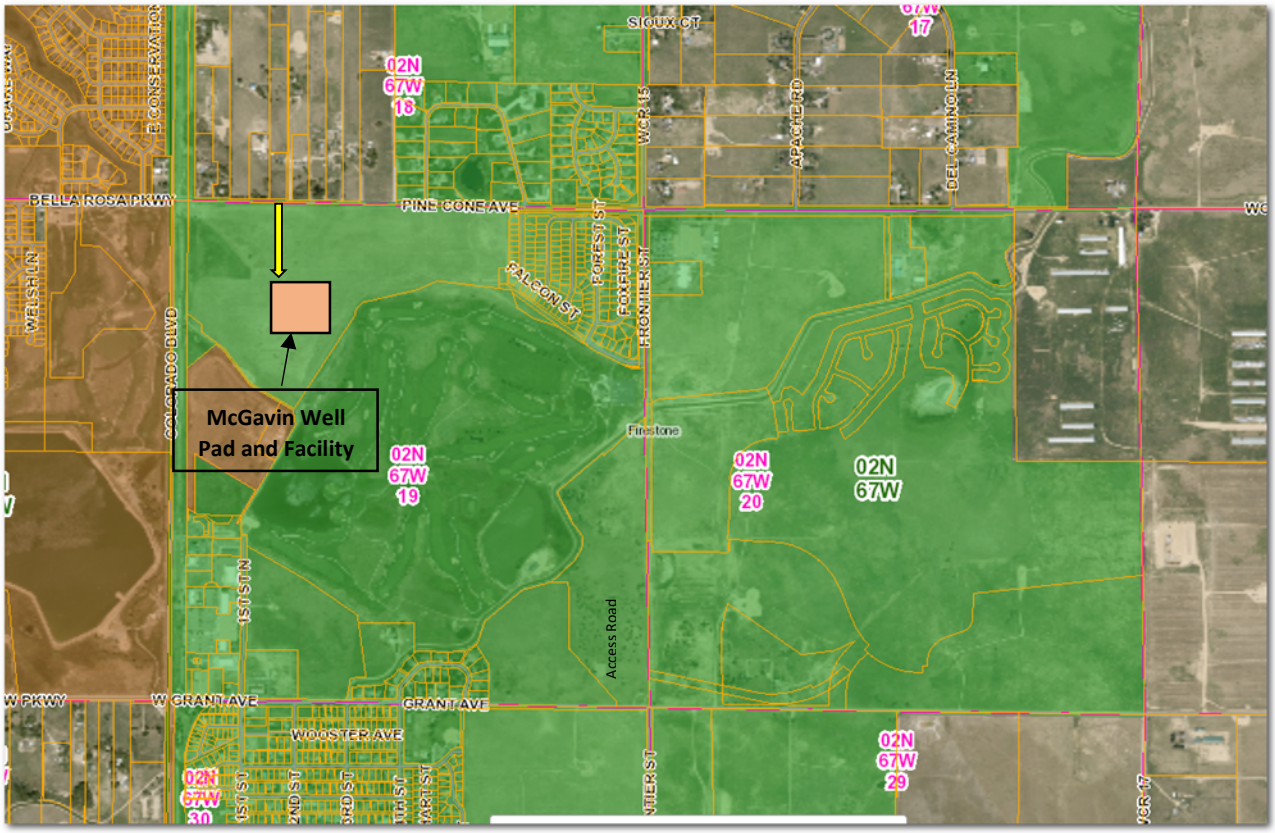
4.1 Typical Drilling Rig 10
4.2 Typical Wellheads 10
4.3 Typical Separators 11
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4.5 LACT Unit - (Lease Automated Custody Transfer) 12
4.6 Typical Flow Diagram 14

1. Narrative

1.1 DESCRIPTION OF INTENDED USE

Kerr-McGee Oil & Gas Onshore LP (KMOG), intends to horizontally drill twenty-six (26) oil and gas wells from one well pad location. The proposed well names are listed in Section 1.2. The desired outcome of this application is to permit the wells to all formations. The purpose of the wells is to produce hydrocarbons from underlying formations known to have commercial potential from the production of such substances.

The proposed wells and production facility are located in Section 19, Township 2 North, Range 67 west 6th P.M. See the aerial vicinity map below showing an arrow for the site access from WCR 20/Pine Cone Ave.



1.2 SITE IMPROVEMENTS

KMOG is proposing one temporary operations area of approximately 25.63 acres for drilling and completions operations. After drilling and completions activities, the site will be reclaimed to approximately 7.08 acres, as the permanent disturbance area.

McGavin 6-19HZ Well Pad:

McGavin 19-1HZ	McGavin 19-15HZ
McGavin 19-2HZ	McGavin 19-16HZ
McGavin 19-3HZ	McGavin 19-17HZ
McGavin 19-4HZ	McGavin 19-18HZ
McGavin 19-5HZ	McGavin 19-19HZ
McGavin 19-6HZ	McGavin 19-20HZ

McGavin 19-7HZ	McGavin 19-14HZ
McGavin 19-8HZ	McGavin 19-21HZ
McGavin 19-9HZ	McGavin 19-22HZ
McGavin 19-10HZ	McGavin 19-23HZ
McGavin 19-11HZ	McGavin 19-24HZ
McGavin 19-12HZ	McGavin 19-25HZ
McGavin 19-13HZ	McGavin 19-26HZ

A Final Develoment Plan is included with this application for further use and review.

After the wells have been drilled to their total depths and completed as wells capable of production, KMOG will reclaim the drill site. The reclamation will be in accordance with the applicable rules and regulations of the Colorado Oil and Gas Conservation Commission (COGCC). The completed well sites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the well sites regularly upon completion of the wells. Flowlines will be laid to connect the wells to the production facility.

If any of the wells are not capable of production, that specific well (or wells) will be plugged and abandoned as a dry hole and the same reclamation of the site will apply.

1.3 CHARACTERISTICS OF INSTALLATION

These wells will have a wellhead assembly installed on site as well as production and gathering facilities. Pumping units may be installed should pressure within the wells necessitate their use.

1.4 CHARACTERISTICS OF DRILLING AND COMPLETION OPERATIONS

KMOG management will utilize authorized employees and professional contractors to conduct the drilling and completion operations on site. The actual drilling phase is approximately five to six days per well, under normal circumstances. Drilling will be continuous, 24 hours a day, for this period. Completion operations will be performed on each well following the drilling phase. The production facility will be installed, and the wells turned over to production. KMOG anticipates mobilization and pad construction to begin the second quarter 2022 contingent upon approval from the Town of Firestone. Completion of all construction activities including site preparation, drilling, completion, facility and pipeline installation and final re-grading will occur within six months of the completion of hydraulic fracturing, construction of production facility and the initiation of oil and gas production.

1.5 CHARACTERISTICS OF MAINTENANCE

A lease operator will inspect the wells on a regular basis under normal conditions and as required by any special circumstances under the supervision of the KMOG Area Manager. In addition, all wells and production facilities are remotely monitored 24 hours a day / seven days a week from our Integrated Operations Center (IOC) located in Platteville, Colorado.

1.6 DISPOSAL METHODS STATEMENT

- Drilling mud will be spread on lands outside of the town limits in a manner approved by the COGCC or taken to a commercial disposal.
- A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation.

- Human waste will be properly handled by portable sanitary facilities located on site. KMOG will contract a sanitary service company to provide and maintain the self-contained sanitary facilities throughout the oil and gas operation.
- Produced water will be disposed of off-site as approved by the COGCC.

2. Operator Information

2.1 OPERATOR IDENTIFICATION

Kerr-McGee Oil & Gas Onshore LP
(Subsidiary of Occidental Petroleum Corporation)
1099 18th Street
Denver, Colorado 80202
Tel:(720) 929-6000
Fax: (720) 929-7297

Kerr-McGee Oil & Gas Onshore LP (KMOG), a subsidiary of Occidental Petroleum Corporation, is a fully insured and bonded oil and gas operator, organized as a Delaware Limited Partnership and authorized to do business in the State of Colorado as Kerr-McGee Oil & Gas Onshore LP. All insurance and bonds held by KMOG meet the requirements as set forth in the rules and regulations as adopted by the COGCC.

2.2 SURFACE OWNER

Anadarko E&P Onshore LLC
PO Box 173779
Denver, Colorado 80217

The surface owner is the applicant and therefore a surface use agreement is not applicable.

3. Operating Plan

3.1 CONSTRUCTION & DRILLING PHASE

The construction and drilling operations for this location are expected to take about six months (under normal circumstances). The subject land is first surveyed, and a well location is staked in accordance with COGCC regulations. The drilling pad is designed to prevent run off so that any spills would be contained on-site. The pad is lined with a layer of compacted clay materials to help prevent fluids from migrating vertically to the subgrade. From this point forward, twenty-four (24) hour operations of dirt work equipment begins to preparing the location including leveling the surface where the drilling rig will be located. After the location has been prepared, a drilling rig will move in to drill the surface intervals of the wells and cement the surface pipe to protect ground water formations. This process will take approximately one day per well under normal circumstances, subsequently a 26 well pad will take 26 days to drill and cement the surface casing pipes. Depending on the size/type of rig utilized to drill the surface interval, production drilling operations will either begin immediately with the same rig or a different rig will be moved onto location at a later date to drill the production interval. Drilling the production interval of the well will take five to six days per well, under normal circumstances. The actual drilling proceeds at a constant rate unless below the surface or mechanical problems are encountered.

If the well is deemed viable, casing is run in the hole and cemented (alternatively the well is plugged according to COGCC regulations). The casing, constructed of steel pipe, is designed to specific criteria to provide an integral conduit for transporting hydrocarbons to the surface. The casing strength is further enhanced by the cementing process. Cement is placed in the space between the casing and the wall of the hole. The cement anchors the casing, provides increased burst resistance, and contains the fracturing and produced fluids. The cement is also designed to special criteria. The cement is then allowed to cure and concurrently the rig is moved off location. At this point the drilling phase is complete.

3.2 DRAINAGE AND EROSION CONTROL PLAN

Changes in the current drainage patterns are not anticipated. The well site will be monitored during the drilling and completion phases for any problems with drainage or erosion. Necessary measures will be taken to correct any problems. Once the drilling and completion phases are complete, the drill site will be restored as near as practical, to its original grade and vegetation planted as required by regulations and surface use agreements. KMOG will continue to monitor the site until all applicable regulatory requirements for revegetation have been met.

KMOG uses a closed loop or "pitless" system for drilling and fluid management and does not construct a reserve pit. The drilling company will actively manage the area around the rig equipment such that any minor fluid spills will be diverted and drain to small pumps strategically located and from there, if only water, will be pumped into the drilling fluid system. If the fluid is contaminated by fluids other than water, it will be pumped into a separate container and removed from the site to an approved disposal facility.

Please see the Phase III Drainage Study in Section five (of the permit) for more detail.

3.3 WATER SOURCES FOR ACTIVITIES

Water for use in completions operations will be secured by KMOG through its own "Water On Demand" system, or from a water supplier in the immediate area of the drill site. Water use will be approved for commercial and industrial use and will be subject to a mutually acceptable agreement between KMOG and the water supplier. The water-on-demand system is a network of over 180 miles of underground pipeline that stretches the length of the 20-mile by 30-mile field to source and transport water to completions crews. This system eliminates more than 2,000 truck trips per day field wide, also reducing associated concerns of traffic, noise, emissions and dust.

KMOG plans to install temporary lay flat waterlines to transfer water from its permanent infrastructure ending on parcel #131121000003 to the well pad for use during completions operations.

3.4 COMPLETIONS PHASE

Sometime after the drilling rig has rigged down, horizontal completions operations may begin.
The construction of the production facility, where practical may occur concurrent with the drilling and/or completions operations. Completions operations include all operations performed after drilling the well up to delivering a producing well to be managed by the Production Operations group. These completions operations consist of well preparation, fracture stimulation, and preparing the well for production to sales.

The well preparation phase of completions operations is performed to prepare for the fracture stimulation operation. Initially, the necessary wellhead equipment is installed to conduct well preparation operations. KMOG wells are designed, built, operated and maintained to the highest standards. Logging is performed to confirm the cement quality behind the well casing meets KMOG and regulatory standards. The wellbore is

pressure-tested to confirm the casing can withstand the high pressures associated with a fracture stimulation. The casing is then perforated at the toe end of the wellbore to prepare the well for the initial fracture stimulation. Lastly, the remaining necessary wellhead equipment is installed to ready the well for fracture stimulation. A crew of one to six people are required to perform the above operations. The cumulative duration of the well preparation operations is three to four days.

The fracture stimulation operation is conducted to stimulate the flow of hydrocarbons from the targeted geologic formation to the wellbore and up to the wellhead. Fracture stimulation consists of pumping a water and sand mixture into the wellbore at a high pressure and flow rate. The water/sand mixture exits the wellbore to contact the rock formation through perforations made to the well casing. The stimulation operation for each well is performed in stages to concentrate the stimulation of the rock formation at designed intervals along the wellbore. In the event multiple wells are included in the fracture stimulation operations, only one well is under stimulation at one time. During stimulation, a crew of 35 to 45 people are required. The cumulative duration of the fracture stimulation operation is three to seven days per well.

At the end of the fracture stimulation operation, the well is prepared for long-term production. A coiled tubing unit is utilized to mill the plugs set in the wellbore to isolate the stimulation stages and to clean out the wellbore. Production tubing is installed to direct the flow of hydrocarbons inside the wellbore to the wellhead at surface. Once the production tubing is landed, the well is managed by the Production Operations group. The cumulative duration of the post fracture stimulation operations is two to five weeks with a crew of three to ten people.

The completion process is a 24 hour a day / seven-days a week operation and crews are rotated every 12 hours for continuous operations. Once fracture stimulation operations begin there will be varying activity on location until the well is turned over to permanent production operations.

3.5 PRODUCTION PHASE

The production phase may overlap the completion phase. After the completions fleet has cleared location, the wells are connected to a production facility. Gathering equipment may also be installed on location by a third-party gathering company. The production and gathering facility, may consist of maintenance/oil tank(s), water tank(s), separator(s), LACT(s) units (Lease Automatic Custody Transfer), vapor recovery unit(s) (VRU), emission control device(s) (ECDs), meter(s) house, chemical tote(s), purge flare(s), communications tower, temporary produced water tanks, temporary ECDs and temporary generator. The temporary equipment will be on site for six to 12 months and then will be removed. In addition, pumping units may be installed. The production facility will be connected to the wells by pressure tested flowline buried approximately four feet deep. At this point, the gas and oil purchasers are preparing to connect the gas and oil sales meter loop.

The production facility installation is completed by constructing an earthen or metal berm around the production tank(s) and separator. The enclosed area will have sufficient volume to contain the entire contents of the largest tank plus adequate freeboard to contain a 24-hour 25-year precipitation event. The berms will be inspected at regular intervals and maintained in good condition. When a berm is provided around tanks no potential ignition sources shall be installed inside that area.

The lease operator then begins his monitoring of the wells. Reports consist of tank measurements, gas sales estimates, and pressure reading. This information is compiled monthly and filed with the COGCC.

When a well is completed for production, all disturbed areas no longer needed will be restored and re-vegetated as soon as practicable. All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established. All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions. The segregated soil horizons will contour as near as practicable to achieve erosion control and long-term stability and shall be tilled adequately to establish a proper seedbed. The disturbed area then shall be re-seeded in the first favorable season.

At some point in the well's life, tubing may be run in the well with the possible addition of a plunger lift and/or pumping unit. This will extend the well's producing life and maximize reserves.

3.6 PLUGGING AND ABANDONMENT PHASE

Plugging and abandonment is the cementing of a well and removal of its associated production facility. This also includes the removal of flowlines after all the wells on the pad are plugged and the remediation and reclamation of the well site.

Upon the plugging and abandonment of a well, all cellars will be backfilled. All debris abandoned gathering line risers, and flowline risers, and surface equipment will be removed, and the location will be graded and re-contoured. Within 90 days after a well is plugged and abandoned, the well site shall be cleared of all non-essential equipment, and debris. All access roads to the plugged and abandoned wells and associated production facilities shall be closed, graded and re-contoured in accordance with the COGCC regulations and Surface Use Agreement (if applicable). Culverts and any other obstructions that were part of the access road(s) shall be removed. Well locations, access roads and associated facilities shall be reclaimed. As applicable, compaction alleviation, restoration, and revegetation of well sites and access roads shall be performed. After plugging a well, reclamation work will be completed within three months on crop land, and six months on non-crop land, or with landowner consent reclamation will occur during optimal re-vegetation times of the year.

Successful Final Reclamation of the well sites and access roads will be considered completed when:

1. Reclamation of crop land has been performed and over two growing seasons has indicated no significant un-restored subsidence.
2. Reclamation of non-crop land has been performed and the total cover of live perennial vegetation, excluding noxious weeds, provides sufficient soils erosion control. The total cover of live perennial vegetation of adjacent or nearby undisturbed land, not including overstory or tree canopy cover, having similar soils, slope and aspect of the reclaimed area.
3. Disturbances resulting from flow line installations shall be adequately reclaimed when the disturbed area is reasonably capable of supporting the pre-disturbance land use.
4. A Sundry Notice, Form 4, will be submitted to the COGCC, which describes the final reclamation procedures and any mitigation measures associated with final reclamation

KMOG will evaluate the 39 wells below for potential plug and abandon operations. The 39 wells are associated with 10 locations and if plugged, nearly 37 acres of previously created pads will be reclaimed.

FIRESTONE 20-29D
FIRESTONE V 20-03
FIRESTONE V 20-04D
FIRESTONE V 20-18D
ROCKY MOUNTAIN FUEL 19-4N (currently being plugged and abandoned)
ROCKY MOUNTAIN FUEL V 19-6JI
ROCKY MTN FUEL V 19-5JI
CENTEX 40-25
TOM L RUSSELL UNIT 1
DUNAWAY U 13-10 (currently being plugged and abandoned)
VICTORIA U 01-14JI
DACONO STATE 22-36 (currently being plugged and abandoned)
DACONO STATE 6-36 (currently being plugged and abandoned)
HSR-TEETS 11-20A
TEETS 12-20A
FIRESTONE 12-30
KUGEL 12-18
KUGEL V 18-4
OVERLOOK 21-30

OVERLOOK 2-30
OVERLOOK 27-30
OVERLOOK 28-30
OVERLOOK 8-30
WALSH GAS UNIT 6-24
WALSH U 24-15 JI
HIDDEN CREEK 12-29
HIDDEN CREEK 13-29X
HIDDEN CREEK 14-29
HIDDEN CREEK 19-29
HIDDEN CREEK 22-29
HIDDEN CREEK 25-29
HIDDEN CREEK 35-29
DACONO STATE 17-36
DACONO STATE 24-36
DACONO STATE 39-36
FREDERICK STATE 1-36 (currently being plugged and abandoned)
NEWTON 1
HSR-TEETS 5-29A
FIRESTONE V 20-2 (currently being plugged and abandoned)

4. Graphics

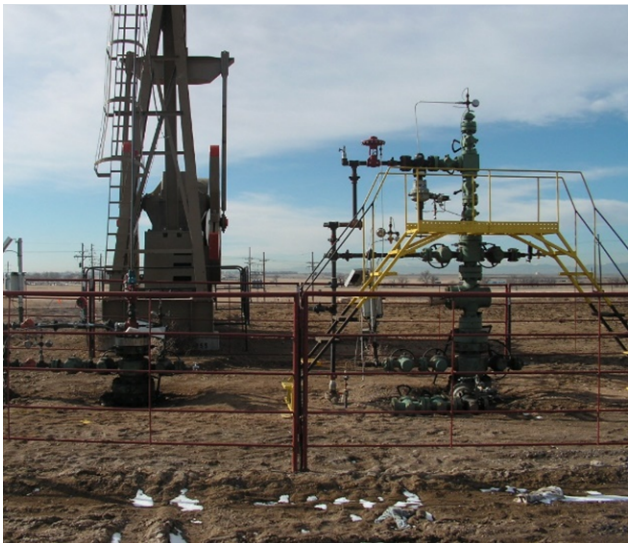
4.1 TYPICAL DRILLING RIG

Temporary, used during the drilling phase.



4.2 TYPICAL WELLHEADS

Permanent equipment for the life of the well.





4.3 TYPICAL SEPARATORS

Permanent equipment, part of the production facility.



Bulk Separators – approximately 11 to 21-foot-tall to top of Pressure Safety Valve (PSV) outlet.



Production Separators - 12 to 15 -foot tall to top of exhaust stack.

4.4 TYPICAL MAINTENANCE – CONDENSATE/OIL AND WATER TANKS

Permanent equipment, part of production facility – approximately ten -foot tall top of tank, 17 -feet tall to top of vent pipes.

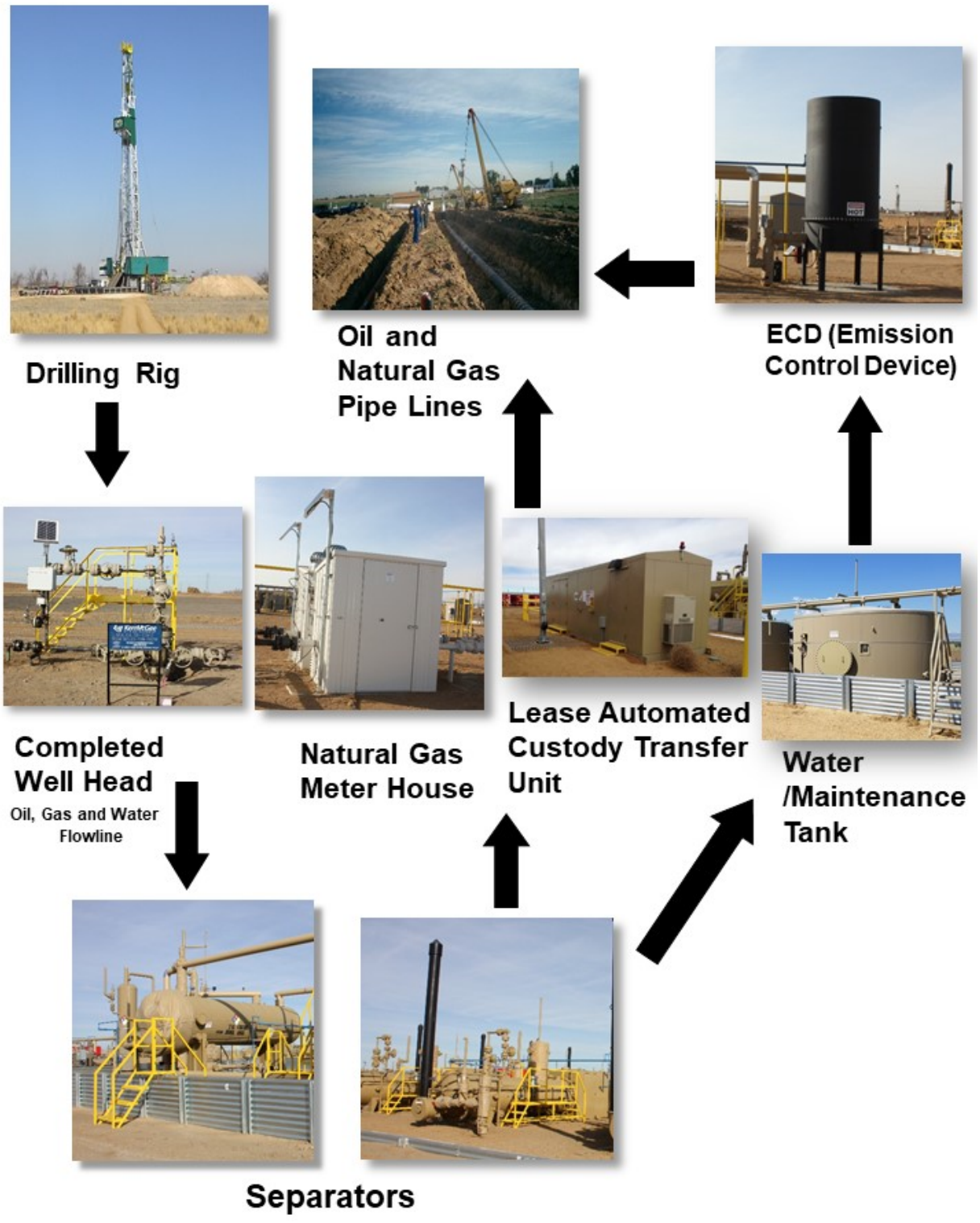


4.5 LACT UNIT - (LEASE AUTOMATED CUSTODY TRANSFER)

Permanent Equipment part of the production facility – nine to ten foot tall.



4.6 TYPICAL FLOW DIAGRAM



Section 3

COGCC Permits

Please see the submitted COGCC permit attached.

FORM 2A Rev 01/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Oil and Gas Location Assessment

Document Number: 402703587

Date Received: 07/12/2021

Location ID:

Expiration Date:

This Oil and Gas Location Assessment is to be submitted to the COGCC for approval prior to any ground disturbance activity associated with oil and gas operations. Approval of this Oil and Gas Location Assessment will allow for the construction of the below specified Location; however, it does not supersede any land use rules applied by the local land use authority. Please see the COGCC website at https://cogcc.state.co.us/ for all accompanying information pertinent this Oil and Gas Location Assessment.

[X] New Location [ ] Refile [ ] Amend Existing Location #

If this Location assessment is a component of an Oil and Gas Development Plan (OGDP) application, enter the OGDP docket number(s).

Docket Number	OGDP ID	OGDP Name
210700114		

If this Location assessment is part of an existing Oil and Gas Development Plan, enter the OGDP ID number(s).

<No existing OGDP number provided>

CONSULTATION

[ ] This location is included in a Comprehensive Area Plan (CAP). CAP ID #

[ ] This Location or its associated new access road, utility, or Pipeline corridor meets Rule 309.e.(2).A, B, or C.

[ ] This Location is within 2,640 feet of a GUDI or Type III Well per Rule 411.b.(4).

[ ] This Location includes a Rule 309.e.(2).E variance request.

[ ] This location includes a Rule 309.f.(1).A.ii. variance request.

Operator

Operator Number: 47120

Name: KERR MCGEE OIL & GAS ONSHORE LP

Address: P O BOX 173779

City: DENVER State: CO Zip: 80217-3779

Contact Information

Name: Shayelyn Marshall

Phone: (720) 929-6907

Fax: ( )

email: shayelyn_marshall@oxy.com

FINANCIAL ASSURANCE

[X] Plugging and Abandonment Bond Surety ID (Rule 706): 20010124

[ ] Gas Facility Surety ID (Rule 711):

[ ] Waste Management Surety ID (Rule 704):

LOCATION IDENTIFICATION

Name: MCGAVIN Number: 6-19HZ

Provide the location description and the latitude and longitude of a single point near the center of the Working Pad Surface as a reference for this Location.

QuarterQuarter: NENW Section: 19 Township: 2N Range: 67W Meridian: 6 Ground Elevation: 4929

Latitude: 40.129275 Longitude: -104.937539

GPS Quality Value: 1.4 Type of GPS Quality Value: PDOP Date of Measurement: 05/04/2021

RELATED REMOTE LOCATIONS

(Enter as many Related Locations as necessary. Enter the Form 2A document # only if there is no established COGCC Location ID#)

This proposed Oil and Gas Location is:	LOCATION ID #	FORM 2A DOC #
☐		

RELEVANT LOCAL GOVERNMENT SITING INFORMATION

County: WELD Municipality: Firestone

Per § 34-60-106 (1)(f)(I)(A), the following questions pertain to the "Relevant Local Government approval of the siting of the proposed oil and gas location."

This proposed Oil and Gas Location is in an area designated as one of State interest and subject to the requirements of § 24-65.1-108, C.R.S. No

Does the Relevant Local Government regulate the siting of Oil and Gas Locations, with respect to this location? Yes

A siting permit application has been submitted to the Relevant Local Government for this proposed Oil and Gas Location: Yes

Date Relevant Local Government permit application submitted: 07/08/2021

Current status or disposition of the Relevant Local Government permit application for this proposed Oil and Gas Location: In Process

Status/disposition date: 07/08/2021

If Relevant Local Government permit has been approved or denied, attach final decision document(s).
Provide the contact information for the Relevant Local Government point of contact for the local permit associated with this proposed Oil and Gas Location:

Contact Name: MARTY OSTHOLTHOFF Contact Phone: 303.531.6275

Contact Email: mostholthoff@firestoneco.gov

PROXIMATE LOCAL GOVERNMENT INFORMATION

For every Proximate Local Government (PLG) associated with this proposed Oil and Gas Location, provide the PLG's point of contact and their contact information.

< No row provided >

FEDERAL PERMIT INFORMATION

A Federal drilling permit (or related siting application) has been submitted for this proposed Oil and Gas Location: No

Date submitted:

Current status or disposition of the Federal drilling permit (or related siting application) for this proposed Oil and Gas Location:

Status/disposition Date:

If Federal agency permit has been approved or denied, attach the final decision document(s).
Provide the contact information of the Federal point of contact for the Federal permit associated with this proposed Oil and Gas Location.

Contact Name: Contact Phone:

Contact Email: Field Office:

Additional explanation of local and/or federal process:

Since 2019, KMOG has worked with the Town of Firestone to negotiate a Cooperative Development Agreement which includes the proposed location. After years of thoughtful planning and significant input from the Town staff, the Board of Trustees approved the Agreement in April of 2021. KMOG submitted the local permit to the town on July 8, 2021.

RELEVANT LOCAL GOVERNMENT OR FEDERAL PRE-APPLICATION CONSULTATION

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Did a pre-application Formal Consultation Process occur with the Relevant Local Government per Rule 301.f.(3)?` No

Date of local government consultation:

Did a pre-application Formal Consultation Process occur with the Federal land manager per Rule 301.f.(3)? No

Date of federal consultation:

Was an ALA that satisfies Rule 304.b.(2).C (or substantially equivalent information per Rule 304.e) developed during a federal or local government permit application process? If yes, attach the ALA to the Form 2A. Yes

ALA APPLICABILITY AND CRITERIA

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Does the proposed Oil and Gas Location meet any of the criteria listed in Rule 304.b.(2)B? Yes

If YES, indicate by checking the box for every Rule 304.b.(2).B criterion met by this proposed Location, and attach an ALA. See Rule 304.b.(2).B.i-x for full text of criteria.

- [X] i. WPS < 2,000 feet from RBU/HOBU
- [ ] ii. WPS < 2,000 feet from School/Child Care Center
- [ ] iii. WPS < 1,500 feet from DOAA
- [ ] iv. WPS < 2,000 feet from jurisdictional boundary and PLG objects/requests ALA
- [ ] v. WPS within a Floodplain
- [ ] vi.aa. WPS within a surface water supply area
- [ ] vi.bb. WPS < 2,640 feet from Type III or GUDI well
- [X] vii. WPS within/immediately upgradient of wetland/riparian corridor
- [ ] viii. WPS within HPH and CPW did not waive
- [ ] ix. Operator using Surface bond
- [ ] x. WPS < 2,000 feet from RBU/HOBU/School within a DIC

Is the proposed Oil and Gas Location within the exterior boundaries of the Southern Ute Indian Reservation, and the Tribe objects to the Location or requests an ALA? If YES, attach an ALA to the Form 2A. No

Operator requests the Director waive the ALA requirement per Rule 304.b.(2).A.i: [ ]

Provide an explanation for the waiver request, and attach supporting information (if necessary).

ALTERNATIVE LOCATIONS DASHBOARD

List every alternative location reviewed and included in the ALA. Provide a latitude and longitude for the approximate center of the alternative location, all Rule 304.b.(2).B Criteria met, if a variance would be required to permit the location, and a brief comment on the key points of the alternative location.

304.b.(2).B.i-x Criteria Met:

< No row provided >

SURFACE & MINERAL OWNERSHIP

Surface Owner Info:

Name: Anadarko E&P Onshore LLC Phone: 720-929-6000

Address: Address: 1099 18th St. Fax:

Address: Email:

City: Denver State: CO Zip: 80202

Surface Owner at this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Check only one:

[X] The Operator/Applicant is the surface owner.

[ ] The Operator has a signed Surface Use Agreement for this Location – attach SUA.

[ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the surface owner owns the minerals beneath this Location and is committed to an oil and gas lease – attach lease map or provide lease description.

[ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the Operator intends to use a surface bond per Rule 703 to secure access to this Location – attach lease map or provide lease description.

Surface Owner protection Financial Assurance type: N/A Surety ID Number:

Mineral Owner beneath this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: Yes

Lease description if necessary:

SITE EQUIPMENT LIST

Indicate the number and type of major equipment components planned for use on this Oil and Gas Location:

Wells	26	Oil Tanks	0	Condensate Tanks	2	Water Tanks	8	Buried Produced Water Vaults	0
Drilling Pits	0	Production Pits	0	Special Purpose Pits	0	Multi-Well Pits	0	Modular Large Volume Tank	1
Pump Jacks	26	Separators	10	Injection Pumps	0	Heater-Treaters	0	Gas Compressors	0
Gas or Diesel Motors	0	Electric Motors	0	Electric Generators	0	Fuel Tanks	0	LACT Unit	2
Dehydrator Units	0	Vapor Recovery Unit	0	VOC Combustor	2	Flare	0	Enclosed Combustion Devices	0
Meter/Sales Building	4	Pigging Station	0			Vapor Recovery Towers	0		

OTHER PERMANENT EQUIPMENT

< No Row Provided >

OTHER TEMPORARY EQUIPMENT

< No Row Provided >

GAS GATHERING COMMITMENT

Operator commits to connecting to a gathering system by the Commencement of Production Operations? Yes

If the answer is NO, a Gas Capture Plan consistent with the requirements of Rule 903.e MUST be attached on the Plans tab.

FLOWLINE DESCRIPTION

Per Rule 304.b.(6), provide a description of all onsite and off-location oil, gas, and/or water flowlines.

Please see Operator Comments Section for flowline description.

CONSTRUCTION

Size of disturbed area during construction in acres: 25.63

Size of location after interim reclamation in acres: 7.08

Estimated post-construction ground elevation: 4930

DRILLING PROGRAM

Will a closed-loop drilling system be used? Yes

Is H2S gas reasonably expected to be encountered during drilling operations at concentrations greater than or equal to 100 ppm? No If YES, attach H2S Drilling Operations Plan.

Will salt sections be encountered during drilling: No

Will salt based (>15,000 ppm Cl) drilling fluids be used? No

Will oil based drilling fluids be used? Yes

DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

Please see attached Waste Managment Plan.

Beneficial reuse or land application plan submitted? Yes

Reuse Facility ID: _____ or Document Number: _____

Centralized E&P Waste Management Facility ID, if applicable: 149021

CURRENT LAND USE

Current Land Use: check all that apply per Rule 304.b.(9).

Crop Land: [X] Irrigated [ ] Non-Irrigated [ ] Conservation Resource Program (CRP)

Non-Crop Land: [ ] Rangeland [ ] Forestry [ ] Recreation [ ] Other

Subdivided: [ ] Industrial [ ] Commercial [ ] Residential

Describe the current land use:

The current land use is agriculture, more specifically irregated cropland. There are no plans to subdivide the property or add any other types of land use at this time.

Describe the Relevant Local Government's land use or zoning designation:

Current zoning designation is a Planned Unit Development.

Describe any applicable Federal land use designation:

N/A

FINAL LAND USE

Final Land Use: check all that apply per Rule 304.b.(9).

Crop Land: [X] Irrigated [ ] Non-Irrigated [ ] Conservation Resource Program (CRP)

Non-Crop Land: [ ] Rangeland [ ] Forestry [ ] Recreation [ ] Other

Subdivided: [ ] Industrial [ ] Commercial [ ] Residential

REFERENCE AREA INFORMATION

If Final Land Use includes Non-Crop Land (as checked above), the following information is required:
Describe landowner's designated final land use(s):

Reference Area Latitude: Reference Area Latitude:

Provide a list of plant communities and dominant vegetation found in the Reference Area.

< No row provided >

Noxious weeds present:

SOILS

List all soil map units that occur within the maximum extent of the proposed Oil and Gas Location. Attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" listing the typical vertical soil profile(s). This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS website at https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/ or from the COGCC website GIS Online map page. Instructions are provided within the COGCC website help section.

NRCS Map Unit Name: 47- Olney fine sandy loam 1-3% slopes

NRCS Map Unit Name: 72- Vona loamy sand 0-3% slopes

NRCS Map Unit Name: 4- Aquolls and Aquepts, flooded

GROUNDWATER AND WATER WELL INFORMATION

Provide the distance and direction, as measured from the Working Pad Surface, to the nearest:

water well: 584 Feet SW

Spring or Seep: 5280 Feet W

Estimated depth to shallowest groundwater that can be encountered at this Oil and Gas Location: 7 Feet

Basis for estimated depth to and description of shallowest groundwater occurrence:

584' SW, Permit 7-WBC, depth 42', Static Water Level unknown, Elev 4923'
Loc Elev 4929'
SWL based off of shallowest groundwater encountered with monitoring well beneath the proposed working pad surface (see attached grading plan for reference).

SURFACE WATER AND WETLANDS

Provide the distance and direction to the nearest downgradient surface Waters of the State, as defined 157 Feet NW

in the 100-Series Rules, measured from the Working Pad Surface:

If less than 2,640 feet, is the Waters of the State identified above within 15 stream miles upstream of a Public Water System intake? No

Provide the distance and direction to the nearest downgradient wetland, measured from the Working Pad Surface: 157 Feet NW

Provide a description of the nearest downgradient surface Waters of the State:

Following a wetland delineation performed in 2020, the nearest wetland was identified 157' NW of the Project Area. This freshwater emergent wetland was not mapped on the National Wetland Inventory (NWI). This wetland is assumed to have connectivity to an unnamed ditch 420' west of the Project Area, as mapped on the National Hydrology Dataset (NHD). This wetland is dominated by Baltic rush (Juncus balticus), creeping spike rush (Eleocharis palustris), and salt grass (Distichlis spicata).

If the proposed Oil and Gas Location is within a Rule 411.a Surface Water Supply Area buffer zone, select the buffer

zone type: _____

If the proposed Oil and Gas Location is within a Rule 411.b GUDI/Type III buffer zone, select the buffer zone type: _____

Is a U.S. Army Corps of Engineers Section 404 permit required for the proposed Oil and Gas Location, access road, or associated pipeline corridor? No

If a U.S. Army Corps of Engineers Section 404 permit is required, provide the permit status, and permit number if available:

Is the Location within a Floodplain? No Floodplain Data Sources Reviewed (check all that apply):

[X] Federal (FEMA) [ ] State [X] County [ ] Local

[ ] Other

Does this proposed Oil and Gas Location lie within a Sensitive Area for water resources, as defined in the 100-Series Rules? Yes

CONSULTATION, WAIVERS, AND EXCEPTIONS

When Rule 309.e.(2) Consultation must occur, check all that apply:

- [ ] This location is included in a Wildlife Mitigation Plan
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within federally designated critical habitat or an area with a known occurrence for a federal or Colorado threatened or endangered species. Provide description in Comments section of Submit tab.
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within an existing conservation easement established wholly or partly for wildlife habitat. Provide description in Comments section of Submit tab.

When Rule 309.e.(3) Consultation is not required, check all that apply:

- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Protection Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Mitigation Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable conservation plan.

Pre-application Consultation:

- [ ] A pre-application consultation with CPW, regarding this Oil and Gas Location, occurred on: _____

CPW Waivers and Exceptions (check all that apply and attach all CPW waivers to this Form 2A):

- [ ] The applicant has obtained a Rule 304.b.(2).B.viii CPW waiver for the requirement to complete an ALA.
- [ ] The applicant has obtained a Rule 309.e.(2).G CPW waiver and consultation is not required.
- [ ] The applicant has obtained a Rule 309.e.(5).D.i CPW waiver and is requesting an exception from Rule 1202.c.(1).R.
- [ ] The applicant has obtained a Rule 309.e.(5).D.ii CPW waiver and is requesting an exception from Rule 1202.c.(1).S.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iii CPW waiver of Rule 1202.c.(1).T.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iv CPW waiver and is requesting an exception from Rule 1202.c.(1) in accordance with an approved CAP.
- [ ] The applicant has obtained a Rule 1202.a CPW waiver.
- [ ] The applicant has obtained a Rule 1202.b CPW waiver.

☐ In accordance with Rule 1203.a.(3), the applicant requests an exception from compensatory mitigation

Rule(s): _____

HIGH PRIORITY HABITAT AND COMPENSATORY MITIGATION

This Oil and Gas Location, associated access roads, utility, or Pipeline corridor falls wholly or partially within the following High Priority Habitats (Note: dropdown options are abbreviated - see Rule 1202 for full rule text):

< No row provided >

The following questions are for Oil and Gas Locations that cause the density to exceed one Oil and Gas Location per square mile in Rule 1202.d High Priority Habitat:

Direct Impacts:

Is Compensatory Mitigation required per Rule 1203.a for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address direct impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Direct impact habitat mitigation fee amount: $ _____

Indirect Impacts:

Is Compensatory Mitigation required per Rule 1203.d for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address indirect impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Indirect impact habitat mitigation fee amount: $ _____

Operator Proposed Wildlife BMPs

No BMP

CPW Proposed Wildlife BMPs

No BMP

AIR QUALITY MONITORING PROGRAM

Will the Operator install and administer an air quality monitoring program at this Location? Yes

Operator Proposed BMPs

No BMP

CDPHE Proposed COAs OR BMPs

No BMP

PLANS

Total Plans Uploaded: 0

- [ ] (1) Emergency Spill Response Program consistent with the requirements of Rules 411.a.(4).B, 411.b.(5).B, & 602.j
- [ ] (2) Noise Mitigation Plan consistent with the requirements of Rule 423.a
- [ ] (3) Light Mitigation Plan consistent with the requirements of Rule 424.a
- [ ] (4) Odor Mitigation Plan consistent with the requirements of Rule 426.a
- [ ] (5) Dust Mitigation Plan consistent with the requirements of Rule 427.a
- [ ] (6) Transportation Plan
- [ ] (7) Operations Safety Management Program consistent with the requirements of Rule 602.d
- [ ] (8) Emergency Response Plan consistent with the requirements of Rule 602.j
- [ ] (9) Flood Shut-In Plan consistent with the requirements of Rule 421.b.(1)
- [ ] (10) Hydrogen Sulfide Drilling Operations Plan consistent with the requirements of Rule 612.d
- [ ] (11) Waste Management Plan consistent with the requirements of Rule 905.a.(4)
- [ ] (12) Gas Capture Plan consistent with the requirements of Rule 903.e
- [ ] (13) Fluid Leak Detection Plan
- [ ] (14) Topsoil Protection Plan consistent with the requirements of Rule 1002.c
- [ ] (15) Stormwater Management Plan consistent with the requirements of Rule 1002.f
- [ ] (16) Interim Reclamation Plan consistent with the requirements of Rule 1003
- [ ] (17) Wildlife Plan consistent with the requirements of Rule 1201
- [ ] (18) Water Plan
- [ ] (19) Cumulative Impacts Plan
- [ ] (20) Community Outreach Plan
- [ ] (21) Geologic Hazard Plan

VARIANCE REQUESTS

Check all that apply:

- [ ] This proposed Oil and Gas Location requires the approval of a Rule 502.a variance from COGCC Rule or Commission Order number: _____

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

RULE 304.d LESSER IMPACT AREA EXEMPTION REQUESTS

Check the boxes below for all Exemptions being requested. Lesser Impact Area Exemption Request must be attached, and will include all requested exemptions.

- ☐ 304.b.(1). Local Government Siting Information
- ☐ 304.b.(2). Alternative Location Analysis
- ☐ 304.b.(3). Cultural Distances
- ☐ 304.b.(4). Location Pictures
- ☐ 304.b.(5). Site Equipment List
- ☐ 304.b.(6). Flowline Descriptions
- ☐ 304.b.(7). Drawings
- ☐ 304.b.(8). Geographic Information System (GIS) Data
- ☐ 304.b.(9). Land Use Description
- ☐ 304.b.(10). NRCS Map Unit Description
- ☐ 304.b.(11). Best Management Practices
- ☐ 304.b.(12). Surface Owner Information
- ☐ 304.b.(13). Proximate Local Government
- ☐ 304.b.(14). Wetlands
- ☐ 304.b.(15). Schools and Child Care Centers
- ☐ 304.c.(1). Emergency Spill Response Program
- ☐ 304.c.(2). Noise Mitigation Plan
- ☐ 304.c.(3). Light Mitigation Plan
- ☐ 304.c.(4). Odor Mitigation Plan
- ☐ 304.c.(5). Dust Mitigation Plan
- ☐ 304.c.(6). Transportation Plan
- ☐ 304.c.(7). Operations Safety Management Program
- ☐ 304.c.(8). Emergency Response Plan
- ☐ 304.c.(9). Flood Shut-In Plan
- ☐ 304.c.(10). Hydrogen Sulfide Drilling Operations Plan
- ☐ 304.c.(11). Waste Management Plan
- ☐ 304.c.(12). Gas Capture Plan
- ☐ 304.c.(13). Fluid Leak Detection Plan
- ☐ 304.c.(14). Topsoil Protection Plan
- ☐ 304.c.(15). Stormwater Management Plan
- ☐ 304.c.(16). Interim Reclamation Plan
- ☐ 304.c.(17). Wildlife Plan
- ☐ 304.c.(18). Water Plan
- ☐ 304.c.(19). Cumulative Impacts Plan
- ☐ 304.c.(20). Community Outreach Plan
- ☐ 304.c.(21). Geologic Hazard Plan

OPERATOR COMMENTS AND SUBMITTAL

Comments

The Town of Firestone approved a Cooperative Development Agreement for this location in April of2021. Please see the approved agreement attached as Other. Upon entrance of the Cooperative Development Agreement and prior to filing this Application, KMOG presented an alternative location analysis to the Director pursuant to Rule 301.f.(4) and engaged in a Formal Consultation Process with the Director and the Town of Firestone.

Please ensure that all correspondence associated with this permit goes to the analyst and DJ Regulatory email addresses, as listed on this permit.

The alternative locations for the proposed McGavin pad are listed as #1-#4 in the ALA narrative, maps and template.

This location is not proposed within 2,000 feet of a Residential Building Unit, High Occupancy Building Unit, or School Facility located within a Disproportionately Impacted Community, a Rule 304.c.(20) Community Outreach Plan is not required. KMOG's “Community Consultation Plan” attached as Other is intended to provide supplemental information regarding efforts on community outreach and communication.

KMOG is proposing one 50,000bbl MVLT for this location - 12’ tall with 176’ diameter. The proposed manufacturer and vendor are Fab Tech and Well Water Solutions. The MLVT is approximately811' from the nearest RBU and is a temporary piece of equipment (on location for approximately 3 months). Please see additional mitigation measures in the BMP section.

The attached ERP was submitted to the Frederick/Firestone Fire Protection District on 7/6/2021. KMOG has a meeting with the staff on 7/15/2021. An approved copy will be sent to the COGCC OGLA staff.

KMOG`s general Air Monitoring Plan has been approved by the CDPHE and is attached to the 2B. A site-specific Air Monitoring Plan for this location will be submitted to the COGCC and CDPHE for approval of air monitor locations prior to operations.

Temporary above ground polyethylene water pipelines (diameter 10" - 12" with a 60 BPM capacity) will deliver water to location operations from larger trunk lines for completions operations.
Flowlines: 26 flow lines will flow to the production facility location. During production, flow direction in the flow lines is from the wellhead to the production facility. The size of flow lines is typically 2". Flow lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the production facility.

Custody Transfer: Gas custody transfer occurs at the custody transfer meter located on the proposed production facility location. Oil custody transfer occurs at the LACT Unit located on the proposed production facility location.
Two 500 barrel skid-mounted tanks will be temporarily placed onsite for use of the pre-spud rig only. One tank will store water and the other will store water-based mud. A temporary ECD may be utilized during drilling.

Gas Lift Lines: Gas lift lines are also occasionally installed (one per well) from the well head to the production facility. During operation flow direction in the gas lift lines will be from the production facility to the well head. The size of the gas lift lines is typically 2". Gas lift lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the tank battery.

44 temporary 500 barrel skid-mounted frac tanks will be utilized during flowback and initially for produced water. It is estimated 13 temporary ECDs and the temporary tanks will be on location for 9 - 12 months and will be removed as water production declines. A temporary generator may be placed on location if needed and would be in place until electric power is available. Temporary purge flares may be placed on location for up to 60 days. A temporary 250-gallon propane tank will be used on location to provide fuel gas during facility equipment startup.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.
Signed: _____ Date: 07/12/2021 Email: DJRegulatory@oxy.com

Print Name: Shayelyn Marshall Title: Regulatory Analyst

Based on the information provided herein, this Oil and Gas Location Assessment complies with COGCC Rules, applicable orders, and SB 19-181 and is hereby approved.

COGCC Approved: _____ **Director of COGCC** Date: _____

Conditions Of Approval

All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.

COA Type	Description

Best Management Practices

No	BMP/COA Type	Description
1	Planning	Access Road: KMOG will utilize an existing access road from CR 20 for drilling, completions, and production operations, including maintenance equipment. The road will be properly constructed and maintained to accommodate for emergency vehicle access.
2	Planning	• The MLVT will be in compliance with the following COGCC safety setbacks. 1) Seventy-five (75) feet from a wellhead, fired vessel, heater-treater, or a compressor with a rating of 200 horsepower or more; 2) Fifty (50) feet from a separator, well test unit, or other non-fired equipment. • Signs shall be posted on each MLVT to indicate that the contents are fresh water and that no E&P waste fluids are allowed. Location and additional signage shall conform to Rule 210. • MLVTs will be operated with a minimum of1 foot freeboard at all times. • Access to the tanks shall be limited to operational personnel. • Construction and installation of the tank structure, liner and sub-grade shall meet or exceed the manufacturer specifications. KMOG follows manufacturers Standard Operating Procedures (SOPs) and will provide these SOPs upon request to the COGCC. • KMOG will conduct daily, visual inspections of the exterior wall and general area for any integrity deficiencies before, during, and after filling the MLVTs. If deficiencies are noted, KMOG will repair them as soon as practicable. Records of repairs will be maintained per Rule 205. • KMOG will follow pre-construction risk assessment measures to address safety concerns, and minimize environmental impacts and property damage in the unlikely event of a MLVT release. • In the event of a catastrophic MLVT failure, KMOG shall notify the COGCC as soon as practicable but not more than 24 hours after discovery, submit a Form 22- Accident Report within 10 days after discovery, conduct a root cause analysis´ and provide same to COGCC on a Form 4-Sundry Notice within 30 days of the failure. • All MLVT liner seams shall be welded and tested in accordance with applicable ASTM international standards. Any repairs to liners shall be made using acceptable practices and applicable standards. • The MLVT shall be constructed and operated in accordance with a design package certified and sealed by a Licensed Professional Engineer either in Colorado or the state where the MLVT was designed or manufactured. • KMOG hereby certifies to the Director that the MLVT at this location will be designed and implemented consistent with the Colorado Oil and Gas Conservation Commission policy dated June 13, 2014.
3	Planning	MLVT Noise/Light: KMOG will install portable sound panels around the MLVT pumping operation to minimize noise and light.
4	Planning	Dust: KMOG will proactively deploy fresh water to suppress dust along access road to well pad, facility and MLVT during all phases of pre-production operations. Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach location.
5	Community Outreach and Notification	KMOG held Surface Impact Planning (SIP) meetings for this location. These meetings are attended by KMOG internal teams. This is a multi-disciplinary team including construction, operations, facilities, EHS, stakeholder relations, regulatory, surface land and mitigation. The team reviews potential impacts to the surrounding residents, identify and plan for necessary mitigations, and identify BMPs that should be included in the pad development moving forward. The team reviews noise, odor, lights, traffic, haul routes, rig orientation and visual mitigation and any input we have receivedfrom surrounding communities either from response line calls or community meetings, relative to our operations. The purpose of the meeting is to proactively identify potential concerns, exhaust possible options and provide best in class solutions in order to have compatible operations.
6	Traffic control	KMOG currently plans to use the water-on-demand system on this location which is a network of over 180 miles of underground pipelines that stretches the length of the 20 -mile by 30-mile field to source and transport water to completions crews. This systemeliminates more than 2,000 truck trips per day, also reducing associated concerns oftraffic, noise, emissions and dust.

7	Traffic control	The operator will obtain access and ROW permits from Firestone and will implement traffic control plans prior to the commencement of operations.
8	General Housekeeping	Loadlines: All loadlines shall be bullplugged or capped.
9	General Housekeeping	Removal of Surface Trash: A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation. Uponcompletion of operations, the commercial trash bin will be removed from the locationand disposed of in an appropriate manner.
10	Material Handling and Spill Prevention	Pit Level Indicators: All storage tanks used for active drilling operations (used in lieu of pits) contain pit level monitors with Electronic Drilling Recorders (EDR). KMG uses EDRs with pit level monitor(s) and alarm(s) for production rigs. Basic level gauges are used on tanks utilized for the surface rig.
11	Construction	Fencing Requirements: The completed wellsites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the wellsites upon completion of the wells. Authorized representatives and/or KMOG personnel shall be on-site during drilling and completionoperations.
12	Emissions mitigation	All twenty six of the wells are commingled into a bulk and test design. This reduces the total number of separators on location on a per well basis which in turn allows to have a smaller facility footprint. Reducing the total number of separators per well also reduces the total noise and emissions from the separator burners.
13	Emissions mitigation	Temporary ECD(s) will be utilized to mitigate releases of emissions from temporary produced water storage tanks for the duration which the tanks are on location and being used.
14	Drilling/Completion Operations	Green Completions: Test separators and associated flow lines, sand traps and emission control systems shall be installed on-site to accommodate green completions techniques. When commercial quantities of salable quality gas are achieved at each well, the gas shall be immediately directed to a sales line or shut in and conserved. If a sales line is unavailable or other conditions prevent placing the gas into a sales line, KMG shall not produce the wells without an approved variance.
15	Drilling/Completion Operations	KMOG`s Integrated Operations Center is staffed 24-hours per day, seven days per week, 365 days per year providing real-time remote monitoring capabilities for all of KMOG`s wells. Employees in the Integrated Operations Center are able to shut in wells remotely and dispatch personnel to a location within 5-15 minutes.
16	Drilling/Completion Operations	Guy line anchors will not be used. Base Beams will be used to stabilize the rig and removed after drilling.
17	Final Reclamation	Well Site Cleared: The wellsite will be cleared of all non-essential equipment within ninety (90) days after all wells associated with the pad have been plugged and abandoned.
18	Final Reclamation	Identification of Plugged and Abandoned Wells: Once the well has been plugged and abandoned, KMOG will identify the location of the wellbore with a permanent monument that will detail the well name and date of plugging.

Total: 18 comment(s)

Attachment List

Att Doc Num	Name
402703587	FORM 2A SUBMITTED
402733369	OTHER
402739056	ACCESS ROAD MAP
402739060	LOCATION PICTURES
402739065	LOCATION DRAWING
402740183	LOCATION AND WORKING PAD GIS SHP
402743487	OTHER
402798998	ALA DATASHEET
402799009	ALA NARRATIVE SUMMARY
402799012	CULTURAL FEATURES MAP
402799015	DIRECTIONAL WELL PLAT
402799027	GEOLOGIC HAZARD MAP
402799042	HYDROLOGY MAP
402799056	LAYOUT DRAWING
402799058	NRCS MAP UNIT DESC
402799062	PRELIMINARY PROCESS FLOW DIAGRAMS
402799069	RELATED LOCATION AND FLOWLINE MAP
402799081	WILDLIFE HABITAT DRAWING
402828392	OTHER

Total Attach: 19 Files

General Comments

User Group	Comment	Comment Date
OGLA	The following changes were made with Operator concurrence: - updated distance to nearest High Occupancy Building Unit (HOBU) and Child Care Center revised to "2662' N"	10/01/2021
OGLA	The Director has determined this OGDP application is complete. Form pushed to IN PROCESS.	10/01/2021
OGLA	Attachments, Plans, and NRCS map units, and Submit tab comment updated.	10/01/2021
OGLA	The following changes were made with Operator concurrence: - added Firestone meeting attachment as OTHER	09/09/2021
OGLA	Returned to draft for: - missing access road soil units; correct air monitoring plan Submit tab comment - attachment and Plan corrections	08/11/2021

Total: 5 comment(s)

Public Comments

No public comments were received on this application during the comment period.

Section 4

Emergency Response Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

Location: Near Colorado Boulevard and Pine Cone Avenue
Address: 6240 Pine Cone Avenue

EMERGENCY RESPONSE PLAN

Revised October 2021



1099 18th Street, Suite 1800

Denver, Colorado 80202

McGavin 6-19HZ Pad

Section 19, T2N – R67W

Firestone, Colorado

DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

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LOCAL RESPONDING AGENCIES

Name	Emergency	Office Number
Frederick Firestone Fire Protection District	911	303-833-2742
Firestone Police Department	911	303-833-0811
Colorado State Patrol	911	970-506-4999

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SIGNATURES

Kerr McGee Oil & Gas Onshore, LP			
Name	Signature	Title	Date
Brent Naherny	DocuSigned by: Brent Naherny D81BF2E6EAE74CF...	Director of Operations	10/15/2021
Frederick-Firestone Fire Protection District			
Name	Signature	Title	Date
Steve Iacino		Assistant Chief of Planning	

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LEGAL DISCLAIMER

This plan serves as an overall guidance document and is based on the best information available at the time of its submission. Actual conditions can and will evolve and possibly change between the submission of this plan for permitting purposes and actual operations, which may not occur for several months or even years. As necessary, and in consultation with state and local agencies, this plan can and will be updated to reflect current conditions. In particular, there could be modifications to equipment, layout, and chemicals located on site to reflect current or updated practices and advances in technology. In most cases, these changes will not be material and will not impact public health, safety, welfare, the environment, or wildlife resources. KMOG understands that accurate information is necessary in any emergency situation and if any change is significant or has the potential to impact public health, safety, welfare, the environment, or wildlife resources, the plan will be updated as appropriate.

LOCATION INFORMATION

DIRECTIONS TO OIL & GAS LOCATION

From the intersection of HWY 52 and Colorado BLVD travel north approximately three miles to Pine Cove Avenue. Turn right and travel approximately 0.21 miles. Turn right (south) on the lease access road and proceed to the well pad and production facility.

INGRESS AND EGRESS INFORMATION

Ingress and egress to and from the location will be via the lease access road.

LEGAL DESCRIPTION OF LOCATION

API NUMBER: Pending COGCC Permit Approval

LEGAL DESCRIPTION: NW/4 of Section 19, Township 2 North, Range 67 West, 6th P.M.

ADDRESS: 6240 Pine Cone Avenue

GPS COORDINATES FOR WELL PAD (NAD 83): LAT: 40.129275°, LONG: -104.937539°

GPS COORDINATES FOR ACCESS ROAD (NAD 83): LAT: 40.131307°, LONG: -104.937875°

DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

EMERGENCY CONTACT NUMBERS

NAME	OFFICE PHONE		EMERGENCY
Kerr McGee Integrated Operations Center IOC	970- 515-1500		970-515-1500
KMOG EMERGENCY MANAGEMENT TEAM	MOBILE PHONE	Function	LOCATION
Moe Felman	303-585-1309	Incident Command	Denver, CO
Brent Naherny	720-284-1112	Incident Command	Denver, CO
Travis Forducey	303-709-4034	Safety Officer	Platteville, CO
Lynna Scranton	303-906-1711	Safety Officer	Denver, CO
Gregory Hamilton	970-590-6256	Environmental Unit Leader	Platteville, CO
Phil Hamlin	707-478-8029	Environmental Unit Leader	Platteville, CO
FIRE OR EXPLOSION OR WELL CONTROL LOSS	EMERGENCY	OFFICE PHONE	STAFFING
Frederick Firestone Fire Protection District	911	303-833-2742	Full Time
Wild Well Control		281-784-4700	Full Time
Carbon Valley Emergency Management Agency		303-319-1008	Full Time
SPILL RESPONSE ORGANIZATIONS	EMERGENCY	OFFICE PHONE	STAFFING
EnviroServe	720-450-1316	800-488-0910	Full Time
EHS –Environmental HAZMAT Services	303-525-3111	720-225-9252	Full Time
Wild Well Control	281-784-4700	281-784-4700	Full Time
Cudd Pressure Control	800-990-2833	303-260-6422	Full Time
REGULATORY CONTACTS	EMERGENCY	OFFICE PHONE	STAFFING
COGCC		303-894-2100	Full Time
CDPHE		877-518-5608	Full Time
Colorado Parks & Wildlife (CPW)		303-291-7227	Full Time
National Response Center		800-424-8802	Full Time
MEDICAL FACILITIES	EMERGENCY	OFFICE PHONE	STAFFING
UCHealth Urgent Care Firestone		720-652-7055	Full Time
North Colorado Medical Center	911	970-810-4121	Full Time
UCHealth Longs Peak Hospital	911	720-718-7000	Full Time
GOVERNMENT AGENCIES	EMERGENCY	OFFICE PHONE	STAFFING
Firestone Police Department	911	303-833-0811	Full Time
Colorado Oil and Gas Conservation Commission (COGCC)		303-894-2100	Full Time

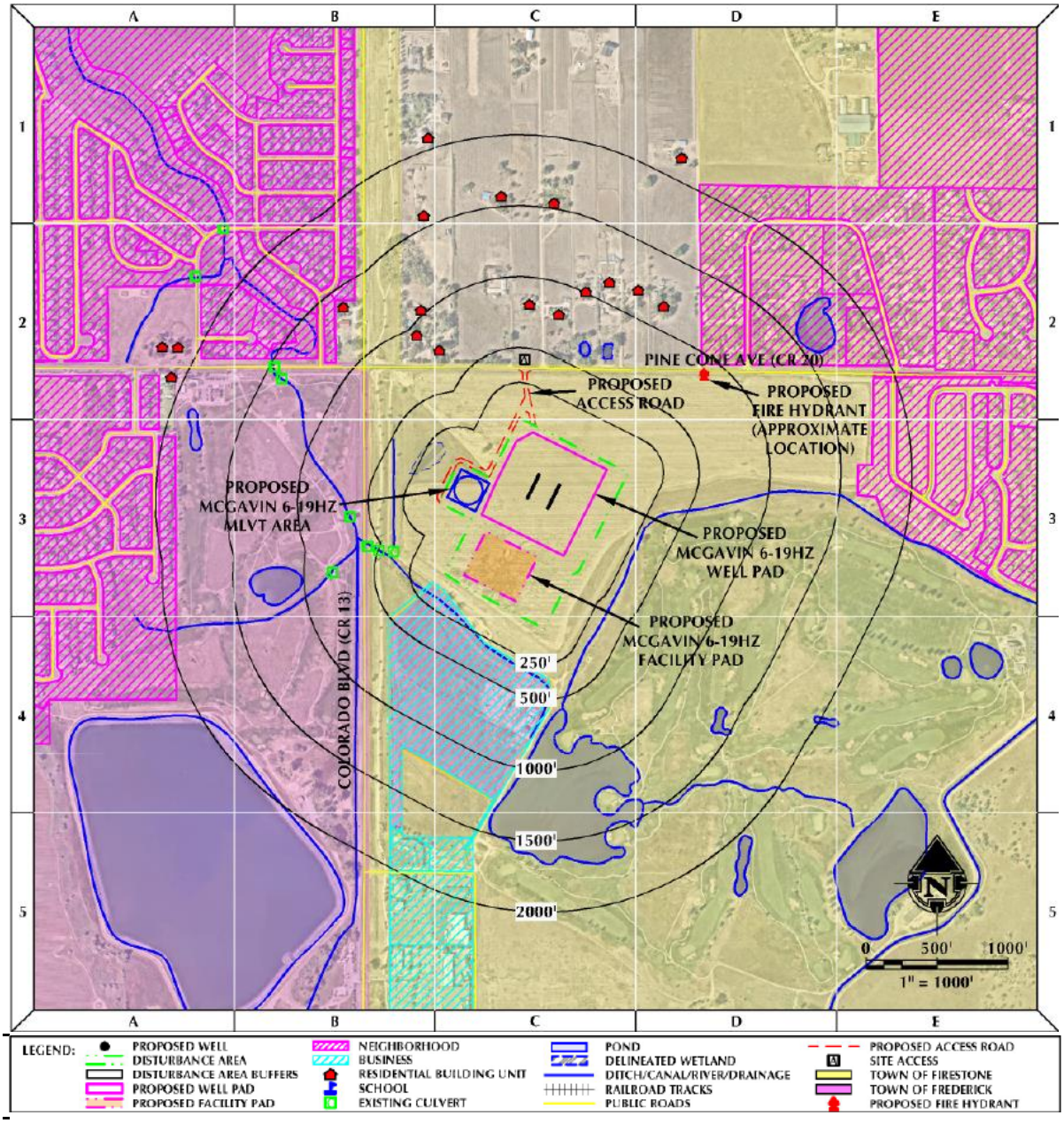
DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

Colorado Dept. of Health and Environment (CDPHE)		877-518-5608	Full Time
Marty Ostholthoff - Firestone Planning Manager and Local Govt. Designee (LGD		303-531-6275	Full Time
RAILROAD EMERGENCY RESPONSE	EMERGENCY	OFFICE PHONE	STAFFING
BNSF	800-832-5452		Full Time
Great Western Railway	800-533-9416	303-398-4500	Full Time
Union Pacific Railroad	888-877-7267		Full Time

DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

SITE DESCRIPTION & LAYOUT

The McGavin 6-19HZ well pad and facility are surrounded by agriculture and residential acreage. There will be 26 horizontal wells on the well pad with up to 44 temporary produced water tanks and 2 condensate tanks.



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KEY LOCATION INFORMATION

In the event of an incident it is important to understand what equipment is on location, what types of chemicals are present and where they are stored and where one can quickly access safety equipment.
Depending on the operations taking place on location, the equipment, chemicals and safety equipment on location will vary. The sections below will show the anticipated quantities and locations during each major phase of the ODGP location. Safety Data Sheets (SDSs) will be available from the Company Representative present or the contractor performing work on location. KMOG does not maintain any response equipment beyond the insipient stage. All response equipment is intended for incidental release mitigation only.

An incidental release is considered to be a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee tasked with mitigating the released product, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up.

Incidental Situations include, but are not limited to, the following examples:

- No significant safety or health hazard to workers in immediate area
- Limited in quantity, exposure potential, toxicity, etc.
- Release that can be absorbed, neutralized or otherwise controlled immediately by onsite workers

All personnel responding to an incident will satisfy the applicable Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements of 29 CFR 1910.120. Additional information may be found in Annex 1 HAZWOPER Program and Training Guidance of the Emergency Preparedness and Response Plan.

CONSTRUCTION PHASE

EQUIPMENT

During construction operations the following fuel powered equipment is anticipated to be on location.

INITIAL PAD BUILD	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Cat 815 Compactor	1	132	132
Belly dump semi	15	240	3600
Mini Excavator	1	12	12
Skid Steer	1	27	27
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	4	130	520
Total			**5217**
CONDUCTOR SETTING OPERATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Conductor Rig	1	80	80
Cement truck	1	120	120
Low Boy Semi	1	120	120
Pump	1	20	20
Skid	1	27	27
Pickup w/ 100 Gallon Transfer Tank	2	130	260
Total			**627**

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MITIGATION INSTALL AND REMOVAL	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Man-lift	1	26	26
8-10k All terrain forklift	1	26	26
Skid Steer	1	27	27
Truck mounted crane	1	120	120
Excavator/vibe hammer or conductor rig	1	80	80
Flatbed semi	2	120	240
Pickup w/ 100 Gallon Transfer Tank	1	130	130
Total			**649**
INTERIM RECLAMATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Belly dump semi	15	240	3600
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	3	130	390
Total			**4916**

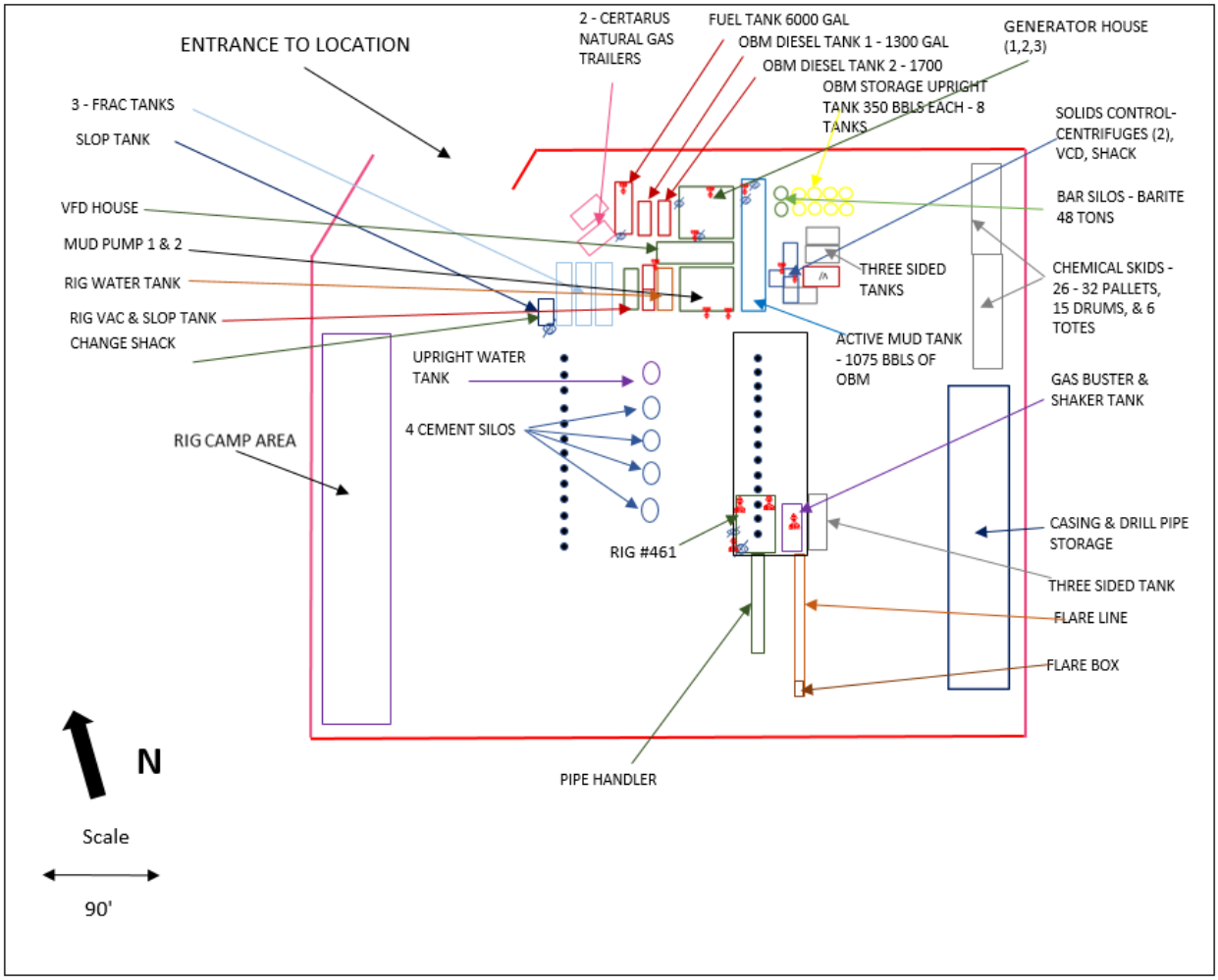
SAFETY EQUIPMENT

During construction operations each piece of construction equipment, heavy duty truck and light duty pickups are all equipped with a dedicated fire extinguisher and spill response kit. There will not be any safety equipment stored on location during these operations.

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DRILLING PHASE:

TYPICAL DRILLING LAYOUT



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EQUIPMENT LIST				
COLOR CODE	EQUIPMENT	DIMENSIONS	# OF UNITS	ADDITIONAL COMMENTS
	RIG		1	
	PIPE HANDLER		1	
	MUD PUMP #1		1	
	MUD PUMP #2		1	
	VFD HOUSE		1	
	GENERATOR HOUSE		1	
	BOILER TANK		1	
	ACTIVE MUD TANKS	12.6' x 45'	3	1075 bbls of OBM
	SHAKER TANK	12.6' x 30'	1	326 bbls of OBM
	FUEL TANK	8' x 40'	1	6000 GAL
	OBM DIESEL TANK 1	8' x 20'	1	1300 GAL
	OBM DIESEL TANK 2	8' x 25'	1	1700 GAL
	CERTARUS NAT GAS TRAILER	8.6' x 40'	2	380 MCF
	RIG WATER TANK	12' x 45'	1	400 bbls Fresh Water
	FRAC TANKS	12' x 45'	3	500 bbls each
	SLOP TANK	8' x 12'	1	200 bbls
	THREE SIDED TANK	10' x 36'	4	150 yards of cuttings
	UPRIGHT WATER TANK	12' x 11.5'	1	350 bbls for Cement job
	CEMENT SILOS	7.8' x 7.5'	4	450 sks per silo
	BAR SILOS	7.8' x 7.5'	2	48 tons barite
	OBM UPRIGHT STORAGE TANK	12' x 11.5'	8	350 bbls each tank
	CENTRIFUGE		2	
	VCD		1	
	SOLIDS CONTROL SHACK		1	
	CHEMICAL SKID	10' x 40'	2	26-32 pallets, 15 drums, 6 totes
	FLARE LINE		1	
	FLARE BOX		1	
	GUARD SHACK		1	
	CASING & DRILL PIPE STORAGE			
	RIG CAMP AREA			
	SOUND WALL			

EMERGENCY EQUIPMENT	
Eye Wash stations	
Fire Extinguishers	

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CHEMICALS

During drilling operations, the following chemicals are anticipated to be on location:

CHEMICALS ON LOCATION	
NAME	**UNITS**
ADAPTA	25 kg bag
BA.STOPPIT	50 lb BA
BARAKLEAN	5 gal CA
BAROID 41	100 lmb bag
BAROID 41 (ST)	1 Uston bulk
BARO-SEAL CLASSIC	40 lbm bag
CAL CHLORIDE POWDER	50 lb bag
DILTREAT	55 gal drum
FORTI-MUL	55 gal drum
GRAPHITE	50 lbm bag
LIME	50 lbm bag
ODOR ARMOR	1 gal tote
RHEMOD L	55 gal drum
SALT	50 lbm bag
SAWDUST FINE	5.5 cuft bag
WALL-NUT MEDIUM	50 lbm bag

SAFETY EQUIPMENT

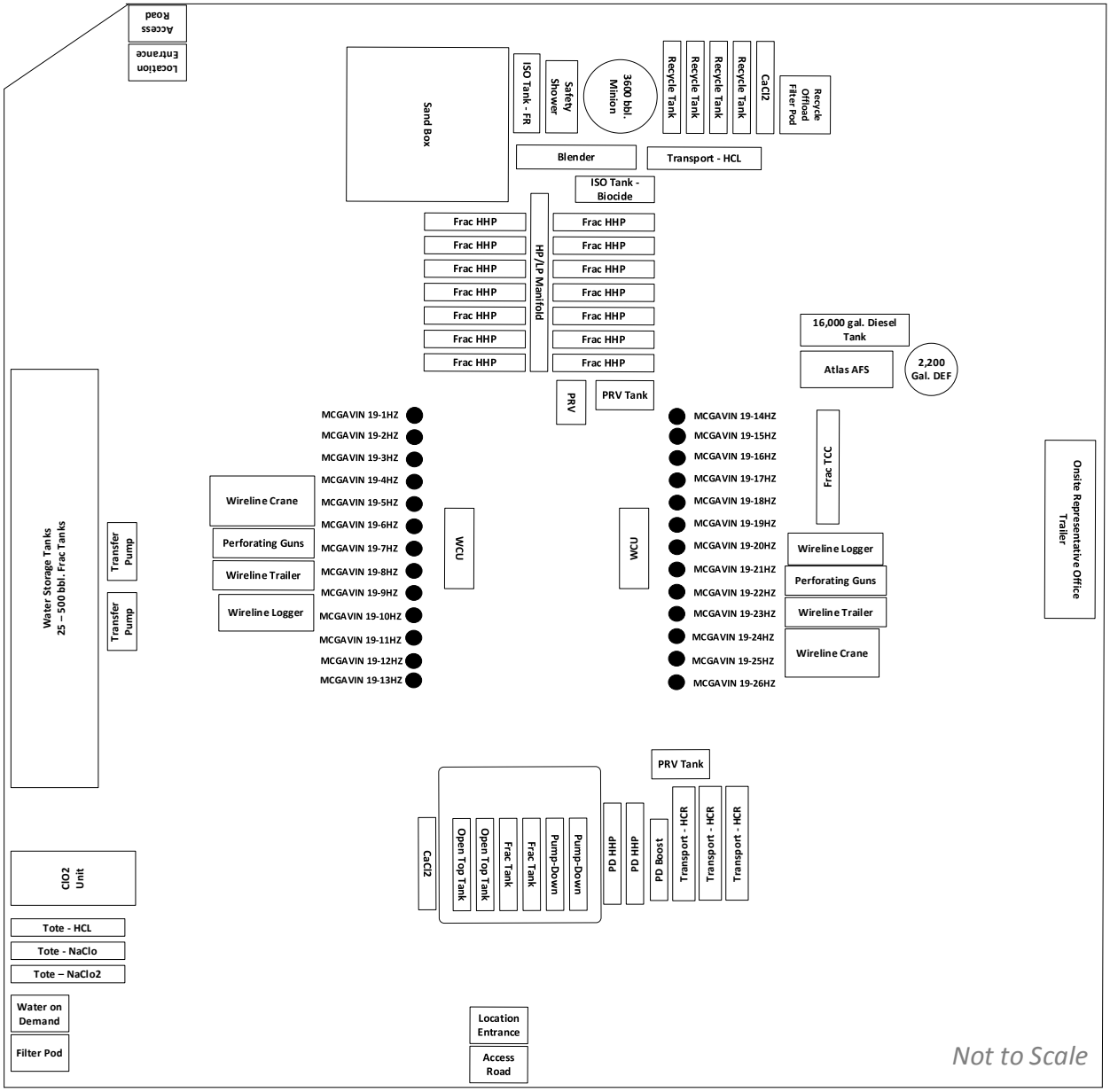
During drilling operations, the following response equipment is staged on location as depicted in the drilling layout shown above

SAFETY EQUIPMENT DETAILS	LOCATION	COMMENTS
Fire Extinguishers	Rig	3
	Shaker Tank	1
	Mud Pump 1	1
	Mud Pump 2	1
	Fuel Tank	1
	Boiler Tank	1
	Generator House	2
	Solids Control/Centrifuges	2
	Active Mud Tank	1
Eye Wash Stations	Rig	2
	Mud Pump 1	1
	Fuel Tank	1
	Generator House	2
	Active Mud Tank	2
	Slop Tank	1

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HYDRAULIC FRACTURING PHASE:

TYPICAL HYDRAULIC FRACTURING LAYOUT



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EQUIPMENT

During hydraulic fracturing the following equipment is expected to be on location:

EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
FRAC HHP	16	FIRE SUPRESSION BUILT INTO EACH UNIT
BLENDER	1	FIRE SUPRESSION BUILT INTO THE BLENDER TUB
FRAC TCC	1	
FRAC HP/LP MANIFOLD	1	
ACID TRANSPORTS	1	4000 GAL CAPACITY
HCR SYNTHETIC ACID TRANSPORT	2	4000 CAPACITY EACH
FRICTION REDUCER ISO	1	4500 GAL CAPACITY
BIOCIDE ISO	1	6000 GAL CAPACITY
WELLHEAD CONNECTION UNIT (WCU)	1	
WL PERFORATING GUN TRAILER	1	
WL CRANE (W/ OUTRIGGERS)	1	
WL TRAILER	1	
WL LOGGER	1	
FUEL TRAILER	1	16000 GAL CAPACITY DIESEL TANK
DEF TANK	1	2200 GAL DEF TANK
ONSITE REPRESENTATIVE OFFICE TRAILER	1	
MINION TANK	1	3600 BBL CAPACITY
STORAGE TANKS	25	500 BBL CAPACITY EACH
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH
SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
BIOCIDE TREATMENT TRAILER	1	REFER TO CHEMICAL TABLE FOR INFO
GREASE SKID	1	
PRV / PRV TANK	1	
SAND FORKLIFT	1	
TRANSFER PUMPS	2	
BOOST PUMPS	2	
WOD FILTER PODS	2	
FORKLIFT/MANLIFT	2	TYPICALLY 1 OF EACH ON LOCATION
FLAMELESS HEATERS	5	WINTER OPS ONLY
GLYCOL HEATERS	2	WINTER OPS ONLY
GENERATORS	4	
AIR COMPRESSORS	2	
VAC TRUCK	1	
DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
GATE GUARD SHACK	1	

CHEMICALS

During hydraulic fracturing operations the following hydrocarbons, hazardous, reactive and flammable materials are anticipated to be in on location:

CHEMICAL	# OF UNITS	VOLUME	COMMENTS
HYDROCHLORIC ACID	1	4000 GAL TRANSPORT	
HCR SYNTHETIC ACID	2	4000 GAL TRANSPORT	
SODIUM BICARBONATE		200-300 LB	ACID NEUTRALIZER
CALCIUM CHLORIDE (BRINE)	1	500 BBL CAPACITY	WINTER OPS
FRICTION REDUCER (FR)	1	4500 GAL CAPACITY ISO	
HYDROCHLORIC ACID (BIOCIDE TRAILER)	1	4000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM CHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM HYPOCHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
PREVENTATIVE BIOCIDE (TTPC)	1	4500 GAL CAPACITY ISO	
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH	PRODUCED WATER ORIGINATES AT ARF FACILITY (FACILITY ID 456644). TYPICALLY 800-1200 BBL PER DAY
DIESEL FUEL TANK	1	16000 GAL CAPACITY	
DEF TANK	1	2200 GAL CAPACITY	

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SAFETY EQUIPMENT

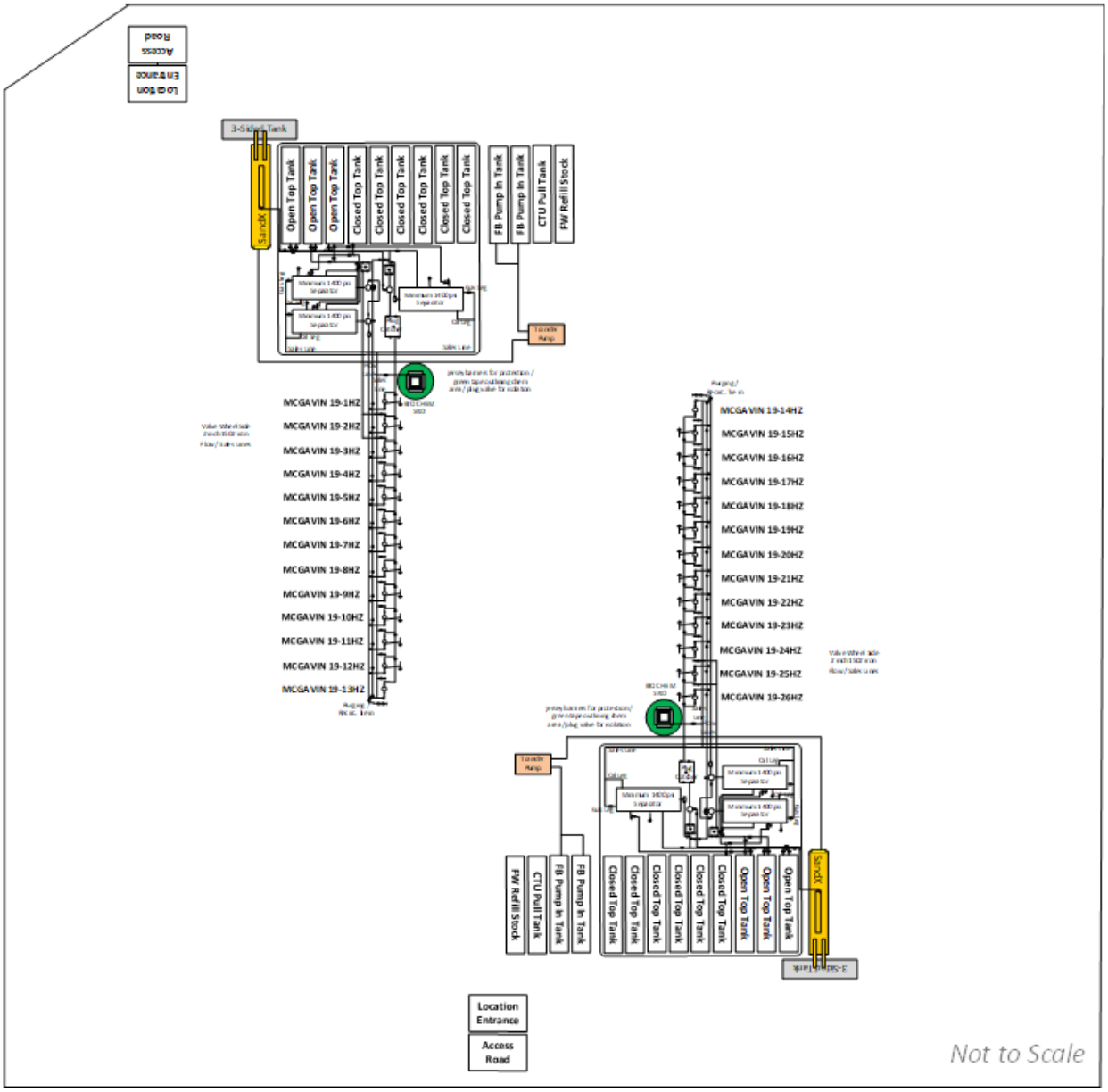
During hydraulic fracturing operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
FIRE SUPRESSION SYSTEM	BUILT INTO XLE PUMPS AND BLENDER TUB
ACID NEUTRALIZER PALLET	200-300 LB SODIUM BICARBONATE
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS AND FLOWBACK OPERATORS
RADIOS	FRAC, CONSULTANTS, WL OPERATOR, FLOWBACK OPERATOR
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

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WELL PREPARATION PHASE:

TYPICAL FLOWBACK LAYOUT



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EQUIPMENT

During preparation, coil and flowback operations the following equipment is expected to be on location:

EQUIPMENT LIST (COMPLETIONS OPERATIONS)			
COMPLETIONS ACTIVITY	EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
COIL	COILED TUBING UNIT	1	
	COIL EQUIPMENT SUPPORT TRAILER	1	
	CRANE (AND OUTRIGGER MATS)	1	
	PUMP TRUCKS	2	
	N2 PUMP	1	
	N2 TRANSPORT	1	120 BBL TRANSPORT
	1502 HARDLINE	VARIES	
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
	MIXING PLANT (CHEMICAL TRAILER)	1	REFER TO CHEMICAL LIST TABLE
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	COIL BHA	1	TYPICALLY STORED ON PALLET ON PAD
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	GENERATORS	5	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
	AIR COMPRESSORS	2	
	CENTRIFUGAL TRANSFER PUMP	1	
	VAC TRUCK	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
FLOWBACK (COIL)	3" DRILLOUT LINE	1	
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	SEPARATORS	3	4-PHASE SEPARATION
	PLUG CATCHER	1	
	SAND KNOCKOUTS	3	
	VX METER	1	NOT USED ON EVERY PAD
	MANIFOLD	1	
	CHEMICAL INJECTION CUBE	2	350 GAL CAPACITY EACH
	SAND X W/ 3-SIDED SAND BIN	1	
	SANDX CONTROL PANEL	1	
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
RIG/SNUB	WORKOVER RIG	1	
	BASE BEAM	1	
	RIG PUMP	1	
	PUMP MANIFOLD & 1502 HARDLINE	1	
	RIG TANK	1	
	PIPE WRANGLER	1	
	PIPE RACKS	1	
	SNUBBING UNIT & BASKET	1	
	SNUBBING TRAILER & CONTROL PANEL	1	
	BOP STACK	1	
	ACCUMULATORS & CONTROL PANELS	2	1 FOR BSR & 1 FOR PIPES/BLINDS
	TUBING & TUBING TRAILER	1	
	TORQUE & TEST UNIT	1	
	TORQUE UNIT	1	
	/DRAULIC LUBRICATOR & EQUALIZING HOSE/MANIFOL	1	
	BOBTAIL	1	TYPICALLY TRANSPORTS 40-60 BBL PER WELL
	WINCH TRUCK	1	
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
	GENERATORS	4	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	AIR COMPRESSORS	2	
	CHEMICAL INJECTION CUBE	2	350 BBL CAPACITY EACH
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
FLOWBACK (RIG/SNUB)	SEPARATORS	3	4-PHASE SEPARATION
	SAND KNOCKOUTS	3	1 FOR EACH SEPARATOR
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	FLOWBACK SHACK	1	

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CHEMICALS

During preparation, coil workover and flowback operations the following hydrocarbons, hazardous, reactive, and flammable materials are anticipated to be in on location:

COMPLETIONS ACTIVITY	CHEMICAL	# OF UNITS	VOLUME	COMMENTS
COIL	FRICTION REDUCER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	BIOCIDE	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	DEFOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	NANO BEADS	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	H2S SCAVENGER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FRICTION REDUCER	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	LIQUID N2	1	120 BBL TRANSPORT	COIL PROVIDER (NOT ALWAYS ON PAD)
	OIL ON PAD	N/A	20 BBL MAX ALLOWED	HAUL OFF OIL BEFORE IT REACHES 20 BBL
	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
RIG/SNUB	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	50/50 METHANOL	1	500 GAL CAPACITY	WINTER OPS ONLY
	BIO WATER	N/A	TYPICALLY 60 BBL/WELL	BROUGHT OUT IN BOBTAIL TRUCK
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)

SAFETY EQUIPMENT

During preparation, coil workover and flowback operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RADIOS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

PRODUCTION PHASE:

Once drilling and completion activities are finalized, the site will transition to its production phase and the primary chemicals stored on site will be crude oil stored in the condensate storage tank and produced water stored in the water storage tanks.

During production there is no emergency response equipment stored on location. Well operators will wear the proper PPE and will have a fire extinguisher in their vehicle.

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NEARBY SENSITIVE AREAS

Following a wetland delineation performed in 2020, the nearest wetland was identified 124' west of the Project Area. This freshwater emergent wetland was not mapped on the National Wetland Inventory (NWI). This wetland is assumed to have connectivity to an unnamed ditch 420' west of the Project Area, as mapped on the National Hydrology Dataset (NHD). This wetland is dominated by Baltic rush (Juncus balticus), creeping spike rush (Eleocharis palustris), and salt grass (Distichlis spicata). List B and C Colorado Noxious Weeds were also documented in this wetland. Existing disturbance near this wetland feature includes agricultural practices, a dirt access road, and a gravel pedestrian path (i.e., Firestone Trail).

Unnamed, perennial, soft-bottom ditch, paralleling the Firestone Trail approximately 110' SW. The banks of the ditch exhibit freshwater emergent wetlands. No disturbance was observed within this feature.

MITIGATION OF POTENTIAL IMPACTS TO THE ENVIRONMENT

If a spill is found reportable, it will be mitigated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and Environment (CDPHE) requirements. Once a release has been identified, it will be immediately stopped and contained if possible and safe to do so. When containing a spill; pig blankets, snakes, absorbent materials, or earthen berms will be constructed around the release to keep material from spreading. These materials will be provided by KMOG and the contract company as applicable.

Diligent efforts will be made to minimize contact with live vegetation or open water if release is outside of secondary containment structures.

In the event of a large incident requiring outside assistance, KMOG has contracted with EHS. EHS possesses a working knowledge of oil and gas operations, emergency response and Incident Command. Once notified EHS personal can be on location with two hours.

Spills deemed as emergency will include notification to the local fire department using 911.

MITIGATION OF POTENTIAL IMPACTS TO THE NEARBY POPULATION

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail. In the event of an actual emergency, the following steps will be immediately taken:

The KMOG representative will immediately notify proper authorities, including the sheriff's office, Colorado State Patrol, and any other public officials and will enlist their assistance in warning people in the calculated radius of exposure. The KMOG representative will coordinate with local authorities to warn residents down-wind of the location and within radius of exposure from the well site. Additional evacuation zones may be necessary as the situation warrants

The KMOG representative will coordinate with appropriate emergency personnel to divert traffic in the vicinity away from the potentially dangerous area

The area included within the radius of exposure is considered to be the zone with the maximum potential hazard. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated.

In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public. KMOG will fully cooperate with these authorities and will provide careful advice to such authorities.

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KMOG will dispatch appropriate personnel to the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as necessary.

DETERMINATION OF INCIDENT TYPE & APPROPRIATE RESPONSE

The following initial response actions and mitigation procedures shall be conducted immediately, or as soon as it is safe to do so, upon discovery of an emergency or threat of an emergency:

INITIAL RESPONSE CHECKLIST		
	Secure the source	As quickly as possible, safely shut down the operation responsible for the emergency **IF SAFE TO DO SO, PROPERLY TRAINED & HAVE PROPER PPE**
	Notify	Pull an alarm, push an evacuation button, use radio or *call 911* **EVACUATE IF NECESSARY**
	The first person on scene will assume the duties of the On-Scene Incident Commander until assistance arrives in the form of a more qualified person, if needed	
	Conduct a Hazard Assessment to determine the potential for fire, explosion, and hazardous/toxic vapors as well as to define Personal Protective Equipment (PPE) needed by responders. Identify source and volume; characterize oxygen levels, explosive character, toxicity of air on scene, splash and ingestive hazards	
	Shut off ignition sources: motors, open flames, electrical circuits	
	Identify and evacuate an exclusion zone in vicinity of the emergency site until the Hazard Assessment is completed	
	Conduct a Personnel Accountability Report (PAR) to accurately determine the location and status of personnel	
	Initiate notification of management personnel	
	Request Response Team activation or escalation as appropriate	
	Initiate notification to required government agencies as promptly as possible and within the required timeframe	
	Coordinate rescue and medical response actions	
	Use explosion proof equipment in high concentration vapor areas and monitor for flammable vapors until the response operation is completed	

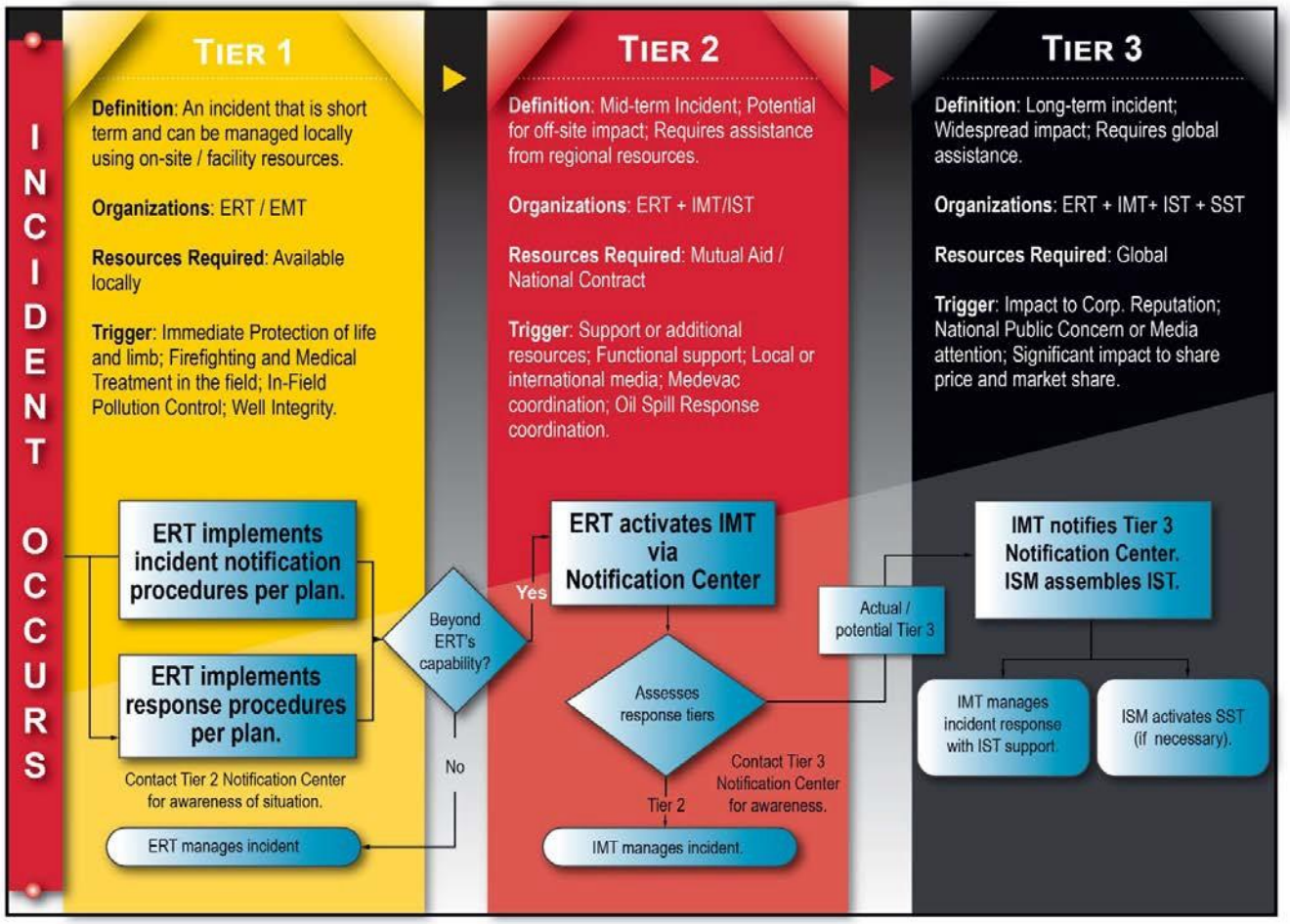
	The PEAS priorities will be utilized throughout the duration of the emergency response
	• People – ensure safety of all responders and impacted persons
	• Environment – protect the environment from further damage
	• Assets – protect non-damaged assets and minimize additional damage where possible
	• Stakeholders – reduce additional impacts and coordinate with to respond and recover effectively including:
	  ○ Effective cooperation with affected regulatory agencies
	  ○ Effective communication with Non-governmental Organizations (NGOs)
	  ○ Effective communication with other stakeholders
	  ○ Safe and effective restoration of business	

	Initiate evacuation of third parties: Contact local and state law enforcement as necessary to coordinate evacuation	
	Initiate containment if necessary and safe to do so. Contact Oil Spill Removal Organization if needed	

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INCIDENT TIER CLASSIFICATION

Incidents are classified in tiers according to their severity, either potential or realized.



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NOTIFICATION

Notifying the appropriate organizations that an incident has occurred is the first step in the initial response for all incidents

Notification efforts should include verification of the type of incident and its exact geographic location, or as close a proximity as can be readily discerned

The accountability of potentially impacted personnel is critical to determine a proper response when the health or safety of individuals are likely to occur

In no instance shall internal notifications take precedent over the safety of people or the request and mobilization of critical safety or medical resources, such as Emergency Medical, Fire, or Police assistance

Internal and external notification procedures shall be implemented immediately after discovering an incident has occurred, or as soon as it is safe to do so.

Upon discovery of or initial notification of an incident, the person in charge will attempt to identify the following information:

- The safety of the reporting party and others in the vicinity
- Name of the reporting party and contact information
- Status of any persons injured
- Accurate Personnel Accountability Report (PAR)
- Location of the incident, either address or global positioning system (GPS) location
- Time of discovery
- Incident description (source, assets involved, fire, etc.)
- Product type and estimated volume released
- Impacts to environmentally sensitive areas, population, waterways, etc.
- Immediate risks or exposures
- Current response actions
- Initial remedial actions, such as source control
- Name and contact of on-scene emergency agencies
- Weather conditions

The HSE Department will make all immediate initial incident notifications to the applicable agencies, including releases or spills, injuries, air emissions or air quality issues or permit variations. Any agency notification related to a deviation to a permit, such as drilling, will be coordinated by the various departments, such as Regulatory, HSE, and Drilling, as set forth in established procedures and are outside the scope of this process. Subsequent, follow-up, or amended notifications to external agencies, partners, joint ventures, or others outside of KMOG shall be made by the Liaison Officer function of the Incident Management Team (IMT) or similar function of the Emergency Management Team (EMT), as established.

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RESPONSE ACTIONS DEPENDING ON INCIDENT TYPE

INJURY / MEDICAL

MEDICAL EMERGENCY CHECKLIST

CONTAMINATED VICTIM

On-site emergency medical response for a contaminated patient requires the same rapid assessment of the patient as any other situation but be aware of other considerations that may affect the patient. The potential for contamination of the personnel, and equipment should be mitigated. Patient treatment should be conducted AFTER the injured party has been decontaminated.

IF	THEN
A responder requires medical attention	Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness. If the treatment needed is critical care or lifesaving treatment.
The need for full decontamination is less than the need for prompt medical treatment.	Refer to the Site Safety Plan for steps to be taken in an abbreviated decontamination for medical treatment
Medical Treatment is needed	The Incident Commander or his designee will request assistance from trained medical personnel
Transportation to a medical facility is needed	The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant.
	SDS information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.

NOTE: **Evacuation of seriously ill or injured persons should be conducted by ground or air ambulance only.** Transportation by company or private vehicle should be discouraged, unless advised to do so by medical authorities. All medical emergencies should be documented on appropriate company reports.

NON-CONTAMINATED VICTIM

Provide BASIC LIFE SUPPORT Stabilize the victim at the scene if necessary		
Maintain airway/breathing/Administer CPR	Control bleeding	Treat for shock
Activate professional medical care for the victim by: Call 911 to arrange for ground or air ambulance support.		
Provide the 911 dispatch the following information		
Your name and location and contact phone number	Type of medical emergency	
Name and location of the injured	Condition of injured	
Assess the situation and contact the Field Office or Safety Department		
Determine the level of medical attention needed - first aid or outside professional assistance.		
Administer first aid if necessary or **Transport the victim to a local hospital or physician**		

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FIRE / EXPLOSION

	FIRE / EXPLOSION CHECKLIST
	Notify the Foreman or supervisor on duty
	Shutdown/ESD facility
	Call 911 for emergency fire services
	Shutdown the Facility, evacuate personnel and move to a muster area or other safe distance to direct the fire department to the scene of the fire
	Keep other personnel and vehicles from entering the danger area
	Each person onsite should evacuate if necessary, to protect themselves from harm

HAZARDOUS SPILL

	LINE BREAK OR LEAK CHECKLIST
	Shutdown pumping and equipment
	Drain the line section, as the situation demands
	Coordinate rescue and medical response actions
	Initiate spill response and containment process
	Clean up spilled product to eliminate any possible environmental problems
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Request local authorities to establish traffic control in the area, as the situation demands
	Make all necessary repairs
	Return the line to service once repairs are completed
	STORAGE TANK LEAK
	Notify the Foreman or supervisor on duty
	Shut down all tank battery product movement operations and isolate the tank
	Initiate Confined Space Entry procedures, as applicable
	Ensure that the containment area drainage valve is closed
	If near tank bottom, consider filling the tank with water and maintain water bottom to suspend the discharge
	Block all drainage of spilled material from travelling offsite
	Request local authorities to establish traffic control in the area, as necessary
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Remove product from containment area with an explosion proof pump, oil skimmer, and/or vacuum truck with skimmer attachments
	If floating roof tank is submerged and tank must be drained, follow the facility operating procedures for landing floating roof and draining any liquids contained upon the floating roof

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VAPOR CLOUD

VAPOR CLOUD CHECKLIST	
	Sound the alarm and notify the foreman or supervisor on duty. Vacate the area.
	The only proper action in the presence of a vapor cloud is to get away from it. **Do not shut off electrical equipment.**
	All personnel should report to the muster point for roll call and further instructions.
	Contact the appropriate agencies and potentially affected neighbors.

DECONTAMINATION

Eyewash stations and safety showers provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing. Contaminated clothing should be disposed of properly. Contaminated personal protective equipment (PPE) must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

DECONTAMINATION CHECKLIST	
	Establish "Exclusion – Hot", "Decontamination – Decon", and "Support – Safe" zones to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.
	Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
	Decontamination facilities should be positioned prior to employee/contractor entrance areas where the potential for exposure to contamination exists. The appropriate Safety Data Sheets (SDS) are available to aid health professionals treating theinjured parties.
	Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
	Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

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SEVERE WEATHER

	TORNADO OR SEVERE STORMS CHECKLIST
	Upon notification by weather monitoring of impending severe weather conditions, notify the person in charge or the appropriate office of the situation Be aware of changing weather conditions: • *Tornado watch* – conditions are right for the formation of a tornado. • *Tornado warning* – a tornado has been seen in area or is imminent. Take cover immediately.
	Personnel will be instructed to shut down all nonessential activities and take shelter where available until the storm has passed.
	Immediately bring personnel off tanks, pipe racks, and other elevated work areas. Suspend product loading operations and close all tank openings.
	Take shelter in a low-level area away from glass until the storm has passed.
	Stay in the shelter until "ALL CLEAR" has been issued.

EVACUATION

The decision to evacuate should always be based upon a prudent analysis of the risks involved in any incident, and/or a response to an incident.

EVACUATION PROCEDURES

Depending upon the hazard, personnel will evacuate either via the access road and meet at muster points.

In case of emergency, the primary command center will be established at the IOC at the Platteville Office. The Denver Office may be used as an alternate command center if necessary.

If determined necessary, local response personnel (fire, police, etc.) would coordinate all community evacuation procedures utilizing existing community evacuation plans.

	EVAUATION PROCEDURES CHECKLIST
	Sound an alarm or give verbal alarm
	Call 911
	Shut down loading/unloading and pipeline operations
	Evacuate trucks from the location
	Divert incoming trucks to a safe distance away
	Evacuate all personnel to designated staging areas

TRAINING AND COORDINATION WITH LOCAL GOVERNMENT AND RESPONDERS

KMOG is a member of the CPRN (Colorado Preparedness Response Network), an industry collaboration with local responders working to enhance emergency preparedness and response. KMOG is committed to preparedness and minimizing impacts of incidents requiring emergency response should they occur. KMOG recognizes the importance of knowledge sharing within the industry and with emergency responders through drills and exercises.

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Trainings and drills will be offered and facilitated regularly through CPRN as well as KMOG will facilitate internal exercises and extend invites to emergency responders annually, at minimum, but often more frequently.

If KMOG staff or contractors are contacted by the OEM or a Fire Protection District, they will provide the necessary information to assess the hazards onsite and coordinate with first responders during all phases of development of the site.

In the event of an emergency requiring first responders, Unified Command will be established between the KMOG appointed company man on location and first responders present.

Address: 6240 Pine Cone Avenue

KerrMcGee

MCGAVIN 6-19HZ

Weld County, Colorado

Firestone, Colorado

GPS Coordinates: NAD 83

Pad Site: LAT: 40.127518° LONG:-104.938519°

Access Road: LAT: 40.131307° LONG:-104.937875°

All Emergencies will be reported through 911

NOTIFICATIONS

1. National Response Center: 800-424-8802
2. Kerr McGee/Emergency Response Coordinator
   - Integrated Operations Center (IOC)
     970-515-1500
3. COGCC: 719-343-0130, 970-573-1277
4. EPA Region VIII: 303-312-6312
5. Carbon Valley Emergency Management Agency: 303-319-1008
6. Frederick/Firestone Fire Protection District: 303-833-2742

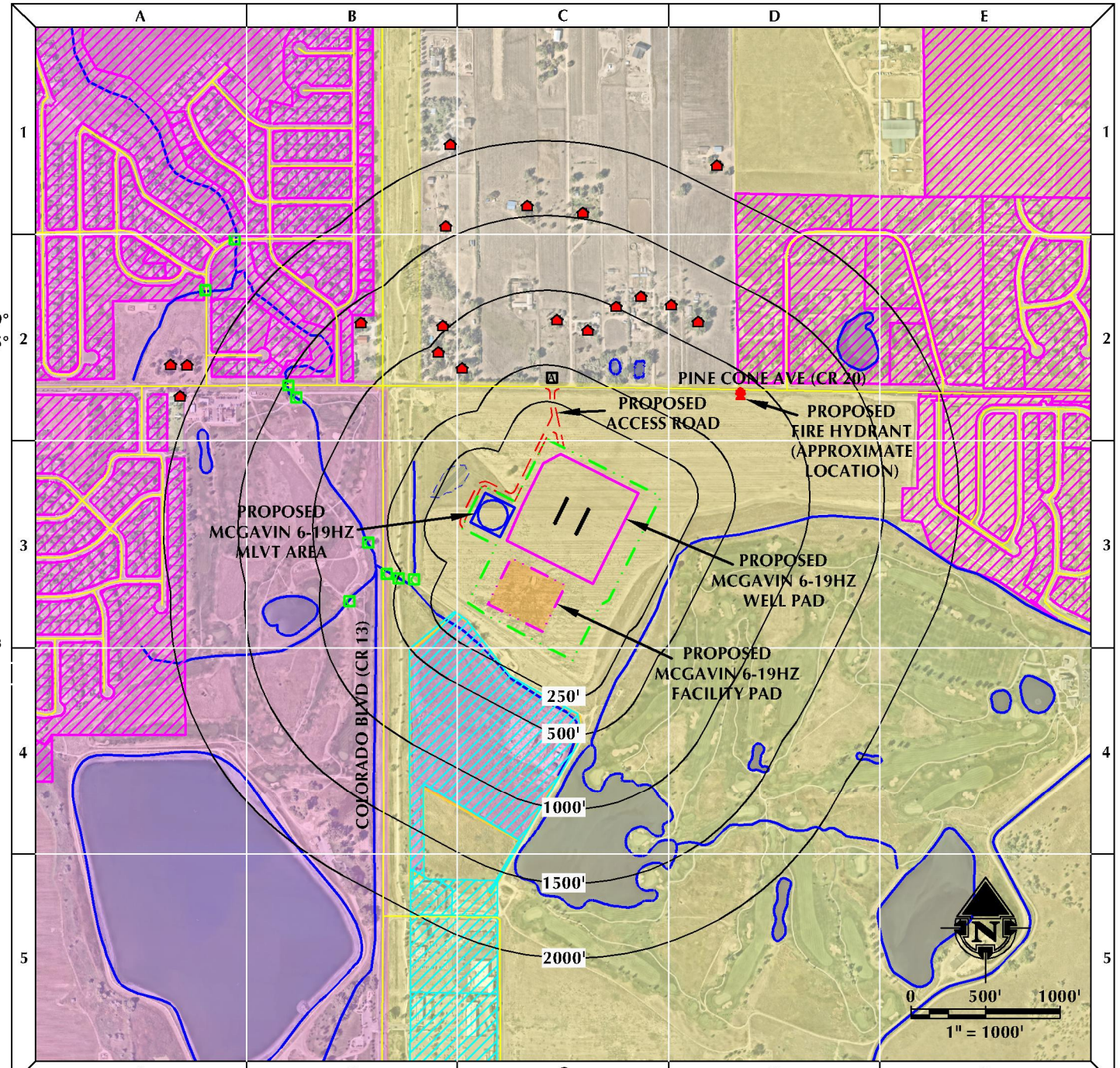
RESPONSE OBJECTIVES

Minimize the impact to the environment and local community. Contain and recover released product to the extent possible

CRITICAL RECEPTORS

1. DRAINAGES, PONDS AND WETLANDS
2. SURROUNDING RESIDENTIAL PROPERTIES
3. SURROUNDING BUSINESSES
4. GOLF COURSES

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.



LEGEND:
- PROPOSED WELL
- DISTURBANCE AREA
- DISTURBANCE AREA BUFFERS
- PROPOSED WELL PAD
- PROPOSED FACILITY PAD
- NEIGHBORHOOD
- BUSINESS
- RESIDENTIAL BUILDING UNIT
- SCHOOL
- EXISTING CULVERT
- POND
- DELINEATED WETLAND
- DITCH/CANAL/RIVER/DRAINAGE
- RAILROAD TRACKS
- PUBLIC ROADS
- PROPOSED ACCESS ROAD
- SITE ACCESS
- TOWN OF FIRESTONE
- TOWN OF FREDERICK
- PROPOSED FIRE HYDRANT

609 CONSULTING, LLC
SHERIDAN OFFICE
1095 Sabertoo Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SCALE: 1" = 1000ft		NAD83 CO-Nft	
DRAWN:	GLK	DATE:	6/24/21
REVISED:	SRS	DATE:	10/15/21

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TACTICAL RESPONSE CHECKLIST

After assessing the incident level and contacting the appropriate parties, the following steps will need to be taken for the tactical response:

1. Implement National Incident Management System (NIMS) Incident Command System (ICS)
2. Assess hazards to site, workers, and public
3. Safety Officer should complete form ICS 208 – Safety Message/Plan
4. Conduct Job Safety Briefing
5. Assess property and environmental impacts
6. Develop ICS 201 Incident Briefing and ICS 202 – Incident Objectives
7. Implement response actions:
   a) Confine spills to tanks/vessels
   b) Locate leading edge of spilled material
   c) Contain spills on ground and any surrounding drainage ways
   d) Recover spilled materials
   e) Dispose of recovered materials properly
8. Document site conditions and activities
9. Document impacts to natural, economic, and cultural resources
10. Document site restoration/remediation activities

See the KMG/Emergency Response Plan for the full list of NIMS ICS Forms.

PAD Name and PAD STATS

FLOW STATS – 30 DAY AVERAGE IP

GAS (MCF/D)	OIL (BBL/D)	WATER (BBL/D)
TBD	TBD	TBD

WELL PAD CONTAINTMENT STORAGE

QTY.	TYPE	SIZE (BBL)
8	Water Tanks	285 barrel
2	Condensate Tanks	285 barrell

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.

RESPONSE RESOURCE CONTACT INFORMATION

Name	Main Phone
Kerr McGee Oil & Gas OnShore LP Integrated Operations Center (IOC)	970- 515-1500

STATE, FEDERAL, MUNICIPAL EMERGENCY RESPONDERS

Name	24-Hour Phone
Carbon Valley Emergency Management Agency	303-319-1008
Weld County Sheriff	970-356-4015
Firestone Police Department	303-833-0811
Frederick/Firestone Fire Protection District	303-833-2742
National Response Center	800-424-8802
Colorado Dept of Natural Resources	303-866-3311
EPA Region 8	303-312-6312
Department of Transportation	855-368-4200

RESPONSE CONTRACTORS

Contractor Name	Office #	Alternative #
Emergency Response Contractors		
EnviroServe	800-488-0910	720-450-1316
EHA-Environmental HAZMAT Services	720-225-9252	303-525-3111
Wild Well Control	281-784-4700	
Boots & Coots	281-931-8884	
Cudd Pressure Control	800-990-2833	307-382-6650 713-849-2769
Support - Incident Management Team Consultant		
CTEH	2501-801-8500	317-473-0688
The Response Group	281-880-5000	
Oil Spill Clean Up Services -Wildlife Rehabilitation		
Birds of Prey Foundation	303-460-0674	
Greenwood Wildlife Rehab Ctr.	303-823-8455	303-545-5849
Rocky Mountain Raptor Program	970-484-7756	970-222-0322
Support - Consultants		
AECOM/ENSR	970-493-8878	720-210-7924
LT Environmental	303-962-5504	
GHD First (Fast Incident Response Services Team)(24hr hotline)		866-812-9565
Tasman Geoscience		303-507-8869

RESPONSE OBJECTIVES CHECKLIST

SAFETY – PROTECT LIFE

❖Evaluate and account for all personnel
❖Isolate all potential ignition sources
❖Initiate emergency services immediately, as needed (911, Fire, LEPC)
❖Identify hazard(s) of emitted material (obtain SDS)
❖Establish site control (safe perimeter and evacuation routes)
❖Monitor air in impacted areas
❖Develop Site Safety Plan (ICS 208) and Medical Plan
❖Continually assess site hazards and risks

RESPONSE – INCIDENT STABILIZATION

❖Conduct notifications to external agencies and internal personnel
❖Identify and implement staging areas to support response operations
❖Activate response company for equipment and manpower as needed
❖Activate response tactics to contain and recover product/material
❖Establish command post and field communications
❖Establish flight traffic restriction if required
❖Provide personnel and equipment support as required
❖Implement waste handling and disposal procedures as required
❖Initiate decontamination and demobilization procedures when appropriate

ENVIRONMENTAL – PROTECT THE ENVIRONMENT

❖Identify, prioritize, and protect environmentally sensitive areas
❖Establish wildlife rescue rehabilitation operations if required
❖Verify release if waters are impacted
❖Conduct visual assessments (spill tracking and surveillance)

Revised: 6/2020

Section 5

Phase III Drainage Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Phase III Drainage Report
for
McGavin 6-19HZ

Prepared for:

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

Submitted to:

Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

October 2021
Revised December 2021

609 Consulting, LLC

Engineering, Surveying, Consulting & Design

Sheridan Office
1095 Saberton Avenue
Sheridan, Wyoming 82801
Ph: (307) 674-0609 Fax: (307) 674-0182

Loveland Office
6706 North Franklin Avenue
Loveland, Colorado 80538
Ph: (970) 776-4331 Fax: (970) 776-3301

Letter of Transmittal

To: Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

cc: Mr. Matt Wiederspahn, PE, Town of Firestone
Mr. Josh Evans, PE, Town of Firestone
Ms. Shayelyn Marshall, Kerr-McGee Oil & Gas Onshore L.P.
Mr. Brian Venn, PE, 609 Consulting

From: Mr. Tyler French, PE
609 Consulting
1095 Saberton Avenue
Sheridan, Wyoming 82801

Date: December 10, 2021

Subject: McGavin 6-19HZ - Phase III Drainage Report - Revised

To the Town of Firestone:

On behalf of Kerr-McGee Oil & Gas Onshore L.P., we are pleased to submit the revised Phase III Drainage Report for McGavin 6-19HZ. The purpose of this report is to discuss and summarize the stormwater drainage analysis and design performed for McGavin 6-19HZ. The proposed project will be located in the northwest quarter of Section 19 in Township 2 North, Range 67 West in Firestone, Colorado.

The drainage analysis and design were prepared using the Town of Firestone Design Standards & Construction Specifications for Public Improvements as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual. The Town of Firestone provided comments and redlines for the Preliminary Phase III Drainage Report for McGavin 6-19HZ in September of 2021. These redlines were incorporated into the Phase III Drainage Report. The Town of Firestone provided additional comments in December of 2021. This revised Phase III Drainage Report has addressed and incorporated all of the comments and redlines provided by Firestone thus far. We believe the analysis and design satisfy all Town of Firestone drainage requirements.

We greatly appreciate your time and consideration in reviewing this submittal. Please contact us with any questions you may have.

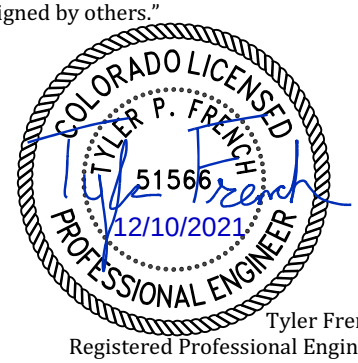
Respectfully,

Tyler French

Tyler French, PE

Certification of Engineering

"I hereby attest that this final report for the drainage design of McGavin 6-19HZ was prepared by me, or under my direct supervision, in accordance with the provisions of the Town of Firestone Storm Drainage Criteria for the responsible parties thereof. I understand that the Town of Firestone does not and shall not assume liability of drainage facilities designed by others."



Tyler French
Registered Professional Engineer
State of Colorado No. 51566

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Appendix B: NRCS Web Soil Survey – Soils Report
Appendix C: FEMA Flood Insurance Rate Map FIRMette
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Appendix F: MHFD-Detention Spreadsheet Calculations
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Appendix I: Conveyance Calculations for Diversion Ditch Design
Appendix J: Sediment Trap Sizing Calculations

1.0 PROJECT OVERVIEW

Kerr-McGee Oil & Gas Onshore L.P. is proposing the construction and development of an oil/gas well pad and production facility, McGavin 6-19HZ, located in the northwest quarter of Section 19 in Township 2 North, Range 67 West in Firestone, Colorado. Per the requirements outlined in the Town of Firestone Municipal Code, and through a direct request from the Town of Firestone, this report was prepared to discuss the analysis and design for stormwater drainage at the proposed project site. The Drainage and Erosion Control Plan, found in Appendix A, was developed in conjunction with this report.

1.1 Project Description

The proposed project consists of the construction and operation of the McGavin 6-19HZ well pad and the McGavin 6-19HZ production facility containing infrastructure and operations for 26 oil/gas wells. Combined, the well pad and facility will have a Colorado Oil & Gas Conservation Commission (COGCC) 2A disturbance boundary area of 25.63 acres during the construction phase which includes topsoil stripping and pad earthwork, well drilling and hydraulic fracturing, installation of permanent pipelines and facilities, and setup of temporary equipment and modular large volume tank (MLVT) areas. Construction phase grading and layout for the facility is included in the Drainage and Erosion Control Plan found in Appendix A.

Once all wells have been drilled and completed, the temporary equipment area, MLVT area, and portions of the well pad and facility will be reclaimed back to existing grade for the production phase. The remaining operational area during the production phase will be approximately 7.29 acres. Production phase grading and layout for the well pad and facility is included in the Drainage and Erosion Control Plan found in Appendix A.

1.2 Project Location

The proposed McGavin 6-19HZ project is located on property owned by Anadarko E & P Onshore LLC (Parcel 131119200045). The project area is approximately 0.1 miles south of Pine Cone Avenue (County Road 20) and 0.1 miles east of Colorado Boulevard (County Road 13) within the Town of Firestone jurisdictional boundary. A proposed access road running south from County Road 20 will provide access to the project site. Figure 1 shows the location of McGavin 6-19HZ.

Soils data for the project area were taken from NRCS Soil Data Viewer. The project area is comprised of Olney fine sandy loam (1 to 3 percent slopes) with a Hydrologic Soil Group (HSG) classification of Group B soils, Vona loamy sand (0 to 3 percent slopes) with a HSG classification of Group A soils, and Aquolls and Aquepts (flooded) with a HSG classification of Group D soils. The soils report for the project area can be found in Appendix B. The proposed project will be constructed on undeveloped agricultural land. According to National Land Cover Database (NLCD 2016), the project area is classified as a combination of cultivated crops, herbaceous, and emergent herbaceous wetlands.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 08123C1890E, Effective Date: 1/20/2016 and Panel 08123C1895E, Effective Date: 1/20/2016), the proposed project is in an area of minimal flood hazard (Zone X) and is therefore determined to be outside the 500-year floodplain. The corresponding FIRMette displaying the flood zone classification at the project site can be found in Appendix C.

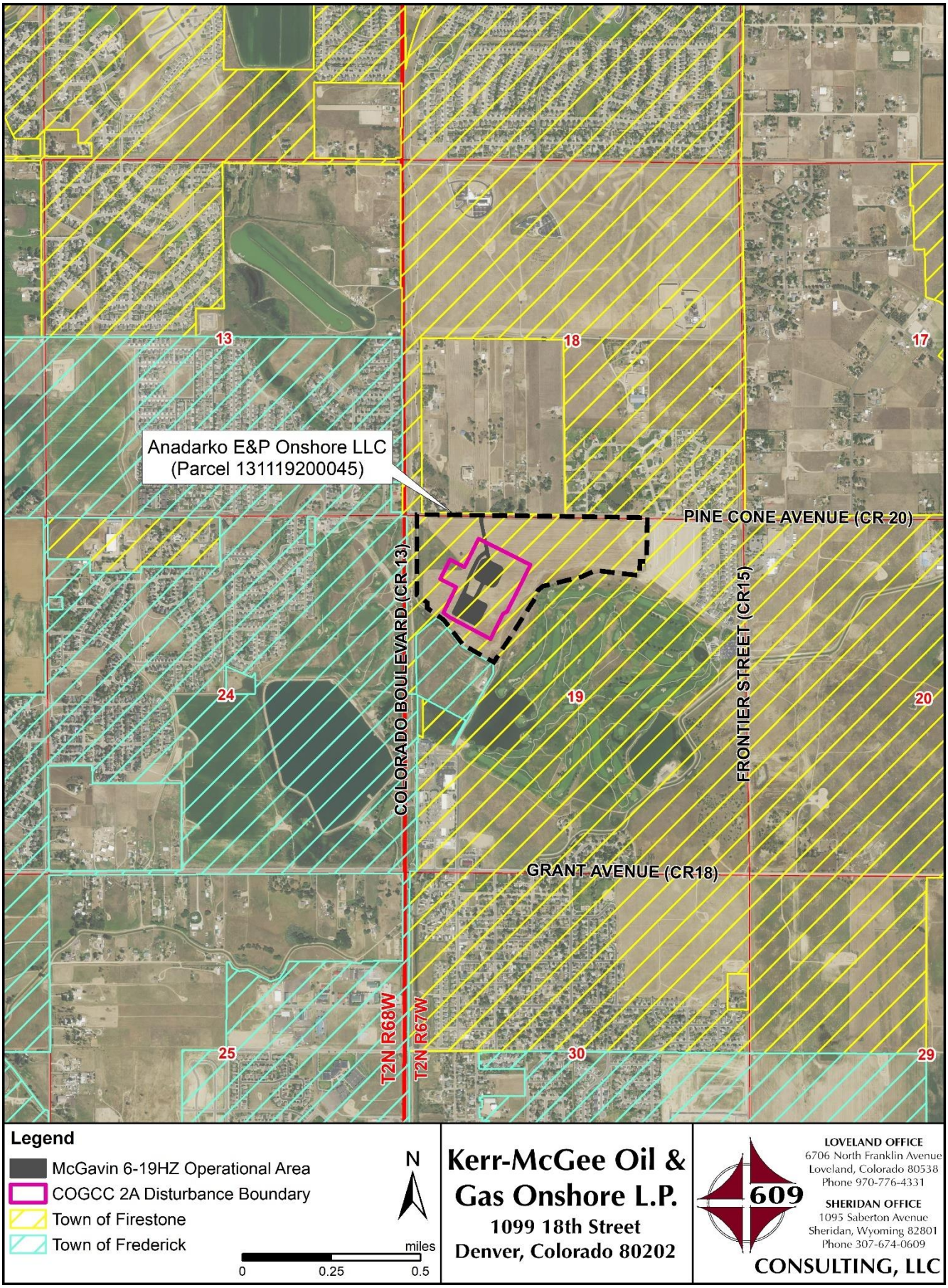


Figure 1. Project Location

1.3 Drainage Summary

The proposed McGavin 6-19HZ project lies within the Firestone Lake – Saint Vrain Creek Hydrologic Unit Code Level 12 (HUC 12): 101900050707. The HUC 12, approximately 69.5 square miles in area, consists of a mixture of agricultural lands and urban development via subdivisions, acreages, and transportation infrastructure that drains to Saint Vrain Creek.

Local drainage to and around the project site generally flows southeast to northwest to a wetland area. From there, the wetland drains south along the Firestone Trail walking path to an unnamed drainage that flows west, under the walking path and under Colorado Boulevard. From there, the drainage flows northwest through several neighborhoods and under several roadways until joining Saint Vrain Creek.

The project site lies within the study area of the *Sump Basin Master Drainage Plan*, published in May of 2010 (Colorado Civil Group, Inc.). According to the report, the Sump Basin has well-drained soils with poorly defined drainageways. Most of the runoff is conveyed via shallow overland flow or sheet flow. Historically, stormwater within the basin generally flows from south to north. Though the Sump Basin contains several existing sumps, there are no existing sumps located near the proposed project site.

The project site also lies within the study area of the *South Weld I-25 Basin Drainage Master Plan*, published in September of 1999 (Anderson Consulting Engineers, Inc.). McGavin 6-19HZ is within the Tri-Town Basin. According to the report, the basin is approximately 12.4 square miles of agricultural land, residential housing developments, parks, golf courses, and light industrial/commercial development. Saint Vrain Creek defines the northern boundary of the basin. The most predominant drainage feature is the Tri-Town Drainageway, also known as the Biederman Draw, with several minor contributing tributaries including the McGavin 6-19HZ project site. The Tri-Town Drainageway is a relatively small channel with the capacity to convey peak flows from small storm events. The Drainage Master Plan recommends improvements to arterial roadway crossings and to the Tri-Town Drainageway.

2.0 HYDROLOGIC ANALYSIS

The following sections outline the methods used and corresponding results for the hydrologic analysis of the project site and drainage design including historic runoff, design flow, and stormwater volume.

2.1 Historic Runoff

Historic runoff, calculated assuming the site is undeveloped with 2.0 percent imperviousness, was calculated for the proposed project site. The rational method was chosen to estimate historic peak flows. As discussed in the Mile High Flood District (MHFD) manual *Urban Storm Drainage Criteria Manual Volume I* (USDCM VI), it is acceptable to use the rational method for design storm analysis of catchments that are not complex and are 90 acres or less in size.

The MHFD spreadsheet model, *Peak Runoff Prediction by the Rational Method, V 2.00* (UD-Rational), was used to calculate peak flows. One-hour point rainfall data were obtained from NOAA Atlas 14 Point Precipitation Frequency Estimates using coordinates for the project site. One-hour point rainfall data are summarized in Table 1 and a copy of the point precipitation frequency estimates obtained from NOAA can be found in Appendix D.

Table 1. Point Rainfall Data (NOAA Atlas 14 Point Precipitation Frequency Estimates)

Storm Event Frequency	One-Hour Point Rainfall, in
2-year	0.820
5-year	1.10
10-year	1.39
25-year	1.84
50-year	2.25
100-year	2.71
500-year	3.97

The COGCC 2A disturbance boundary was used to define the drainage area. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery. HSG was derived from an area-weighted average using NRCS Soil Data Viewer. HSG and soils data for the project area can be found in Appendix B. USDCM VI was referenced for recommended conveyance factor (K). Computed Time of Concentration (Tc) was used since historic conditions have an imperviousness of less than 20 percent. Historic peak flow estimates calculated using the rational method are summarized in Table 2 and spreadsheet model inputs and results can be found in Appendix E.

Table 2. Historic Peak Flow Estimates Using the Rational Method

Storm Event Frequency	Historic Peak Flow, cfs
2-year	0.2
5-year	0.5
10-year	3.0
25-year	13.2
50-year	21.6
100-year	35.5
500-year	69.8

2.2 Design Flow

Design flows for McGavin 6-19HZ were calculated for stormwater derived within the project disturbance area (on-site) as well as the broader drainage to and around the project area. Both the construction phase and the production phase were analyzed and used to aid in the hydraulic design.

The rational method was chosen to estimate design-specific peak flows for the proposed culverts and ditch outlets (sediment traps). Locations for peak flow calculations are summarized in Table 3. Drainage area delineations for sediment traps and culverts during the construction phase are shown in Figure 2 and drainage area delineations for culverts and stormwater storage during the production phase are shown in Figure 3.

One-hour point rainfall data for the project area (Table 1) and the Denver Area Intensity Equation were used for inputs to UD-Rational. Field survey, LiDAR, and site design characteristics were used to delineate drainage areas for culverts (ARC1, ARC2, ARC3, ARC4, ARC5, and ARC6). Drainage areas for the on-site outlets (ST1, ST2, ST3, FS, and WPS) were delineated using the on-site drainage design and grading found in Appendix A. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery.

Table 3. Summary of Outlets and Drainage Areas

Outlet	Name	Description	Total Drainage Area, acre	
			Construction Phase	Production Phase
ARC1	Access Road Culvert #1	Access road approach culvert conveying off-site stormwater	46.63	50.92
ARC2	Access Road Culvert #2	Diversion ditch conveying on-site stormwater under well pad access road	1.27	-
ARC3	Access Road Culvert #3	Diversion ditch conveying on-site stormwater from sediment trap under facility access road	9.58	-
ARC4	Access Road Culvert #4	Diversion ditch conveying on-site stormwater from sediment trap under facility access road	2.24	-
ARC5	Access Road Culvert #5	Diversion ditch conveying on-site stormwater under facility access road	4.88	-
ARC6	Access Road Culvert #6	Road ditch conveying stormwater under the facility access road	-	2.03
ST1	Sediment Trap #1	Diversion ditch conveying on-site stormwater to a sediment trap	9.08	-
ST2	Sediment Trap #2	Diversion ditch conveying on-site stormwater to a sediment trap	1.89	-
ST3	Sediment Trap #3	Diversion ditch conveying on-site stormwater to a sediment trap	13.49	-
FS	Facility Stormwater Storage	Berm and ditch on facility used for stormwater storage	-	5.37
WPS	Well Pad Stormwater Storage	Berm and ditch on well pad used for stormwater storage	-	3.86

HSG was derived from an area-weighted average using NRCS Soil Data Viewer. Due to the presence of Type A, Type B, and Type D soils, HSG and percent imperviousness were used within the UD-Rational spreadsheet to calculate area-weighted runoff coefficients (C-values) which were used to override the default runoff coefficients. HSG and soils data for the project area can be found in Appendix B and area-weighted runoff coefficient calculations can be found in Appendix E.

USDCM VI was referenced for recommended imperviousness and conveyance factor (K). Computed T_c was used for outlets with imperviousness less than 20 percent. Drainage areas were evaluated for non-contributing area. During both the construction and production phases, facility tanks and separators are bermed to contain spills. This area is considered ineffective and non-contributing area. Calculations for area-weighted averages of percent imperviousness along with effective area are found in Table 4. Peak flow estimates calculated using the rational method are summarized in Table 5 and complete spreadsheet model inputs and results can be found in Appendix E.

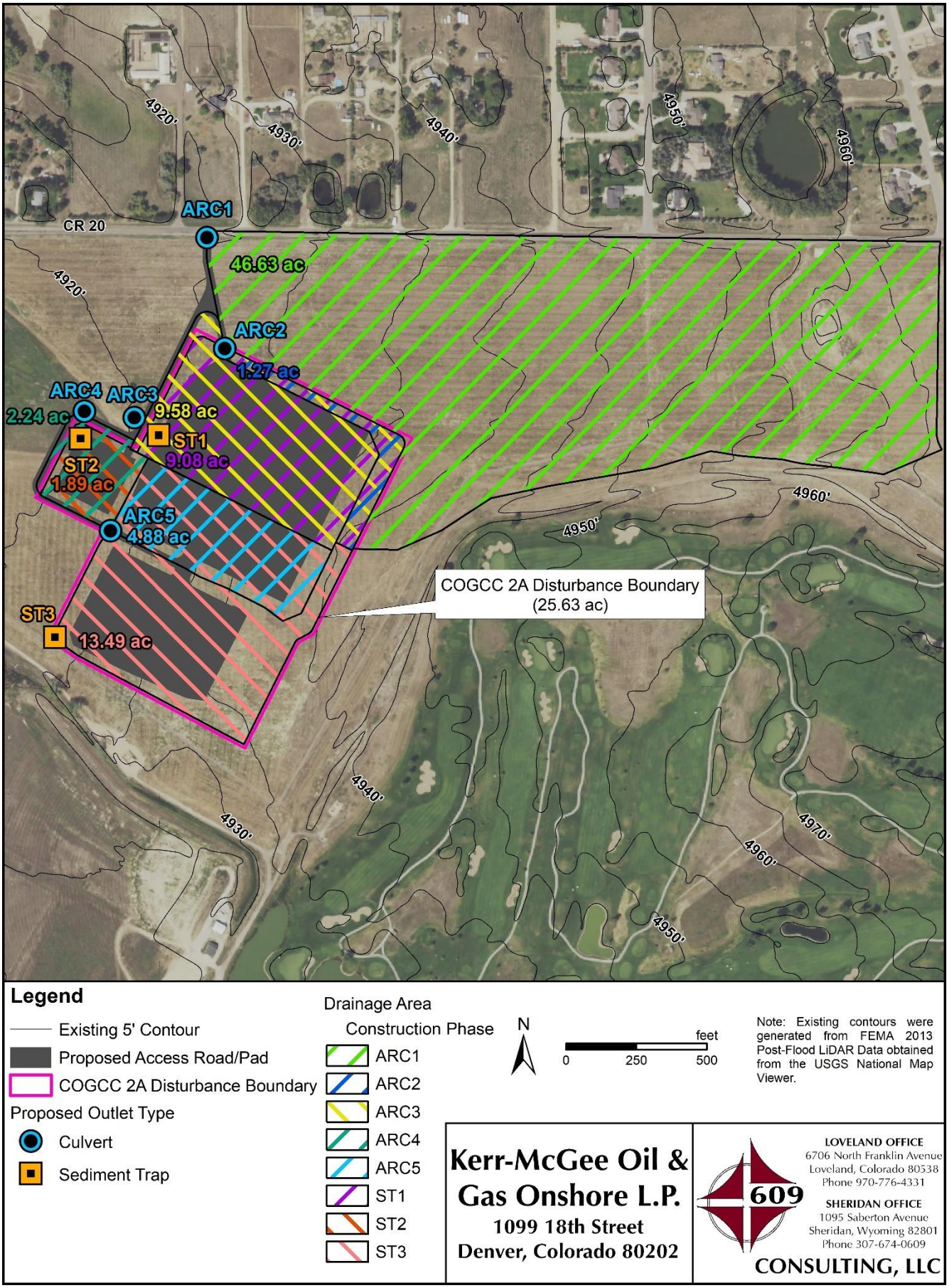


Figure 2. Drainage Areas for the Construction Phase

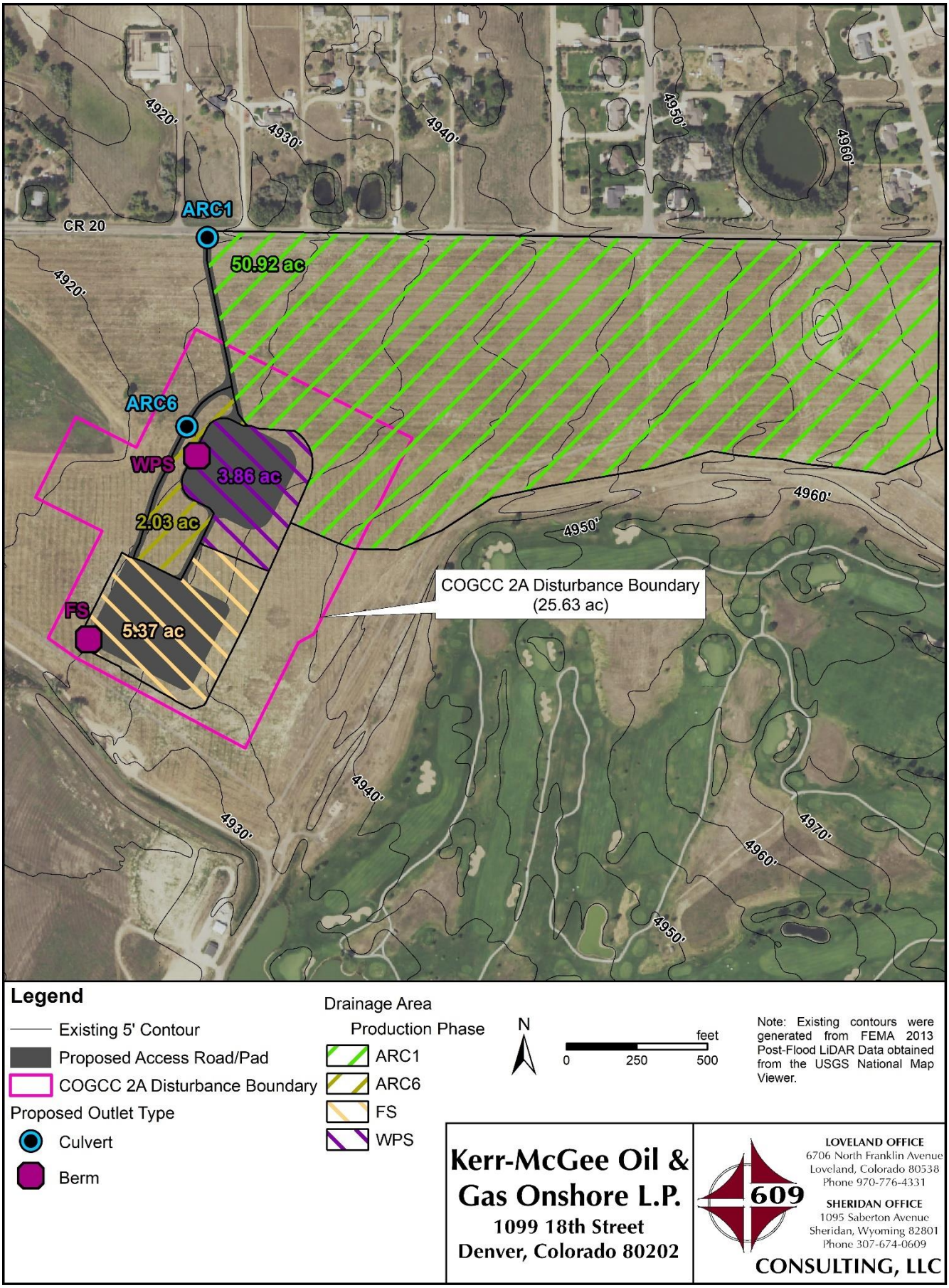


Figure 3. Drainage Areas for the Production Phase

Table 4. Imperviousness and Effective Area

Outlet	Phase	Total Area, acre	Ineffective Area, acre	Effective Area, acre	Open (2% Imperv), acre	Gravel (40% Imperv), acre	Weighted Imperviousness	
							acre	%
ARC1	Construction	46.63	0.00	46.63	45.74	0.89	1.27	2.7
	Production	50.92	0.00	50.92	49.94	0.98	1.39	2.7
ARC2	Construction	1.27	0.00	1.27	1.25	0.02	0.03	2.4
ARC3	Construction	9.58	0.00	9.58	2.78	6.80	2.78	29.0
ARC4	Construction	2.24	0.00	2.24	0.83	1.41	0.58	25.9
ARC5	Construction	4.88	0.00	4.88	1.08	3.80	1.54	31.6
ARC6	Production	2.03	0.00	2.03	1.51	0.52	0.24	11.8
ST1	Construction	9.08	0.00	9.08	2.52	6.56	2.67	29.4
ST2	Construction	1.89	0.00	1.89	0.66	1.23	0.51	27.0
ST3	Construction	13.49	0.42	13.07	4.96	8.11	3.34	25.6
FS	Production	5.37	0.42	4.95	2.09	2.86	1.19	24.0
WPS	Production	3.86	0.00	3.86	1.33	2.53	1.04	26.9

Table 5. Peak Flow Estimates Using the Rational Method

Outlet	Phase	Calculated Peak Flow, cfs					
		2-year	5-year	10-year	25-year	50-year	100-year
ARC1	Construction	0.3	0.5	1.4	4.5	8.9	19.5
	Production	0.4	0.5	1.4	4.6	9.3	20.5
ARC2	Construction	<0.1	<0.1	0.1	0.3	0.6	1.2
ARC3	Construction	2.0	2.9	4.1	6.7	9.7	13.9
ARC4	Construction	0.6	0.9	1.4	2.5	3.5	4.9
ARC5	Construction	1.4	2.0	3.2	6.0	8.3	11.4
ARC6	Production	0.2	0.3	0.6	1.5	2.2	3.4
ST1	Construction	2.4	3.4	4.8	8.1	11.5	16.5
ST2	Construction	0.5	0.8	1.3	2.4	3.3	4.6
ST3	Construction	2.8	4.2	7.0	14.3	20.1	28.1
FS	Production	1.0	1.5	2.5	5.4	7.6	10.6
WPS	Production	0.9	1.3	2.1	3.9	5.6	7.9

2.3 Stormwater Volume

In accordance with Town of Firestone Municipal Code requirements, stormwater falling on the project area will be detained and released at reduced flow rates. The MHFD spreadsheet model *Detention Basin Design Workbook Version 4.03* (MHFD-Detention) was used to calculate storm runoff volumes. One-hour point rainfall data for the project area (Table 1) were used within MHFD-Detention. Watershed parameters including area, length, and slope as well as imperviousness and soil type were calculated based on the site design and site characteristics. Table 6 shows storm runoff volumes calculated for the stormwater storage outlets. MHFD-Detention inputs and results can be found in Appendix F.

Table 6. Calculated Storm Runoff Volumes

Outlet	Phase	Storm Runoff Volume, acre-ft								
		WQCV	EURV	2-year	5-year	10-year	25-year	50-year	100-year	500-year
FS	Production	0.054	0.120	0.056	0.092	0.173	0.374	0.534	0.746	1.273
WPS	Production	0.045	0.104	0.046	0.073	0.113	0.254	0.372	0.536	0.934

3.0 HYDRAULIC ANALYSIS AND DRAINAGE DESIGN

Criteria presented in MHFD's Urban Storm Drainage Criteria Manual outline the capacity, velocity, and slope requirements involved with drainage design and stormwater conveyance. The following sections describe the design recommendations for conveyance during the construction phase and production phase. The recommended drainage design is included in the Drainage and Erosion Control Plan found in Appendix A.

3.1 Stormwater Storage

During the production phase, stormwater will be stored in two locations: on the facility and on the well pad. Each storage location will hold its own required stormwater volume and control releases through individual outlets and spillways.

Facility

The facility will drain southwest to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the facility. During the 10-year event, stormwater will back up out of the ditch onto the facility and will pond to a maximum depth of 0.31 feet above the edge of the facility. During the 100-year event, stormwater will pond to a maximum depth of 0.65 feet above the edge of the facility creating a stored volume of 0.289 acre-feet.

The outlet for the facility storage berm consists of a 10-inch diameter high-density polyethylene (HDPE) pipe with an orifice cap used to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (9/16 inch diameter) at the invert of the outlet pipe and a second orifice (2-1/4 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 4.0 feet, 4:1 side slopes, and a crest invert at 1.3 feet above the ditch/outlet pipe invert (0.2 feet above the edge of the facility). It will take approximately 40 hours to drain 99 percent of the water quality capture volume (WQCV) with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 32 hours to drain 99 percent of the inflow with peak flow release of 5.1 cubic feet per second (cfs). Buoyancy calculations were performed for the outlet pipe. Using a factor safety of 1.5, it was found that a minimum cover of 0.8 feet is needed to anchor the 10-inch outlet pipe during fully saturated conditions. Buoyancy calculations can be found in Appendix G. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the facility storage berm, overlapping the weir. The spillway was designed with a crest length of 10.0 feet, 4:1 side slopes, and a crest invert at 1.75 feet above the ditch/outlet pipe invert (0.65 feet above the edge of the facility) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.48 feet. A berm height of 1.65 feet (2.75 feet above the bottom of the ditch) will provide 1.0 feet of freeboard above the spillway and 0.52 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater volume, outlet sizing, and spillway design details for the facility are included in the Drainage and Erosion Control Plan found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

Well Pad

The well pad will drain west to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the well pad. During the 10-year event, stormwater will back up out of the ditch onto the well pad and will pond to a maximum depth of 0.16 feet above the edge of the well pad. During the 100-year event, stormwater will back up out of the ditch onto the well pad and pond to a maximum depth of 0.43 feet above the ditch creating a stored volume of 0.344 acre-feet.

The outlet for the well pad storage consists of a 10-inch diameter HDPE pipe with an orifice cap to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (9/16 inch diameter) at the invert of the outlet pipe and a second orifice (2-1/4 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 2.0 feet, 4:1 side slopes, and a crest invert at 1.1 feet above the ditch/outlet pipe invert (0.1 feet above the edge of the well pad). It will take approximately 40 hours to drain 99 percent of the WQCV with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 40 hours to drain 99 percent of the inflow with peak flow release of 1.9 cfs. A minimum cover of 0.8 feet over the outlet pipe is needed to avoid buoyancy issues. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the well pad storage berm, overlapping the weir. The spillway was designed with a crest length of 5.2 feet, 4:1 side slopes, and a crest invert at 1.5 feet above the ditch/outlet pipe invert (0.5 feet above the edge of the well pad) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.48 feet. A berm height of 1.5 feet (2.5 feet above the bottom of the ditch) will provide 1.0 feet of freeboard above the spillway and 0.52 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater volume, outlet sizing, and spillway design details for the well pad are included in the Drainage and Erosion Control Plan found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

3.2 Culverts

Six proposed culvert locations will ensure proper on-site and off-site drainage. MHFD's *Culvert Hydraulics Version 4.00* (MHFD-Culvert) was used to calculate conveyance, sizing, and performance characteristics for the recommended culvert designs. Peak flows used for culvert designs are found in Table 5 and spreadsheet calculations can be found in Appendix H.

Access Road Culvert #1 (ARC1) will convey off-site runoff from the area northeast of the project site (south of County Road 20) under the access road and to the west during both the construction phase (Figure 2) and the production phase (Figure 3). One 15-inch reinforced concrete pipe (RCP) culvert is recommended for this location. Characteristics for the recommended culvert at ARC1 are found in Table 7. The maximum design conveyance before overtopping the access road is 7.3 cfs; therefore, the proposed culvert can adequately convey more than the 25-year peak flow during the construction phase (4.5 cfs) and more than the 25-year peak flow during the production phase (4.6 cfs).

Table 7. Culvert Performance Characteristics for Recommended Culvert Designs

Site	Recommended Culvert Design	2-year Peak Flow			Full Barrel Flow			Max Conveyance		
		Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D
ARC1	15-inch RCP	0.4	3.2	0.2	3.9	3.2	1.0	7.3	5.9	1.8
ARC2	12-inch CMP	0.1	1.1	0.2	1.7	2.2	1.0	3.3	4.2	2.0
ARC3	12-inch CMP	2.0	2.5	1.1	1.9	2.4	1.0	3.4	4.3	2.0
ARC4	12-inch CMP	0.6	2.4	0.4	2.3	2.9	1.0	3.7	4.7	2.0
ARC5	12-inch CMP	1.4	2.7	0.6	2.1	2.7	1.0	3.6	4.6	2.0
ARC6	12-inch CMP	0.2	2.3	0.2	2.3	2.9	1.0	4.2	5.3	2.0

Access Road Culvert #2 (ARC2) will convey on-site runoff from the northern part of the well pad under the well pad access road and to the west during the construction phase. One 12-inch corrugated metal pipe (CMP) culvert is recommended for this location. Characteristics for the recommended culvert at ARC2 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.3 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow during the construction phase (1.2 cfs). The 2-year peak flow velocity is below 3.0 feet per second (fps). Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #3 (ARC3) will convey on-site runoff from ST1 under the facility access road and to the west during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC3 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.4 cfs; therefore, the proposed culvert can adequately convey more than the 5-year peak flow during the construction phase (2.9 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #4 (ARC4) will convey on-site runoff from ST2 under the facility access road and to the west during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC4 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.7 cfs; therefore, the proposed culvert can adequately convey more than the 50-year peak flow during the construction phase (3.5 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #5 (ARC5) will convey on-site runoff from the southern part of the well pad south under the facility access road and into the external ditch and berm during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC5 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.6 cfs; therefore, the proposed culvert can adequately convey more than the 10-year peak flow during the construction phase (3.2 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #6 (ARC6) will convey runoff from between the well pad and facility, as well as the well pad stormwater storage releases, under the facility access road and to the west during the production phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC6 are found in Table 7. The maximum design conveyance before overtopping the access road is 4.2 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow during the production phase (3.4 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

3.3 Ditching

Temporary diversion ditches and berms will be used to collect and direct on-site stormwater to outlets while also deflecting and redirecting off-site flows around the disturbance area during the construction phase. Per recommendations from the MHFD Urban Storm Drainage Criteria Manual, all temporary diversion ditches were designed with slopes between 0.5 percent and 2.0 percent. Temporary diversion ditch slopes are identified in the Drainage and Erosion Control Plan found in Appendix A.

Manning's equation was used to calculate conveyance based on typical temporary diversion ditch design. Using a ditch slope of 0.5 percent (lowest proposed ditch slope for the project), the typical design was found to convey 5.6 cfs at a depth of 1.0 feet and 16.5 cfs at a depth of 1.5 feet (maximum capacity assuming 2:1 ditch slope is carried onto pad). The typical design at a depth of 1.0 feet will convey more than the largest 5-year peak flow (ST3, 4.2 cfs) and the typical design at a depth of 1.5 feet will convey more than the largest 25-year peak flow (ST3 14.3 cfs). Manning's calculations for typical temporary diversion ditch conveyance can be found in Appendix I.

3.4 Sediment Traps

Sediment traps and outlets will be installed at the end of temporary diversion ditches. Sediment traps were sized according to the Kerr-McGee BMP Manual which uses modified MHFD typicals. Total ditch length draining the fill portion of the pad and ditch length along topsoil stockpiles were added together for the ditch length design parameter. In order to provide additional capture volume and treatment, sediment traps are designed to be oversized when possible. The results of the sediment trap sizing are found in Table 8. Sediment trap sizing calculations can be found in Appendix J and typical sediment trap details are included in the Drainage and Erosion Control Plan found in Appendix A.

Table 8. Sediment Trap Sizing Design

Outlet	Minimum Design Area, ft^2	Recommended Design Size
ST1	400	20 ft x 20 ft (400 ft^2)
ST2	100	15 ft x 15 ft (225 ft^2)
ST3	380	20 ft x 20 ft (400 ft^2)

4.0 SITE MAINTENANCE AND UPKEEP

Kerr-McGee's site monitoring program ensures site conditions stay in compliance. Sedimentation, culvert and access road condition, vegetation health, and several other safety and maintenance items are routinely monitored and evaluated to ensure the site is in workable and drainable order.

In addition to monitoring during regular operations, a formal monitoring plan has been developed for the project site. During the construction phase, the site will be inspected a minimum of every 14 calendar days as well as following any rain or snowmelt events that are able to cause surface erosion. After the construction phase, areas not needed for production operations within the disturbance area will be reclaimed and site inspections will occur at a minimum of every 30 calendar days until the site is fully stabilized. Once the site is stabilized and has achieved interim reclamation standards, inspections will occur annually. More frequent, informal inspections will continue to occur during routine operations.

Routine maintenance and required repairs of access roads, culverts, ditches, berms, and the berm outlet structures will be handled by the operations team. Cleaning and removal of sediment and debris from ditches, culverts, and berm outlets as well as vegetation maintenance and specific manufacturer maintenance will also be handled by the operations team during regular operations and maintenance checks.

5.0 CONCLUSION

The information and analysis presented in this report display the adequacy and effectiveness of the design and planning associated with the McGavin 6-19HZ Drainage and Erosion Control Plan. The design protects public health, safety, and general welfare and has no adverse impacts on public rights-of-way or off-site properties. Furthermore, the report demonstrates that the design adheres to the Town of Firestone Municipal Code as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual.

6.0 REFERENCES

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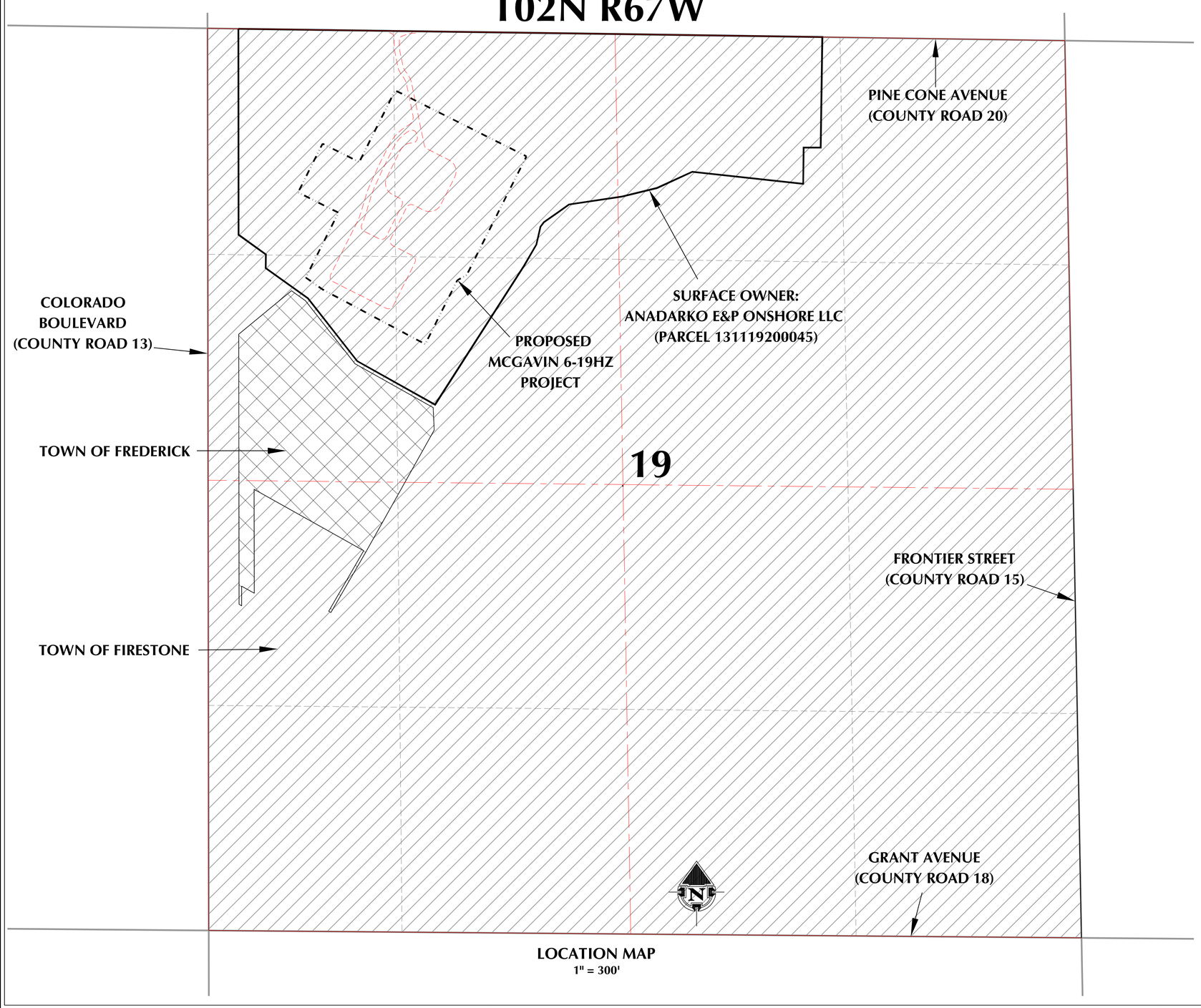
APPENDICES

Appendix A:

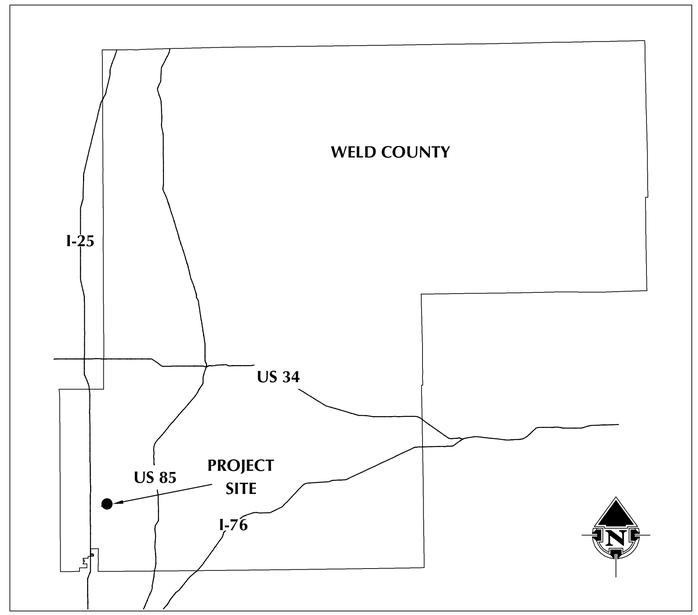
Drainage and Erosion Control Plan

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'



VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - FACILITY STORMWATER STORAGE
6 - WELL PAD STORMWATER STORAGE
7 - BMP TYPICALS (A)
8 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

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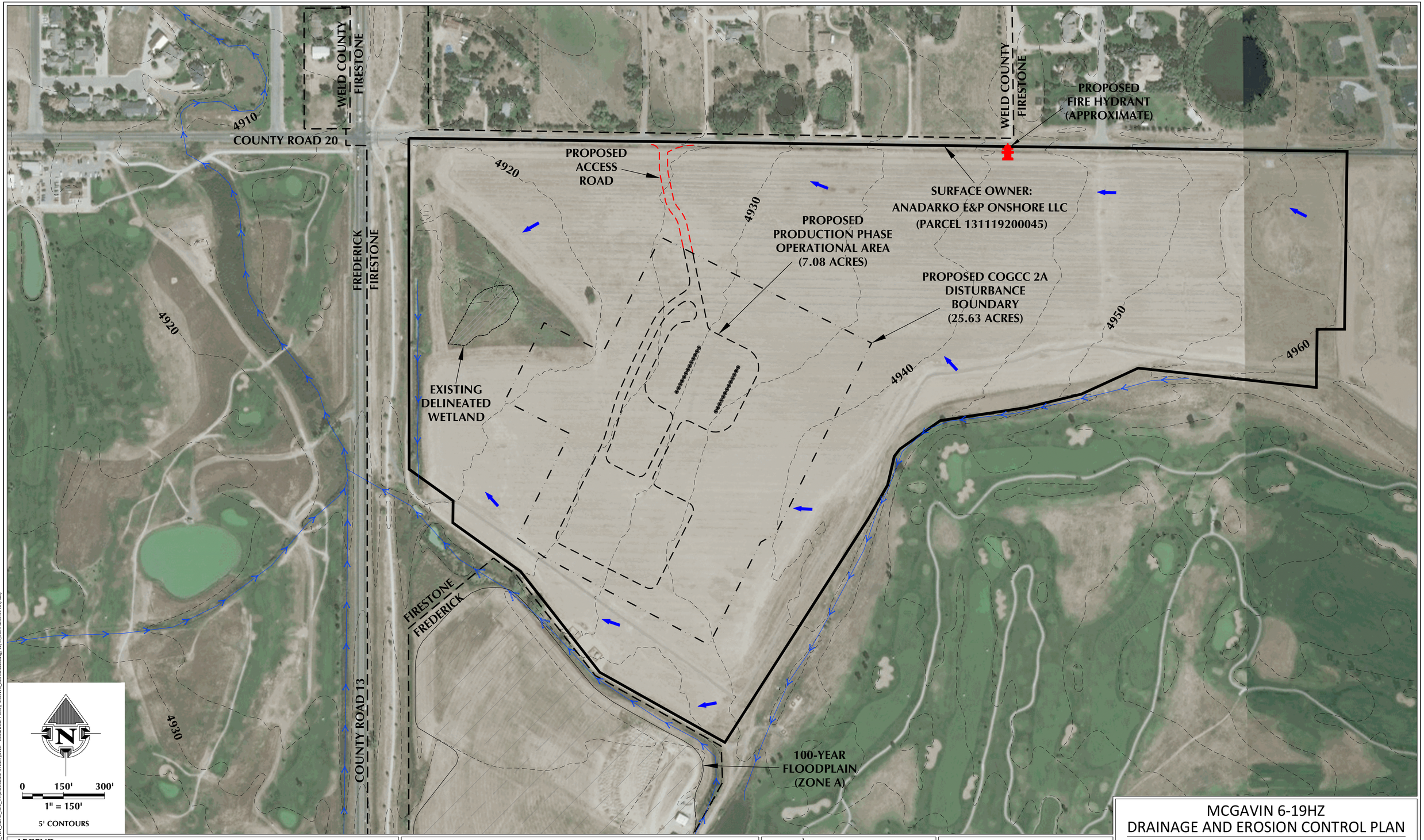
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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC2	12" CMP	30	4927.1	4927.0	0.3%
ARC3	12" CMP	30	4920.4	4920.2	0.7%
ARC4	12" CMP	30	4917.3	4916.9	1.3%
ARC5	12" CMP	30	4923.2	4922.9	1.0%

COUNTY ROAD 13
BIKE PATH
100-YEAR FLOODPLAIN (ZONE A)
EXISTING PRIVATE ROAD
DELINEATED WETLAND
15' X 15' X 3' SEDIMENT TRAP (ST2)
ACCESS ROAD CULVERT #4 (ARC4)
ACCESS ROAD CULVERT #3 (ARC3)
20' X 20' X 3' SEDIMENT TRAP (ST1)
ACCESS ROAD CULVERT #5 (ARC5)
20' X 20' X 3' SEDIMENT TRAP (ST3)
ACCESS ROAD CULVERT #1 (ARC1)
ACCESS ROAD CULVERT #2 (ARC2)
COUNTY ROAD 20
POWER POLE (TYP.)
OVERHEAD POWER LINE
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
MCGAVIN 6-19HZ MLVT
FLAT GRADED ELEVATION = 4919.3'
MCGAVIN 6-19HZ FACILITY
FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'
MCGAVIN 6-19HZ WELL PAD
FLAT GRADED ELEVATION = 4929.9'
TEMPORARY EQUIPMENT AREA
TOPSOIL STOCKPILE
4915
4920
4925
4930
4935
4940
1.1% DITCH SLOPE
1.8% DITCH SLOPE
2.0% DITCH SLOPE
1.2% DITCH SLOPE
1.3% DITCH SLOPE
1.4% DITCH SLOPE
0.5% DITCH SLOPE
0.5% SLOPE
1.0% SLOPE
0.8% SLOPE
0.6% SLOPE
CUT
FILL
SP

0 75' 150'
1" = 75'
1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

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2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 75'	PAGE:	3 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC6	12" CMP	30	4923.8	4922.9	3.0%

COUNTY ROAD 13

BIKE PATH

4915

DELINEATED WETLAND

4920

4920

EXISTING PRIVATE ROAD

100-YEAR FLOODPLAIN (ZONE A)

FACILITY WEIR & SPILLWAY

FACILITY OUTLET PIPE 4925

FACILITY STORAGE BERM

2-YEAR STORMWATER STORAGE FOOTPRINT

ACCESS ROAD CULVERT #6 (ARC6)

WELL PAD OUTLET PIPE

WELL PAD WEIR & SPILLWAY

WELL PAD STORAGE BERM

PROPOSED 6' MASONRY WALL

FILL

CUT

0.5% SLOPE

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ FACILITY

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'

0.8% SLOPE

0.5% SLOPE

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.9'

0.6% SLOPE

FILL

CUT

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ WELL PAD

WELL ELEVATION = 4929.9'

0.5% SLOPE

0.5% SLOPE

4930

4930

4930

4925

ACCESS ROAD CULVERT #1 (ARC1)

COUNTY ROAD 20

POWER POLE (TYP.)

OVERHEAD POWER LINE

4935

4935

4940

4940

PRODUCTION PHASE OPERATIONAL AREA (7.08 ACRES)

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

N

0 75' 150'

1" = 75'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

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2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

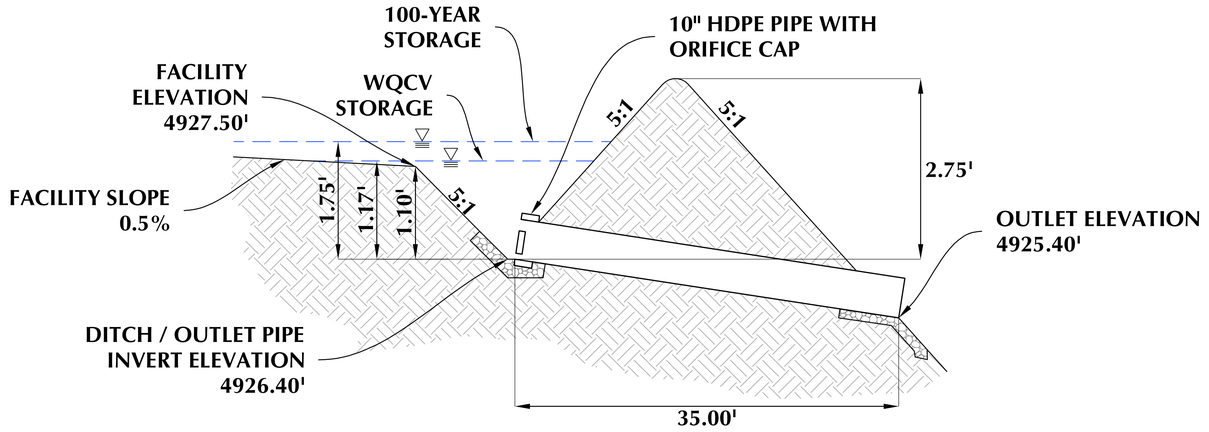
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DRAFTED BY:	HJL	REVISED:	12/10/21

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FACILITY STORMWATER STORAGE

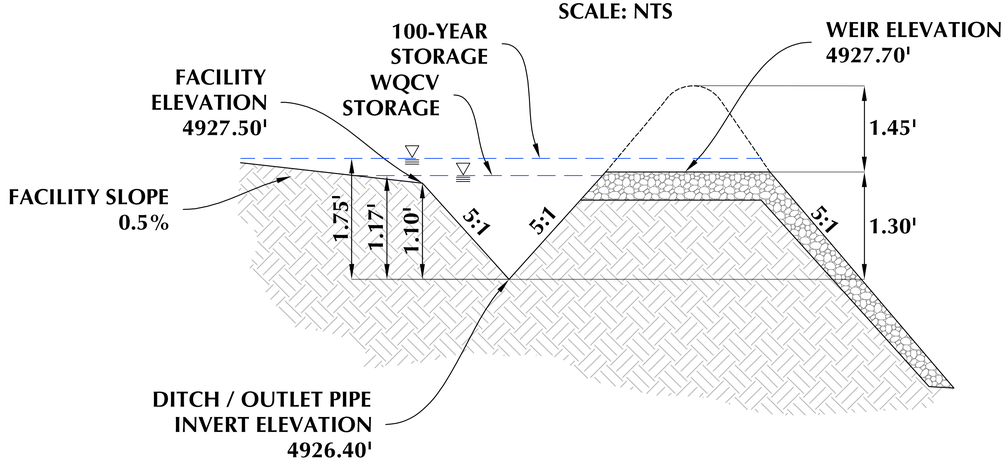
OUTLET PROFILE

SCALE: NTS



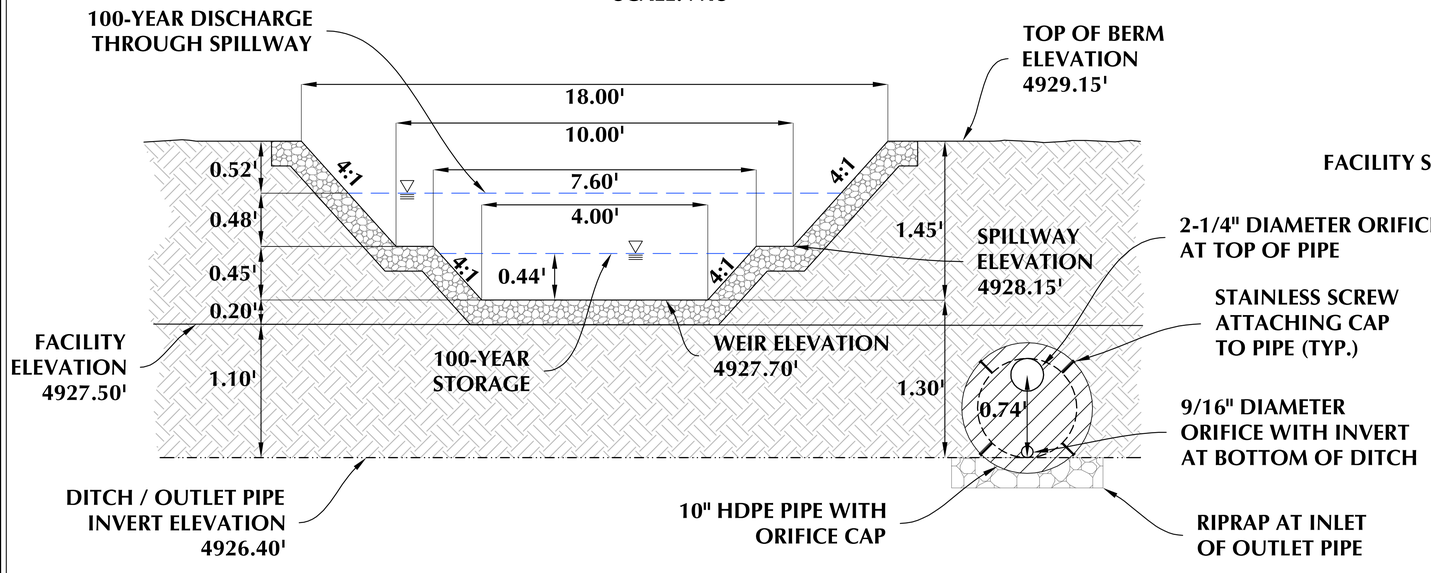
WEIR PROFILE

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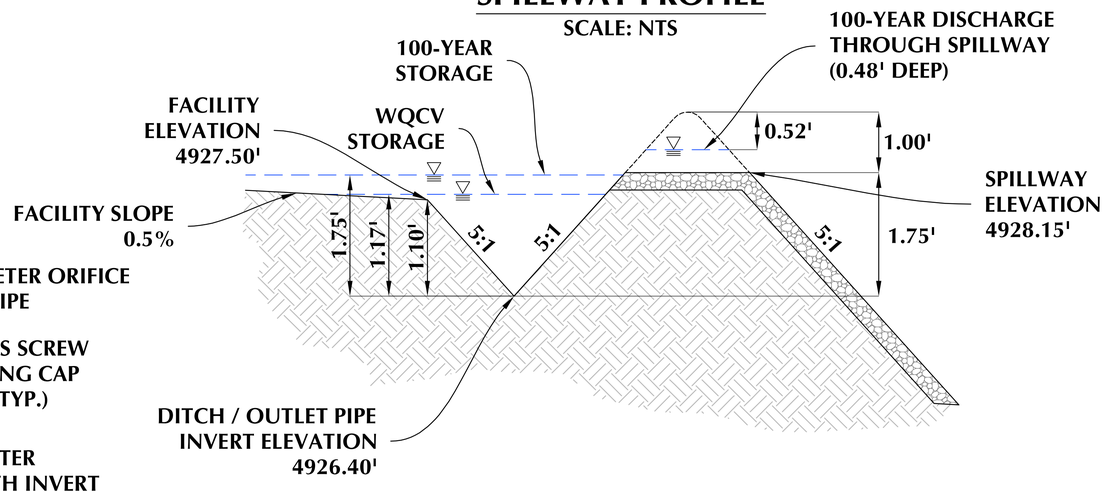
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
FACILITY STORMWATER STORAGE

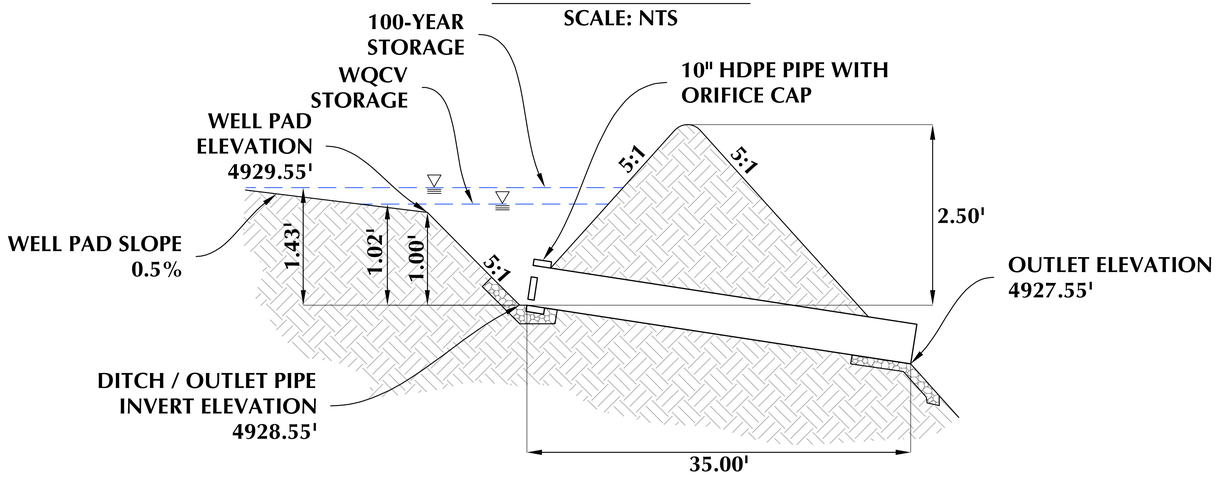
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WELL PAD STORMWATER STORAGE

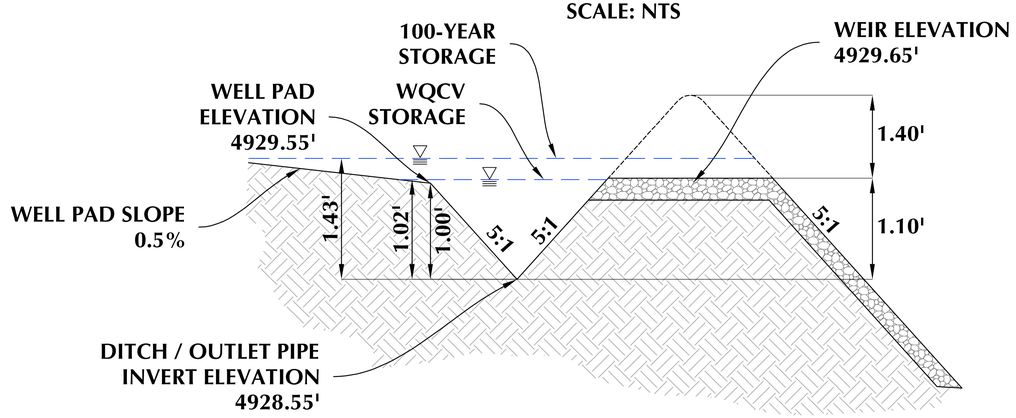
OUTLET PROFILE

SCALE: NTS



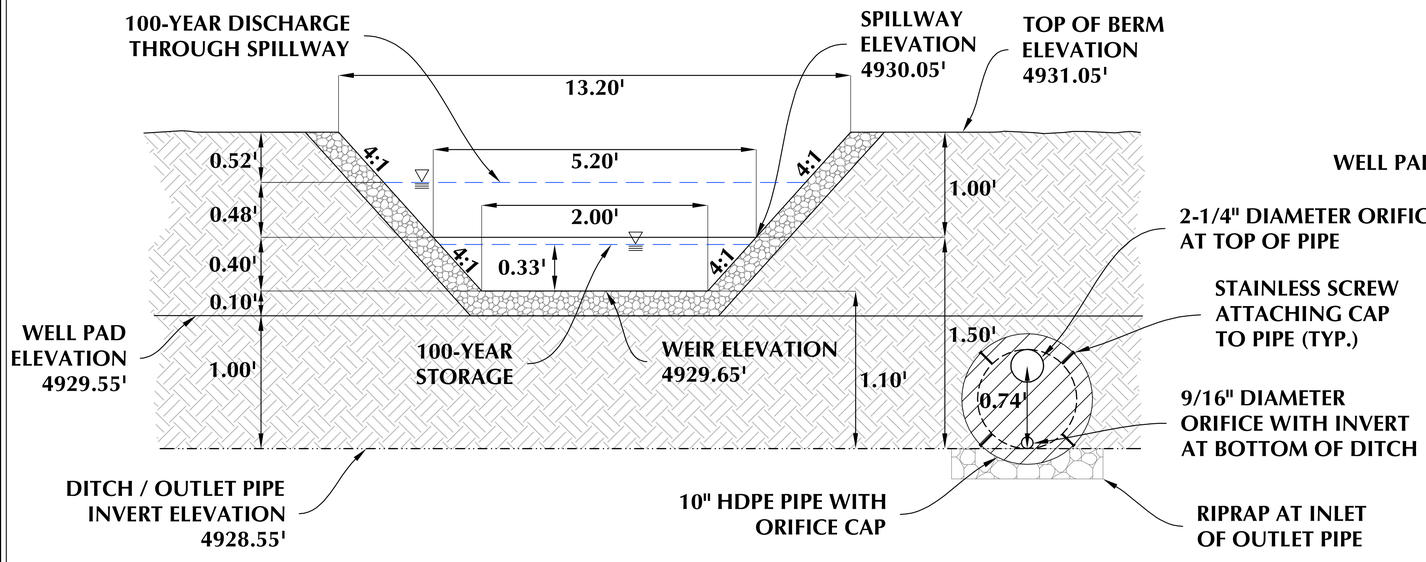
WEIR PROFILE

SCALE: NTS



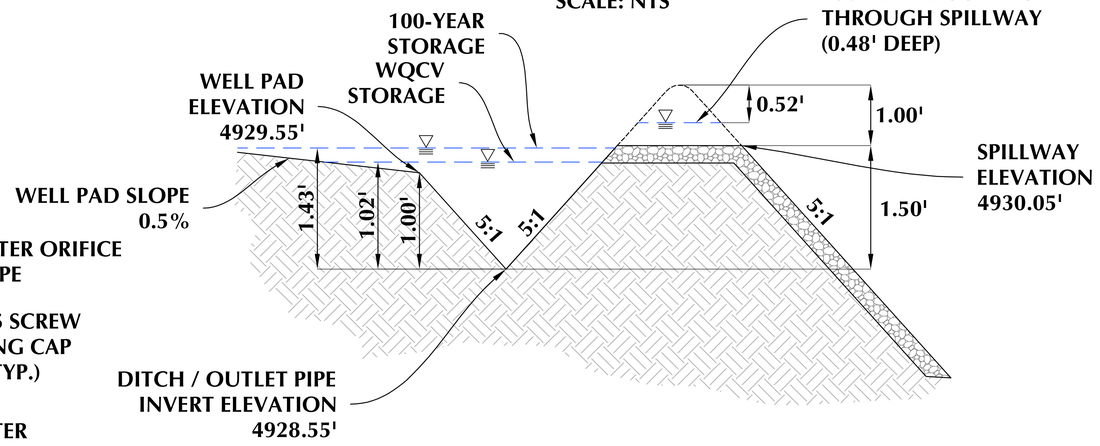
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

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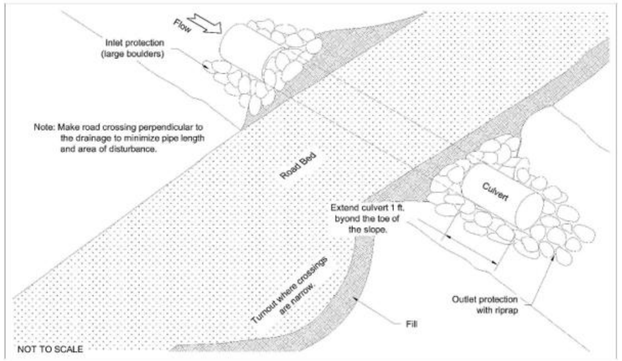
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Denver, Colorado 80202

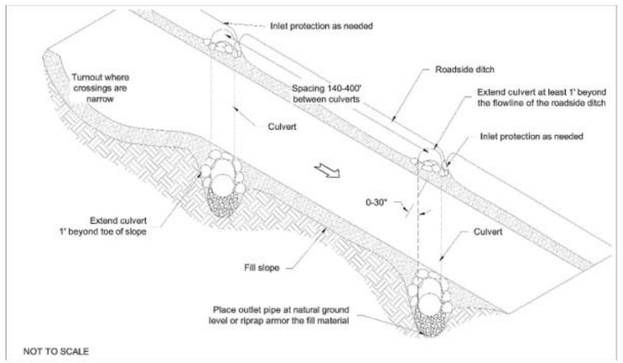
MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
WELL PAD STORMWATER STORAGE

SCALE:	VARIES	PAGE:	6 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	

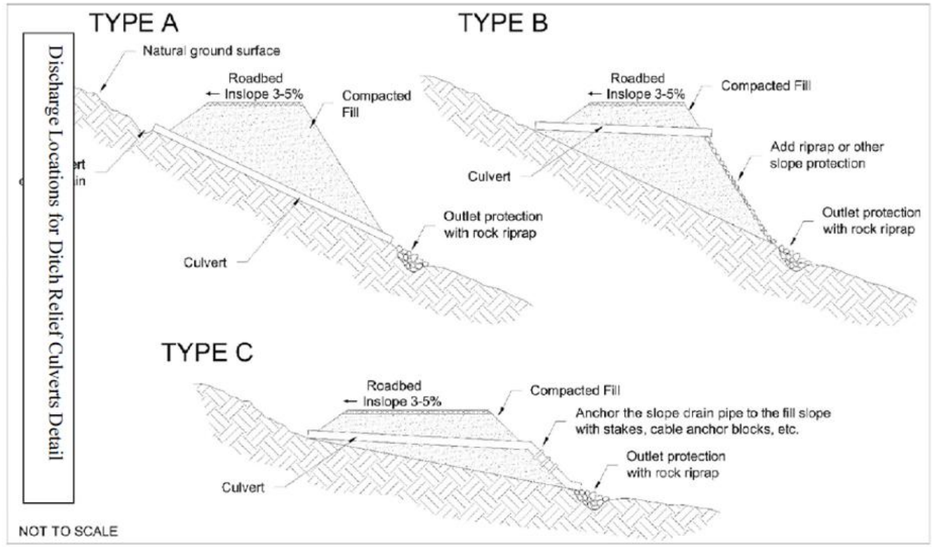
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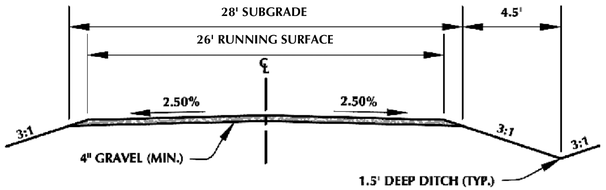
Culvert





Culvert

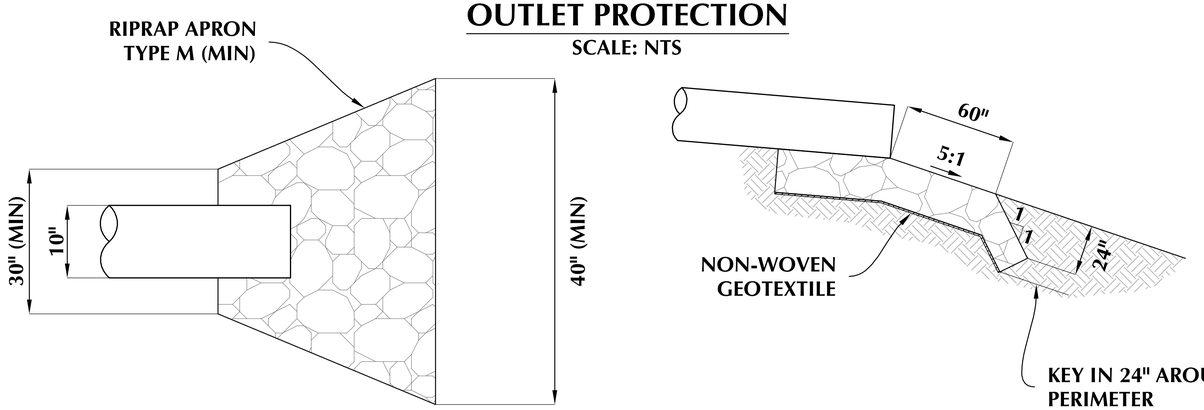




ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

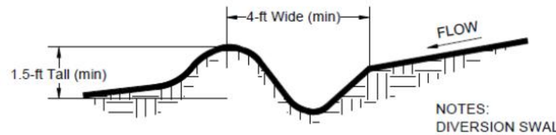
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Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

SCALE:	VARIES	PAGE:	7 OF 8
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Sediment Trap

ST

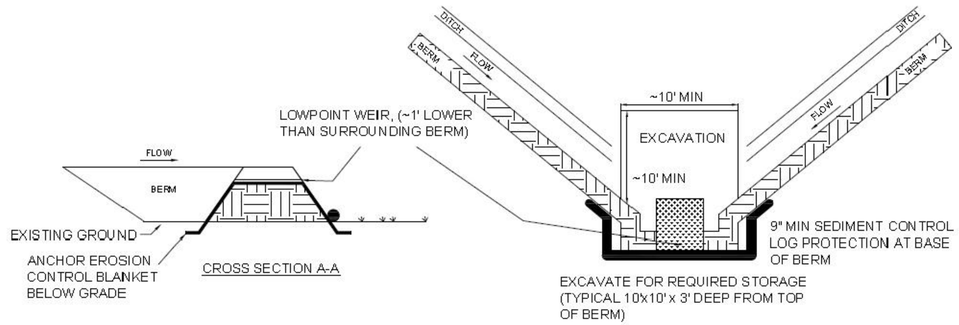
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

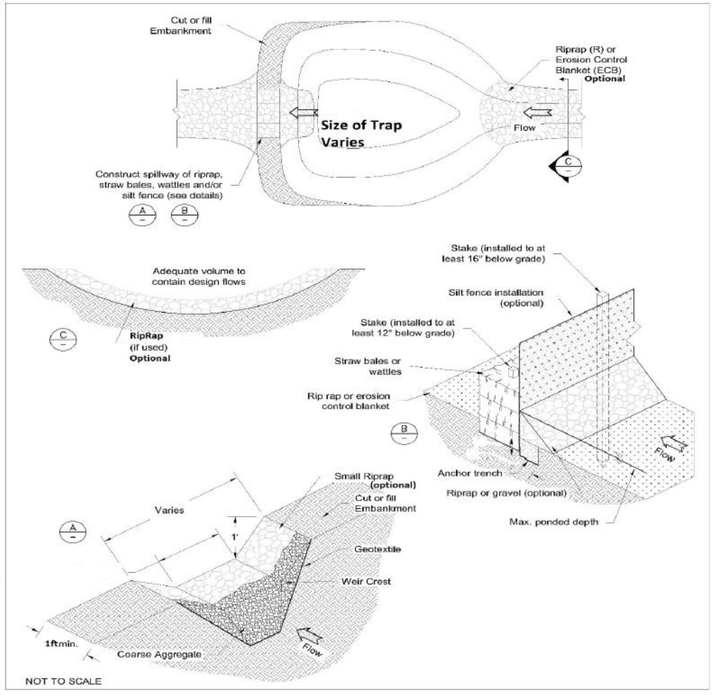
Sediment Trap

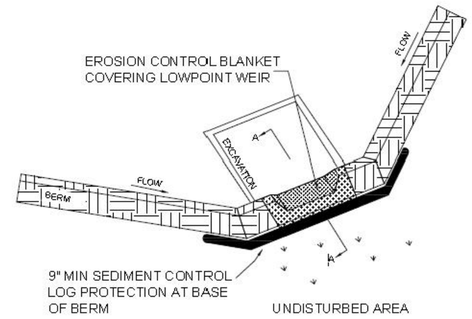
ST



Sediment Trap

ST





GENERAL NOTES:

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DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (B)

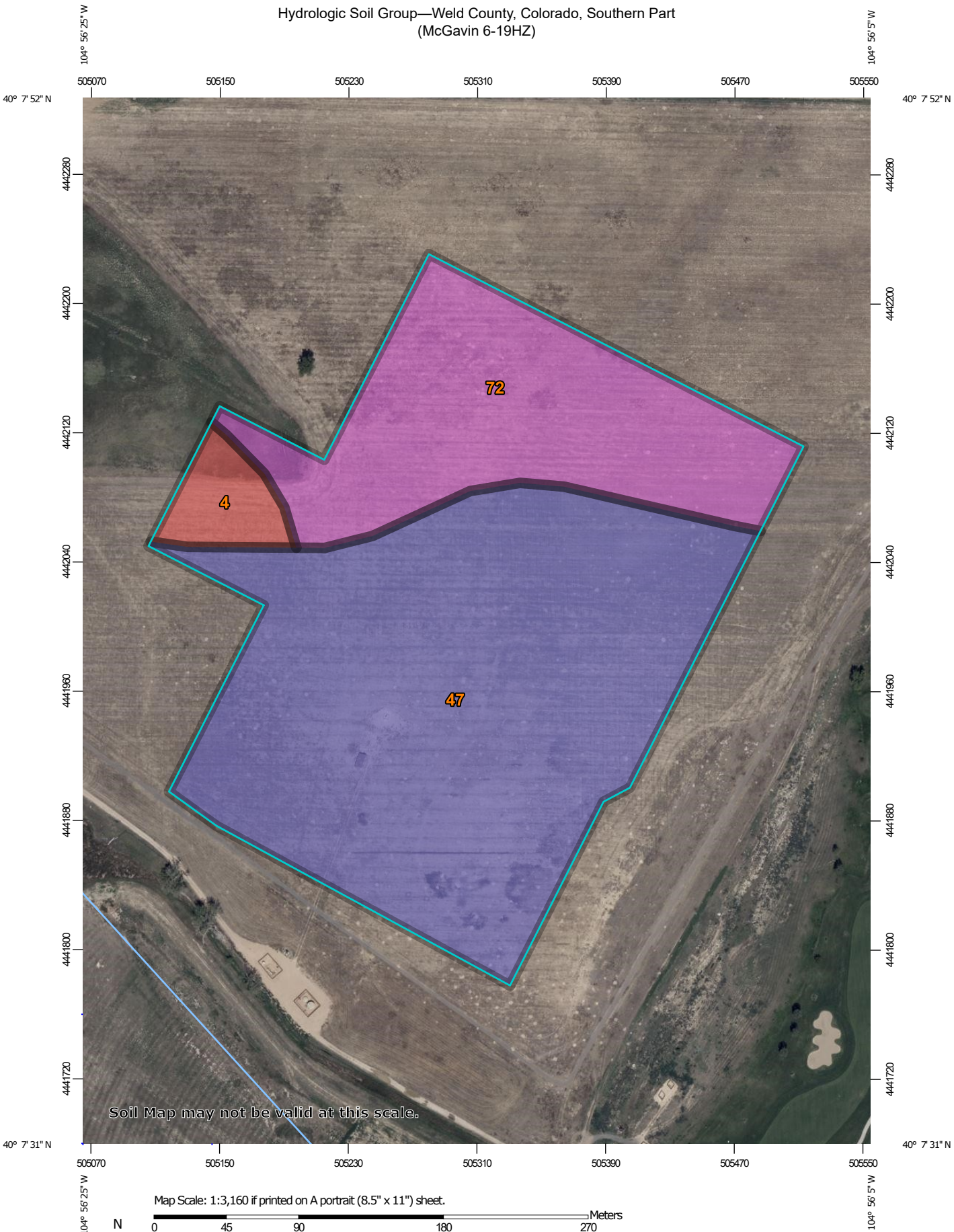
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JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	

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Appendix B:

NRCS Web Soil Survey – Soils Report

Hydrologic Soil Group—Weld County, Colorado, Southern Part
(McGavin 6-19HZ)



Map Scale: 1:3,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquolls and Aquepts, flooded	D	1.0	3.9%
47	Olney fine sandy loam, 1 to 3 percent slopes	B	16.9	66.0%
72	Vona loamy sand, 0 to 3 percent slopes	A	7.7	30.1%
Totals for Area of Interest			**25.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C:

FEMA Flood Insurance Rate Map FIRMette

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/5/2020 at 4:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D:

NOAA Atlas 14 Point Precipitation Frequency Estimates

NOAA Atlas 14, Volume 8, Version 2
Location name: Firestone, Colorado, USA*
Latitude: 40.129°, Longitude: -104.9379°
Elevation: 4926.92 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.229 (0.176-0.297)	0.278 (0.213-0.361)	0.374 (0.287-0.488)	0.469 (0.358-0.615)	0.623 (0.471-0.877)	0.759 (0.556-1.08)	0.911 (0.645-1.32)	1.08 (0.735-1.61)	1.33 (0.871-2.04)	1.54 (0.973-2.36)
10-min	0.335 (0.258-0.435)	0.406 (0.313-0.528)	0.547 (0.420-0.714)	0.687 (0.524-0.900)	0.912 (0.689-1.28)	1.11 (0.814-1.57)	1.33 (0.945-1.94)	1.58 (1.08-2.36)	1.95 (1.27-2.99)	2.25 (1.43-3.46)
15-min	0.408 (0.314-0.530)	0.496 (0.381-0.644)	0.668 (0.512-0.871)	0.838 (0.639-1.10)	1.11 (0.841-1.57)	1.36 (0.993-1.92)	1.63 (1.15-2.36)	1.93 (1.31-2.88)	2.38 (1.56-3.64)	2.75 (1.74-4.22)
30-min	0.554 (0.427-0.720)	0.671 (0.516-0.872)	0.901 (0.691-1.18)	1.13 (0.861-1.48)	1.50 (1.13-2.11)	1.83 (1.34-2.59)	2.19 (1.55-3.18)	2.60 (1.77-3.88)	3.20 (2.10-4.91)	3.70 (2.34-5.69)
60-min	0.677 (0.521-0.880)	0.820 (0.631-1.07)	1.10 (0.846-1.44)	1.39 (1.06-1.82)	1.84 (1.40-2.60)	2.25 (1.65-3.19)	2.71 (1.92-3.93)	3.22 (2.19-4.80)	3.97 (2.60-6.08)	4.59 (2.91-7.05)
2-hr	0.800 (0.623-1.03)	0.970 (0.754-1.25)	1.31 (1.01-1.68)	1.64 (1.27-2.13)	2.19 (1.67-3.05)	2.67 (1.98-3.74)	3.22 (2.31-4.61)	3.83 (2.63-5.64)	4.73 (3.13-7.15)	5.48 (3.50-8.29)
3-hr	0.868 (0.681-1.11)	1.05 (0.823-1.34)	1.41 (1.10-1.81)	1.77 (1.38-2.28)	2.36 (1.82-3.26)	2.88 (2.15-4.00)	3.47 (2.50-4.93)	4.13 (2.86-6.02)	5.09 (3.39-7.63)	5.90 (3.79-8.85)
6-hr	1.03 (0.817-1.30)	1.23 (0.977-1.55)	1.64 (1.29-2.06)	2.03 (1.60-2.58)	2.67 (2.08-3.63)	3.24 (2.45-4.43)	3.88 (2.83-5.43)	4.59 (3.21-6.60)	5.64 (3.79-8.32)	6.50 (4.23-9.61)
12-hr	1.27 (1.01-1.57)	1.50 (1.20-1.86)	1.94 (1.55-2.41)	2.37 (1.88-2.96)	3.05 (2.39-4.06)	3.64 (2.77-4.89)	4.30 (3.16-5.92)	5.03 (3.55-7.11)	6.10 (4.14-8.84)	6.98 (4.59-10.2)
24-hr	1.51 (1.23-1.85)	1.80 (1.46-2.21)	2.33 (1.88-2.86)	2.81 (2.26-3.47)	3.54 (2.78-4.60)	4.15 (3.18-5.45)	4.81 (3.57-6.48)	5.53 (3.93-7.65)	6.55 (4.49-9.32)	7.38 (4.90-10.6)
2-day	1.72 (1.42-2.08)	2.10 (1.72-2.54)	2.74 (2.24-3.33)	3.30 (2.68-4.01)	4.09 (3.23-5.19)	4.73 (3.64-6.07)	5.39 (4.02-7.09)	6.08 (4.35-8.23)	7.02 (4.85-9.78)	7.77 (5.22-11.0)
3-day	1.88 (1.55-2.25)	2.27 (1.87-2.72)	2.92 (2.40-3.51)	3.48 (2.85-4.21)	4.29 (3.41-5.39)	4.93 (3.83-6.28)	5.60 (4.20-7.31)	6.30 (4.54-8.45)	7.25 (5.03-10.0)	8.00 (5.41-11.2)
4-day	2.01 (1.67-2.39)	2.39 (1.98-2.85)	3.04 (2.52-3.64)	3.61 (2.97-4.33)	4.41 (3.53-5.51)	5.06 (3.95-6.40)	5.74 (4.33-7.44)	6.44 (4.67-8.59)	7.41 (5.17-10.2)	8.17 (5.55-11.3)
7-day	2.31 (1.93-2.71)	2.70 (2.27-3.19)	3.38 (2.82-3.99)	3.96 (3.28-4.70)	4.78 (3.85-5.89)	5.44 (4.28-6.79)	6.12 (4.66-7.83)	6.83 (5.00-8.98)	7.80 (5.49-10.6)	8.56 (5.87-11.7)
10-day	2.56 (2.16-2.99)	2.98 (2.51-3.49)	3.68 (3.09-4.32)	4.28 (3.58-5.04)	5.12 (4.15-6.25)	5.79 (4.59-7.17)	6.48 (4.96-8.22)	7.19 (5.29-9.37)	8.16 (5.77-10.9)	8.90 (6.14-12.1)
20-day	3.28 (2.80-3.78)	3.76 (3.21-4.34)	4.55 (3.87-5.26)	5.21 (4.41-6.05)	6.13 (5.01-7.34)	6.84 (5.47-8.31)	7.55 (5.85-9.40)	8.29 (6.16-10.6)	9.26 (6.62-12.2)	10.0 (6.98-13.4)
30-day	3.85 (3.31-4.40)	4.40 (3.78-5.03)	5.29 (4.53-6.07)	6.02 (5.13-6.94)	7.03 (5.79-8.33)	7.80 (6.28-9.37)	8.56 (6.67-10.5)	9.33 (6.98-11.8)	10.3 (7.44-13.5)	11.1 (7.80-14.7)
45-day	4.53 (3.93-5.14)	5.19 (4.50-5.89)	6.25 (5.39-7.11)	7.11 (6.10-8.12)	8.26 (6.84-9.68)	9.13 (7.39-10.9)	9.98 (7.81-12.2)	10.8 (8.13-13.5)	11.9 (8.61-15.3)	12.7 (8.97-16.6)
60-day	5.09 (4.44-5.74)	5.86 (5.10-6.61)	7.09 (6.15-8.02)	8.07 (6.96-9.16)	9.38 (7.79-10.9)	10.3 (8.41-12.2)	11.3 (8.87-13.6)	12.2 (9.20-15.1)	13.3 (9.70-17.0)	14.2 (10.1-18.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

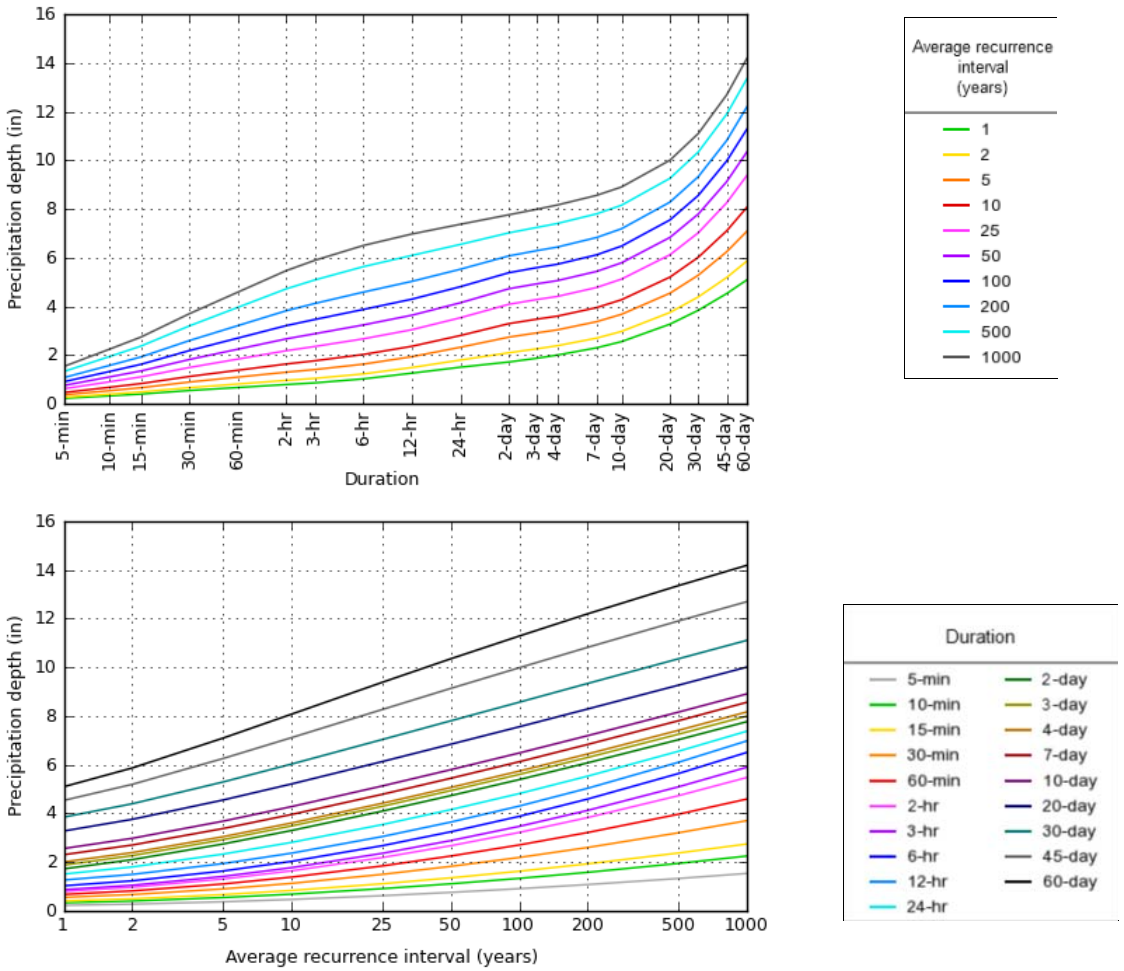
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.1290°, Longitude: -104.9379°

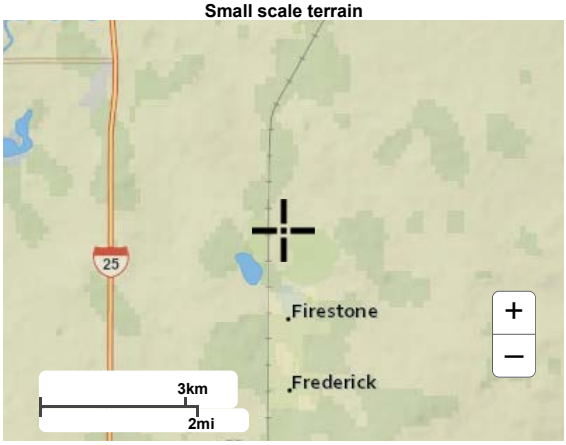


NOAA Atlas 14, Volume 8, Version 2 Created (GMT): Mon Oct 5 20:55:42 2020

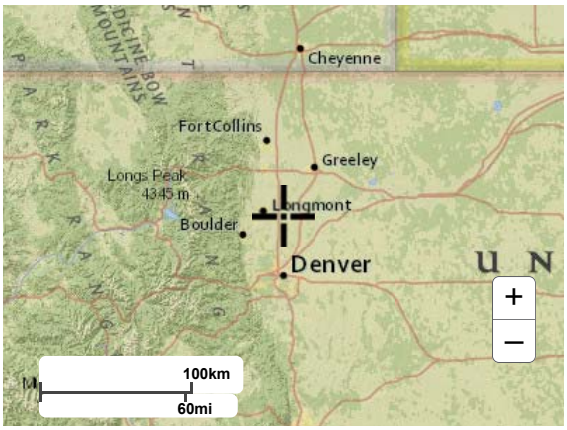
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Maps & aerials

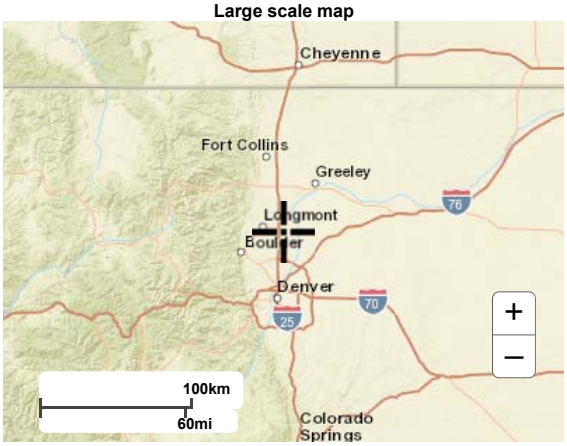
Small scale terrain



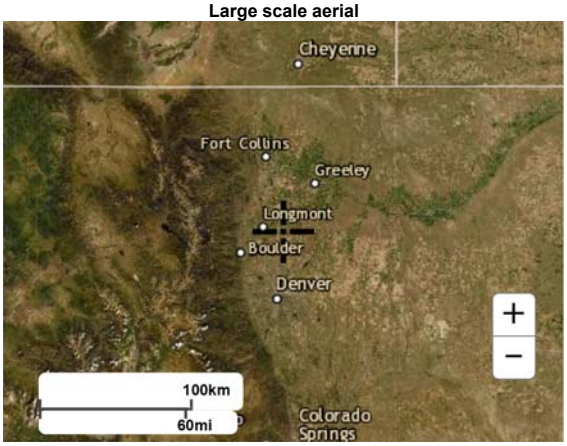
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix E:

UD-Rational Spreadsheet Inputs and Results

Calculation of Peak Runoff using Rational Method

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$ = 5 (urban)
$t_{minimum}$ = 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.820	1.10	1.39	1.84	2.25	2.71	3.97
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

$$I(in/hr) = \frac{a + P_1}{(b + t_c)^c}$$

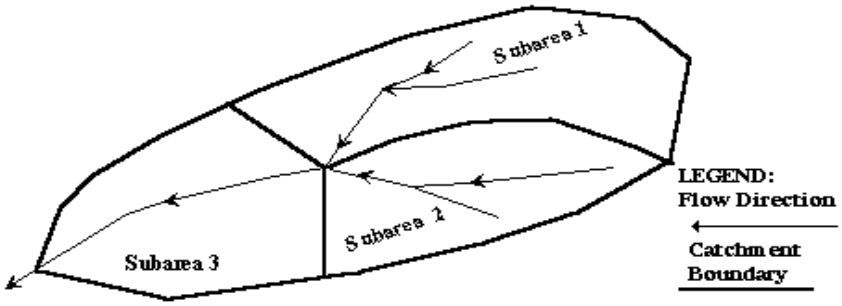
$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time				Channelized (Travel) Flow Time						Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_t (ft/ft)	Overland Flow Time t_t (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Disturbance Boundary - Historical	25.63	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54	500			0.024	32.90								32.90	25.66	25.66	1.4	1.9	2.4	3.2	3.9	4.7	6.8	0.3	0.6	4.5	21.2	33.6	51.9	94.9
				0.01	0.01	0.06	0.19	0.25	0.34	0.46					32.91								32.91		32.91	1.2	1.6	2.1	2.7	3.3	4.0	5.9	0.2	0.5	3.0	13.2	21.6	35.5	69.8
ARC1 - CON	46.63	A	2.7	0.01	0.01	0.01	0.02	0.05	0.13	0.27	500			0.021	34.49	2600			0.017	7	0.91	47.48	81.97	60.98	60.98	0.8	1.1	1.4	1.8	2.2	2.7	4.0	0.3	0.4	0.7	1.3	5.0	16.6	50.2
				0.01	0.01	0.03	0.06	0.10	0.19	0.32					34.36								81.84		81.84	0.7	0.9	1.1	1.5	1.8	2.2	3.2	0.3	0.5	1.4	4.5	8.9	19.5	48.8
ARC1 - PRO	50.92	A	2.7	0.01	0.01	0.01	0.02	0.05	0.13	0.27	500			0.021	34.49	2800			0.017	7	0.91	51.13	85.62	63.71	63.71	0.8	1.1	1.3	1.8	2.2	2.6	3.9	0.3	0.5	0.7	1.4	5.3	17.5	53.2
				0.01	0.01	0.02	0.06	0.10	0.19	0.32					34.38								85.51		85.51	0.6	0.9	1.1	1.5	1.8	2.1	3.1	0.4	0.5	1.4	4.6	9.3	20.5	51.5
ARC2 - CON	1.27	A	2.4	0.01	0.01	0.01	0.01	0.05	0.13	0.27	80			0.020	14.04	1000			0.014	10	1.18	14.09	28.12	40.68	28.12	1.3	1.8	2.3	3.0	3.7	4.4	6.5	0.0	0.0	0.0	0.1	0.2	0.7	2.2
				0.01	0.01	0.03	0.09	0.13	0.22	0.35					13.98								28.07		28.07	1.3	1.8	2.3	3.0	3.7	4.4	6.5	0.0	0.0	0.1	0.3	0.6	1.2	2.9
ARC3 - CON	9.58	A	29.0	0.17	0.18	0.19	0.22	0.27	0.34	0.44	300			0.005	36.27	1580			0.013	10	1.14	23.10	59.36	38.75	38.75	1.1	1.5	1.9	2.5	3.0	3.6	5.3	1.8	2.5	3.4	5.2	7.9	11.7	22.5
				0.19	0.20	0.23	0.28	0.33	0.40	0.50					35.30								58.40										2.0	2.9	4.1	6.7	9.7	13.9	25.4
ARC4 - CON	2.24	D	25.9	0.18	0.25	0.32	0.46	0.52	0.59	0.67	200			0.005	27.41	300			0.005	10	0.71	7.07	34.48	27.20	27.20	1.4	1.8	2.3	3.1	3.7	4.5	6.6	0.6	1.0	1.7	3.2	4.4	5.9	9.9
				0.18	0.21	0.26	0.36	0.42	0.48	0.58					28.43								35.50										0.6	0.9	1.4	2.5	3.5	4.9	8.5
ARC5 - CON	4.88	B	31.6	0.22	0.24	0.31	0.45	0.50	0.57	0.65	300			0.005	33.62	640			0.006	10	0.77	13.77	47.39	30.89	30.89	1.3	1.7	2.1	2.8	3.5	4.2	6.1	1.3	2.0	3.3	6.2	8.5	11.7	19.5
				0.22	0.25	0.31	0.43	0.49	0.56	0.64					33.56								47.33										1.4	2.0	3.2	6.0	8.3	11.4	19.1
ARC6 - PRO	2.03	B	11.8	0.07	0.08	0.15	0.32	0.39	0.48	0.58	180			0.039	15.71	650			0.015	7	0.86	12.64	28.35	32.30	28.35	1.3	1.8	2.3	3.0	3.6	4.4	6.4	0.2	0.3	0.7	2.0	2.9	4.3	7.6
				0.07	0.08	0.12	0.24	0.30	0.38	0.49					15.77								28.40		28.40	1.3	1.8	2.3	3.0	3.6	4.4	6.4	0.2	0.3	0.6	1.5	2.2	3.4	6.4
ST1 - CON	9.08	A	29.4	0.17	0.18	0.19	0.22	0.28	0.34	0.44	300			0.005	36.14	360			0.005	10	0.71	8.49	44.63	27.47	27.47	1.4	1.8	2.3	3.0	3.7	4.5	6.6	2.1	3.0	4.0	6.2	9.3	13.8	26.4
				0.19	0.21	0.23	0.29	0.34	0.41	0.50					35.15								43.64										2.4	3.4	4.8	8.1	11.5	16.5	30.0
ST2 - CON	1.89	D	27.0	0.19	0.26	0.33	0.47	0.53	0.59	0.67	200			0.005	27.12	100			0.005	10	0.71	2.36	29.48	23.25	23.25	1.5	2.0	2.5	3.3	4.1	4.9	7.2	0.5	1.0	1.6	3.0	4.1	5.5	9.2
				0.19	0.22	0.27	0.38	0.43	0.50	0.59					28.19								30.55										0.5	0.8	1.3	2.4	3.3	4.6	8.0
ST3 - CON	13.07	B	25.6	0.17	0.19	0.26	0.41	0.47	0.55	0.63	300			0.005	35.59	980			0.012	10	1.10	14.91	50.50	33.50	33.50	1.20	1.62	2.04	2.70	3.31	3.98	5.83	2.7	4.1	7.0	14.5	20.3	28.4	48.0
				0.18	0.20	0.26	0.40	0.47	0.54	0.62					35.39								50.30										2.8	4.2	7.0	14.3	20.1	28.1	47.6
FS - PRO	4.95	B	24.0	0.16	0.18	0.25	0.40	0.46	0.54	0.62	230			0.005	31.62	600			0.005	7	0.49	20.20	51.82	33.36	33.36	1.21	1.62	2.05	2.71	3.31	3.99	5.85	0.9	1.5	2.5	5.4	7.6	10.6	18.1
				0.17	0.19	0.25	0.40	0.46	0.54	0.62					31.40								51.60										1.0	1.5	2.5	5.4	7.6	10.6	18.0
WPS - PRO	3.86	B	26.9	0.18	0.21	0.27	0.42	0.48	0.55	0.63	165			0.005	26.08	450			0.005	7	0.49	15.15	41.23	29.74	29.74	1.29	1.73	2.19	2.90	3.55	4.27	6.26	0.9	1.4	2.3	4.7	6.5	9.1	15.3
				0.18	0.20	0.24	0.35	0.41	0.48	0.57					26.29								41.44										0.9	1.3	2.1	3.9	5.6	7.9	13.8

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
DB-Historical

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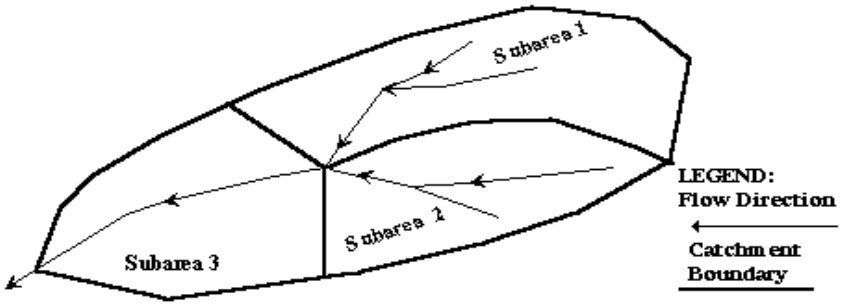
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
4	1.01	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
47	16.90	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
72	7.72	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	25.63		Area-Weighted C	0.01	0.01	0.06	0.19	0.25	0.34	0.46
			Area-Weighted Override C	0.01	0.01	0.06	0.19	0.25	0.34	0.46

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



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Subcatchment Name
ARC1 - CON

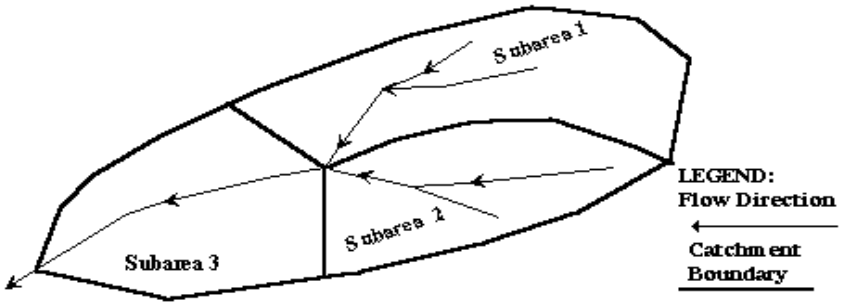
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
D	0.15	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.55	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	7.79	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
A	0.55	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	37.40	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**46.63**		**Area-Weighted C**	**0.01**	**0.01**	**0.03**	**0.06**	**0.10**	**0.19**	**0.32**
			Area-Weighted Override C	**0.01**	**0.01**	**0.03**	**0.06**	**0.10**	**0.19**	**0.32**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC1 - PRO

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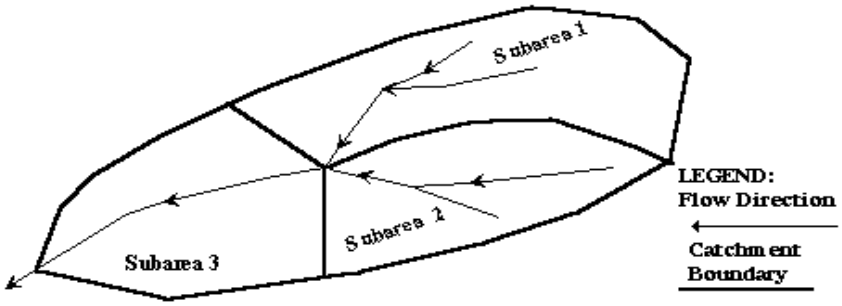
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.80	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	40.86	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	9.07	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	50.92		Area-Weighted C	0.01	0.01	0.02	0.06	0.10	0.19	0.32
			Area-Weighted Override C	0.01	0.01	0.02	0.06	0.10	0.19	0.32

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC2

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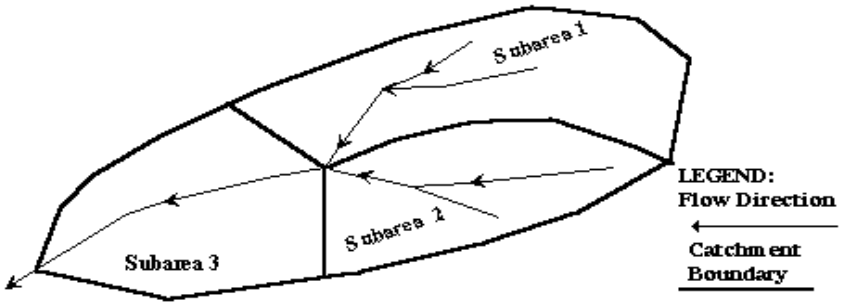
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.02	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.88	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.37	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	**1.27**		**Area-Weighted C**	**0.01**	**0.01**	**0.03**	**0.09**	**0.13**	**0.22**	**0.35**
			Area-Weighted Override C	**0.01**	**0.01**	**0.03**	**0.09**	**0.13**	**0.22**	**0.35**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC3

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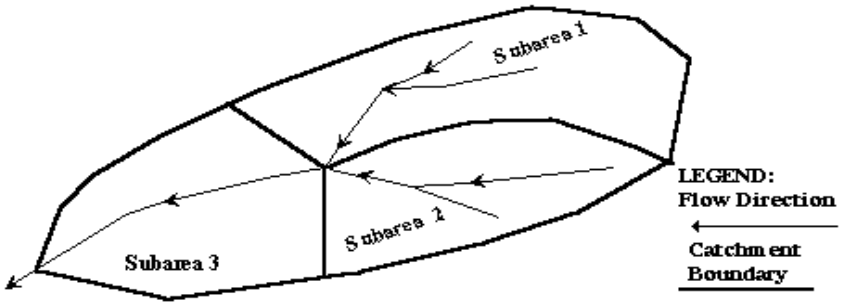
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	4.86	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	2.00	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.94	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.78	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	9.58		Area-Weighted C	0.19	0.20	0.23	0.28	0.33	0.40	0.50
			Area-Weighted Override C	0.19	0.20	0.23	0.28	0.33	0.40	0.50

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC4

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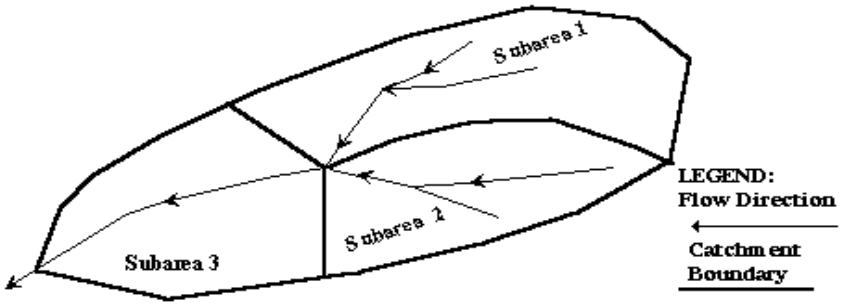
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.39	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.35	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.25	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.20	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
D	0.77	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.28	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
Total Area (ac)	**2.24**		**Area-Weighted C**	**0.18**	**0.21**	**0.26**	**0.36**	**0.42**	**0.48**	**0.58**
			Area-Weighted Override C	**0.18**	**0.21**	**0.26**	**0.36**	**0.42**	**0.48**	**0.58**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC5

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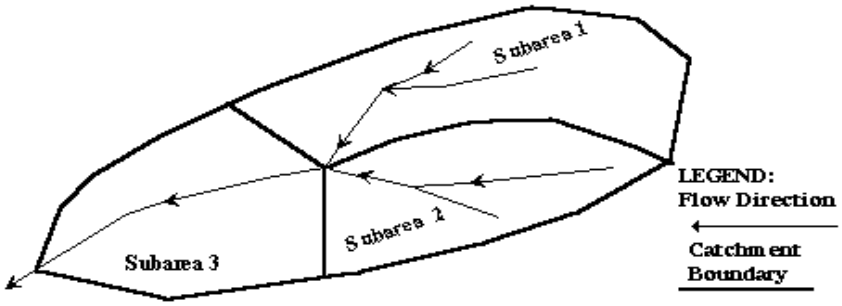
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.33	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.02	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	3.48	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.05	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	4.88		Area-Weighted C	0.22	0.25	0.31	0.43	0.49	0.56	0.64
			Area-Weighted Override C	0.22	0.25	0.31	0.43	0.49	0.56	0.64

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC6

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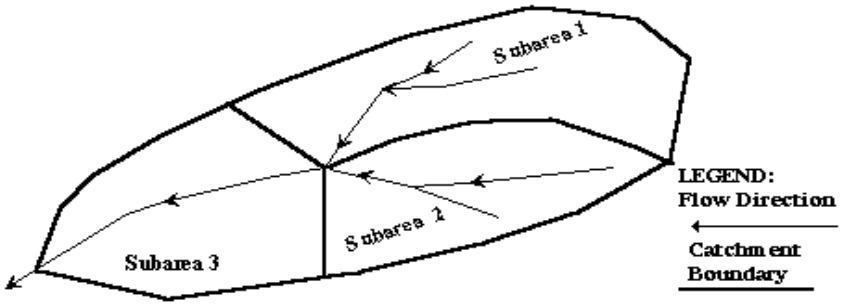
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.30	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.44	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.21	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.08	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	2.03		Area-Weighted C	0.07	0.08	0.12	0.24	0.30	0.38	0.49
			Area-Weighted Override C	0.07	0.08	0.12	0.24	0.30	0.38	0.49

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

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Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST1

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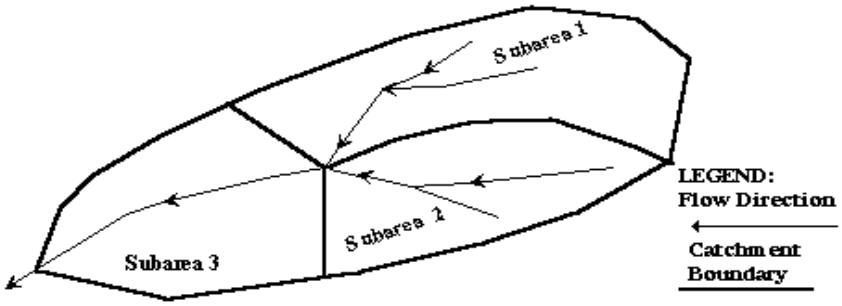
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	4.62	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	1.74	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.94	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.78	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	9.08		Area-Weighted C	0.19	0.21	0.23	0.29	0.34	0.41	0.50
			Area-Weighted Override C	0.19	0.21	0.23	0.29	0.34	0.41	0.50

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST2

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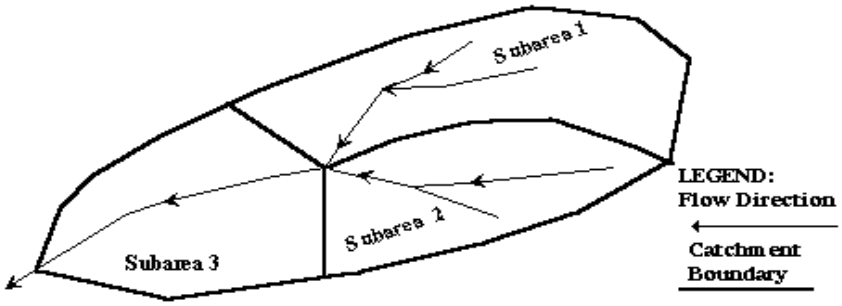
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.29	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.27	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.20	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
D	0.74	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.20	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
Total Area (ac)	**1.89**		**Area-Weighted C**	**0.19**	**0.22**	**0.27**	**0.38**	**0.43**	**0.50**	**0.59**
			Area-Weighted Override C	**0.19**	**0.22**	**0.27**	**0.38**	**0.43**	**0.50**	**0.59**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST3

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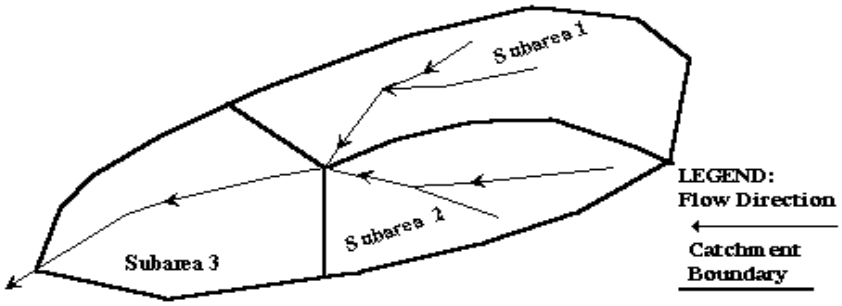
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.33	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.02	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	7.78	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	4.94	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	13.07		Area-Weighted C	0.18	0.20	0.26	0.40	0.47	0.54	0.62
			Area-Weighted Override C	0.18	0.20	0.26	0.40	0.47	0.54	0.62

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
FS

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

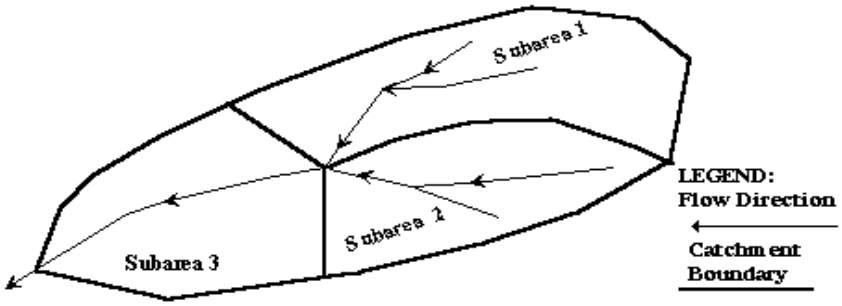
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
B	2.86	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	2.09	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	4.95		Area-Weighted C	0.17	0.19	0.25	0.40	0.46	0.54	0.62
			Area-Weighted Override C	0.17	0.19	0.25	0.40	0.46	0.54	0.62

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
WPS

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	1.02	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.26	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.51	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.07	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	3.86		Area-Weighted C	0.18	0.20	0.24	0.35	0.41	0.48	0.57
			Area-Weighted Override C	0.18	0.20	0.24	0.35	0.41	0.48	0.57

Appendix F:

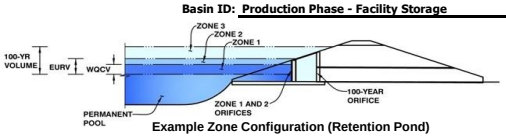
MHFD-Detention Spreadsheet Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Facility Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	4.95	acres
Watershed Length =	600	ft
Watershed Length to Centroid =	230	ft
Watershed Slope =	0.005	ft/ft
Watershed Imperviousness =	24.0%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.054	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.120	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.056	acre-feet	0.820	inches
5-yr Runoff Volume (P1 = 1.1 in.) =	0.092	acre-feet	1.10	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.173	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.374	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.534	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	0.746	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.97 in.) =	1.273	acre-feet	3.97	inches
Approximate 2-yr Detention Volume =	0.058	acre-feet		
Approximate 5-yr Detention Volume =	0.090	acre-feet		
Approximate 10-yr Detention Volume =	0.149	acre-feet		
Approximate 25-yr Detention Volume =	0.207	acre-feet		
Approximate 50-yr Detention Volume =	0.238	acre-feet		
Approximate 100-yr Detention Volume =	0.309	acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

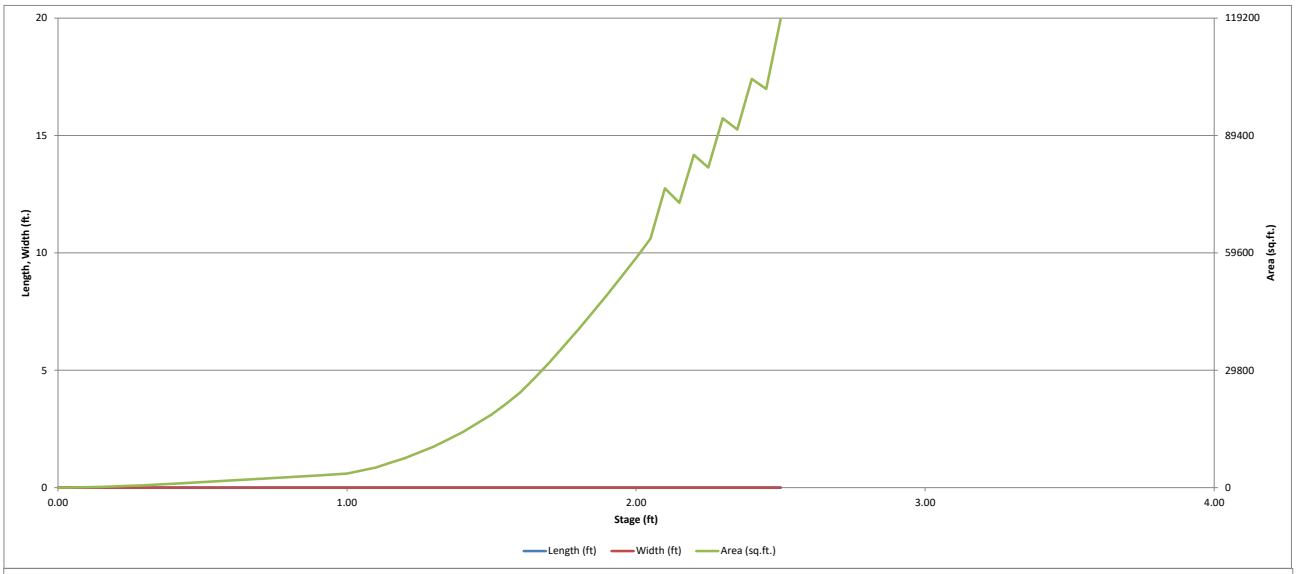
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

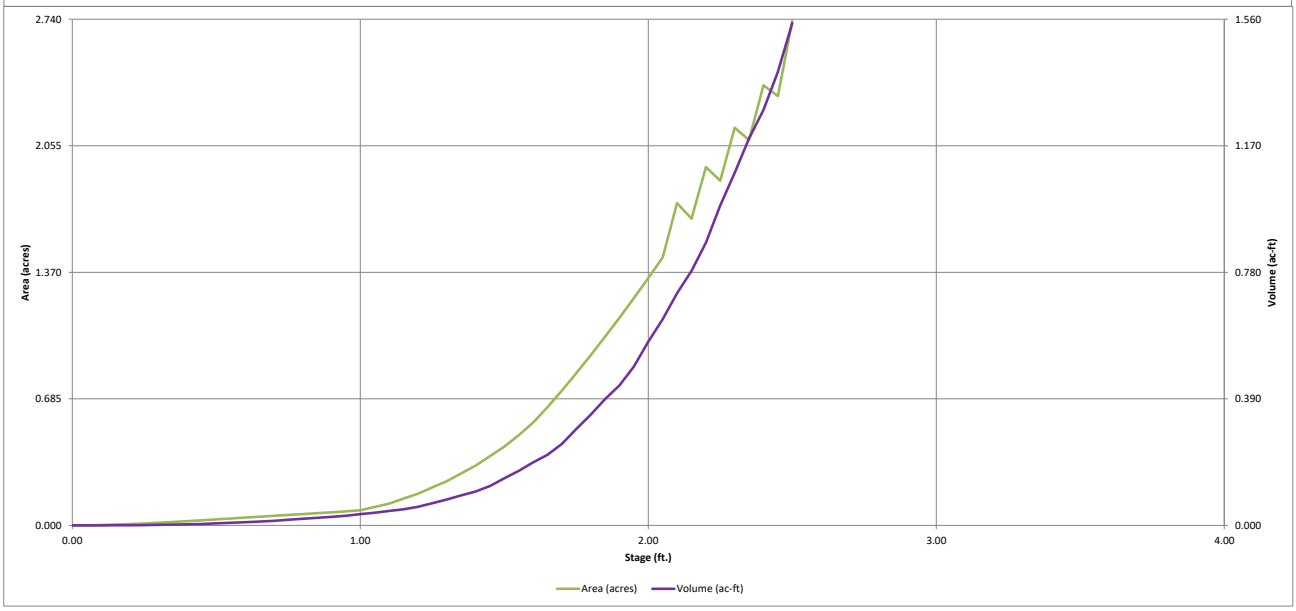
Depth Increment = 0.10 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	40	0.001	1	0.000
	--	0.10	--	--	--	104	0.002	5	0.000
	--	0.15	--	--	--	196	0.004	10	0.000
	--	0.20	--	--	--	309	0.007	22	0.000
	--	0.25	--	--	--	450	0.010	44	0.001
	--	0.30	--	--	--	612	0.014	70	0.002
	--	0.35	--	--	--	797	0.018	105	0.002
	--	0.40	--	--	--	995	0.023	141	0.003
	--	0.45	--	--	--	1,210	0.028	194	0.004
	--	0.50	--	--	--	1,416	0.032	271	0.006
	--	0.55	--	--	--	1,631	0.037	347	0.008
	--	0.60	--	--	--	1,836	0.042	434	0.010
	--	0.65	--	--	--	2,051	0.047	511	0.012
	--	0.70	--	--	--	2,256	0.052	616	0.014
	--	0.75	--	--	--	2,472	0.057	757	0.017
	--	0.80	--	--	--	2,677	0.061	886	0.020
	--	0.85	--	--	--	2,892	0.066	1,025	0.024
	--	0.90	--	--	--	3,098	0.071	1,144	0.026
	--	0.95	--	--	--	3,313	0.076	1,302	0.030
	--	1.00	--	--	--	3,572	0.082	1,507	0.035
	--	1.05	--	--	--	4,342	0.100	1,705	0.039
Edge of Facility	--	1.10	--	--	--	5,128	0.118	1,942	0.045
	--	1.15	--	--	--	6,321	0.145	2,166	0.050
	--	1.20	--	--	--	7,471	0.172	2,499	0.057
	--	1.25	--	--	--	8,956	0.206	2,983	0.068
	--	1.30	--	--	--	10,410	0.239	3,467	0.080
	--	1.35	--	--	--	12,255	0.281	4,034	0.093
	--	1.40	--	--	--	14,086	0.323	4,553	0.105
	--	1.45	--	--	--	16,327	0.375	5,292	0.121
	--	1.50	--	--	--	18,560	0.426	6,325	0.145
	--	1.55	--	--	--	21,257	0.488	7,320	0.168
	--	1.60	--	--	--	24,223	0.556	8,457	0.194
	--	1.65	--	--	--	27,883	0.640	9,485	0.218
	--	1.70	--	--	--	31,776	0.729	10,938	0.251
	--	1.75	--	--	--	35,909	0.824	12,943	0.297
	--	1.80	--	--	--	40,105	0.921	14,844	0.341
	--	1.85	--	--	--	44,506	1.022	16,959	0.389
	--	1.90	--	--	--	48,948	1.124	18,810	0.432
	--	1.95	--	--	--	53,599	1.230	21,328	0.490
	--	2.00	--	--	--	58,292	1.338	24,656	0.566
	--	2.05	--	--	--	63,206	1.451	27,694	0.636
	--	2.10	--	--	--	75,982	1.744	31,173	0.716
	--	2.15	--	--	--	72,334	1.661	34,154	0.784
	--	2.20	--	--	--	84,498	1.940	37,969	0.872
	--	2.25	--	--	--	81,269	1.866	42,946	0.986
	--	2.30	--	--	--	93,783	2.153	47,322	1.086
	--	2.35	--	--	--	90,899	2.087	51,939	1.192
	--	2.40	--	--	--	103,758	2.382	55,781	1.281
	--	2.45	--	--	--	101,220	2.324	60,915	1.398
	--	2.50	--	--	--	118,933	2.730	67,433	1.548
	--		--	--	--				
	--		--	--	--				
	--		--	--	--			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



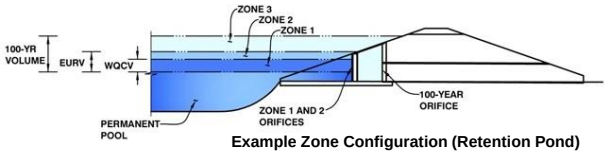


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: **McGavin 6-19HZ**

Basin ID: **Production Phase - Facility Storage**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1	#N/A		Orifice Plate
Zone 2			Weir (No Pipe)
Zone 3			
Total (all zones)			

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.74						
Orifice Area (sq. inches)	0.249	3.976						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.30		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	4.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	1.75	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	10.00	feet	Stage at Top of Freeboard =	2.75	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.73	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	1.55	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

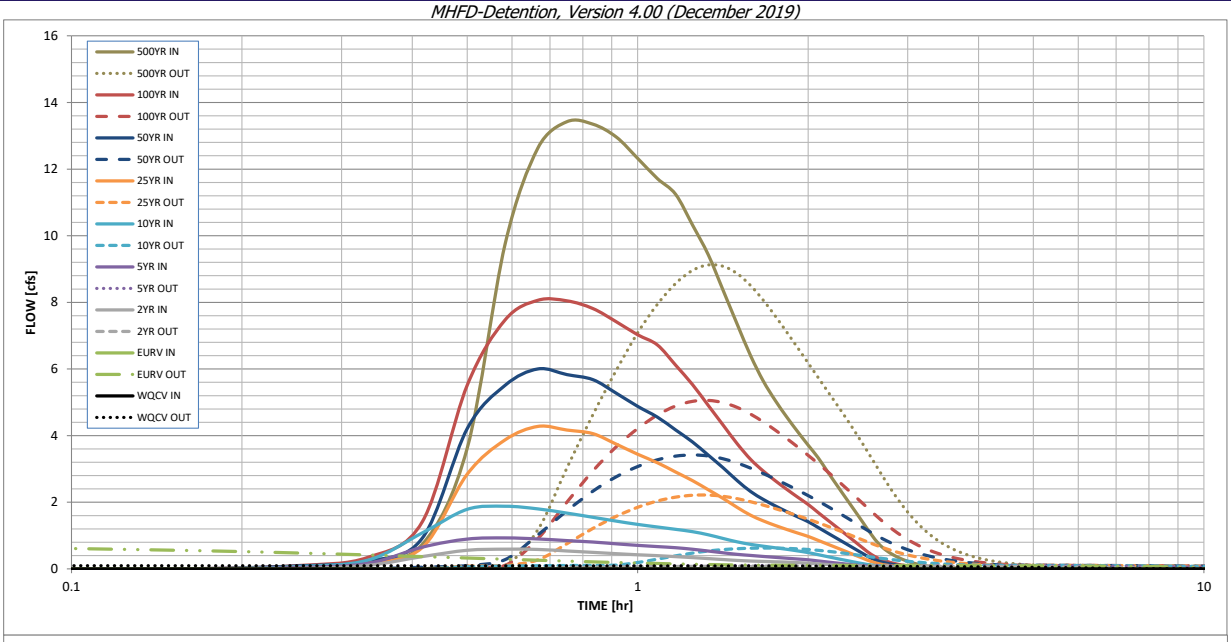
Routed Hydrograph Results

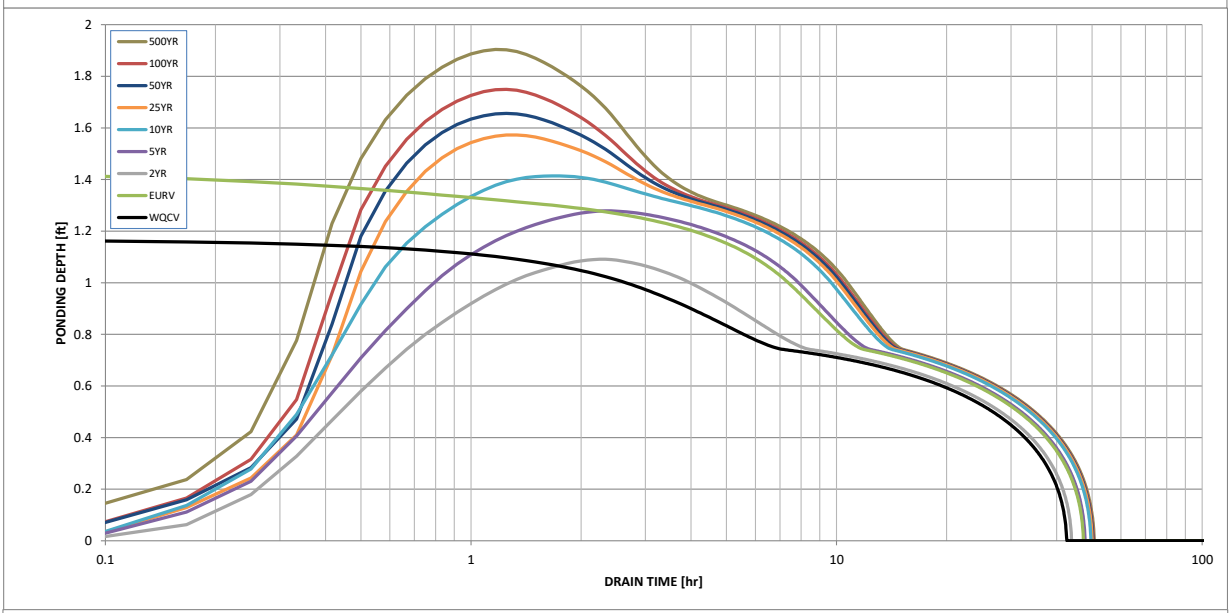
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

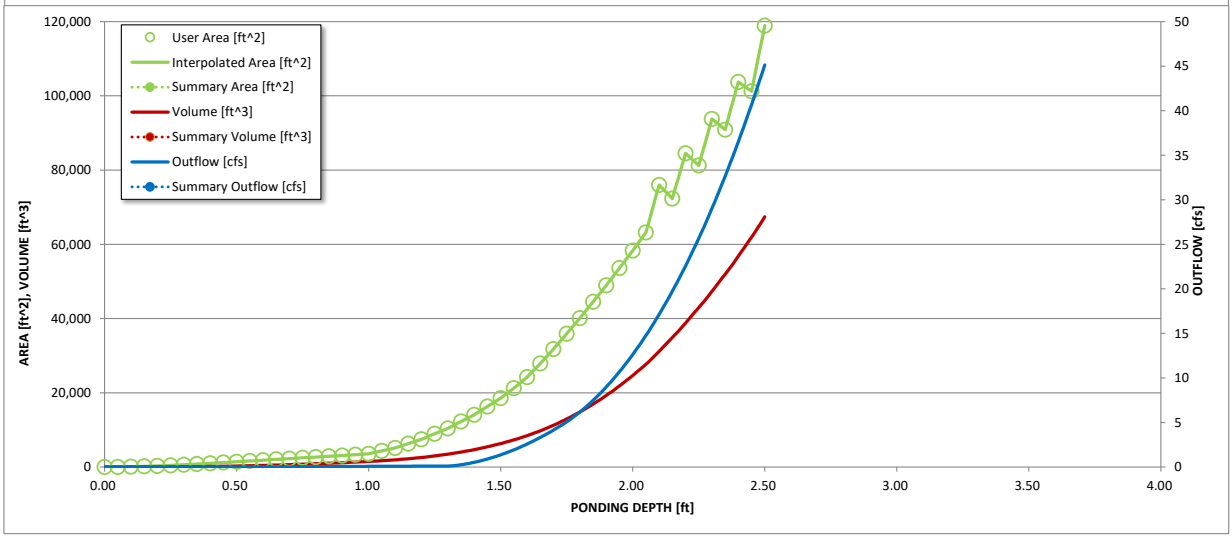
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.10	1.39	1.84	2.25	2.71	3.97
CUHP Runoff Volume (acre-ft) =	0.054	0.120	0.056	0.092	0.173	0.374	0.534	0.746	1.273
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.056	0.092	0.173	0.374	0.534	0.746	1.273
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.9	3.1	4.7	6.8	11.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.18	0.63	0.95	1.36	2.37
Peak Inflow Q (cfs) =	N/A	N/A	0.6	0.9	1.9	4.3	6.0	8.1	13.4
Peak Outflow Q (cfs) =	0.1	0.7	0.1	0.1	0.6	2.2	3.4	5.1	9.1
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.5	0.7	0.7	0.7	0.7	0.8
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	37	38	40	36	25	16	13	10
Time to Drain 99% of Inflow Volume (hours) =	**40**	43	42	44	44	40	36	32	23
Maximum Ponding Depth (ft) =	1.17	1.44	1.09	1.28	1.41	1.57	1.66	1.75	1.90
Area at Maximum Ponding Depth (acres) =	0.16	0.36	0.11	0.22	0.33	0.52	0.64	0.81	1.12
Maximum Volume Stored (acre-ft) =	0.054	0.121	0.043	0.073	0.111	0.178	0.224	0.289	0.443

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







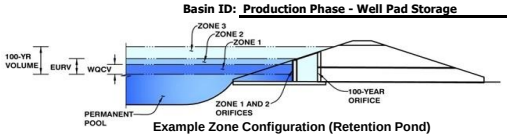
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Well Pad Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	3.86	acres
Watershed Length =	450	ft
Watershed Length to Centroid =	165	ft
Watershed Slope =	0.005	ft/ft
Watershed Imperviousness =	26.9%	percent
Percentage Hydrologic Soil Group A =	33.0%	percent
Percentage Hydrologic Soil Group B =	67.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.045	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.104	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.046	acre-feet	0.820	inches
5-yr Runoff Volume (P1 = 1.1 in.) =	0.073	acre-feet	1.10	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.113	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.254	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.372	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	0.536	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.97 in.) =	0.934	acre-feet	3.97	inches
Approximate 2-yr Detention Volume =	0.049	acre-feet		
Approximate 5-yr Detention Volume =	0.073	acre-feet		
Approximate 10-yr Detention Volume =	0.114	acre-feet		
Approximate 25-yr Detention Volume =	0.158	acre-feet		
Approximate 50-yr Detention Volume =	0.186	acre-feet		
Approximate 100-yr Detention Volume =	0.242	acre-feet		

Define Zones and Basin Geometry

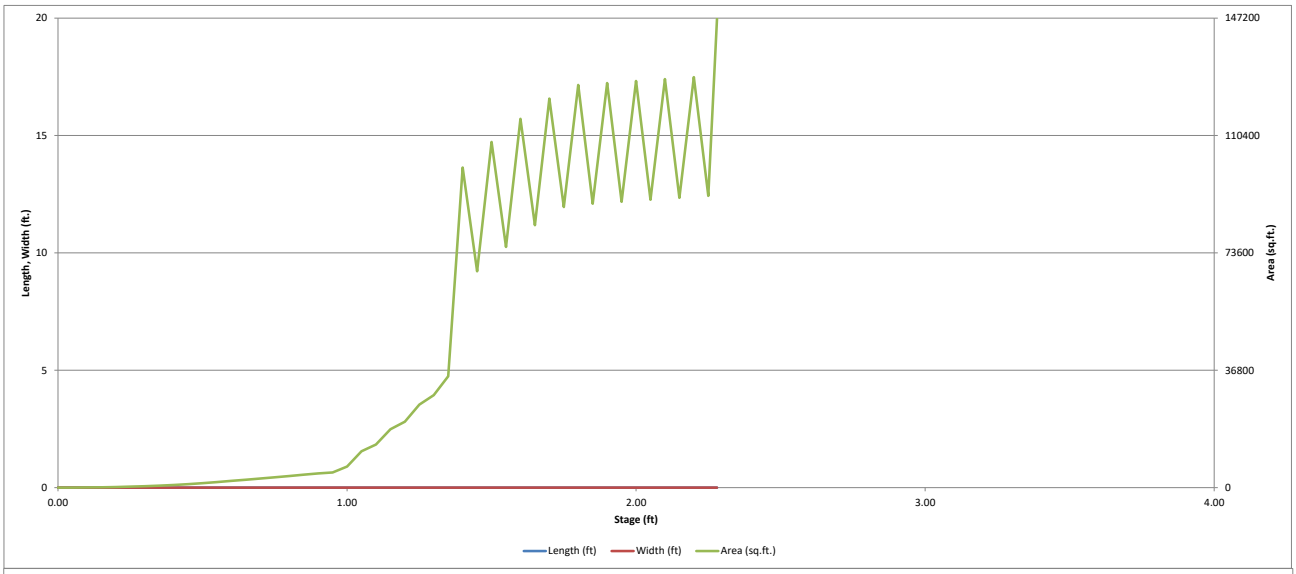
Zone 1 Volume (WQCV) =	0.045	acre-feet
Zone 2 Volume (100-year - Zone 1) =	0.197	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.242	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

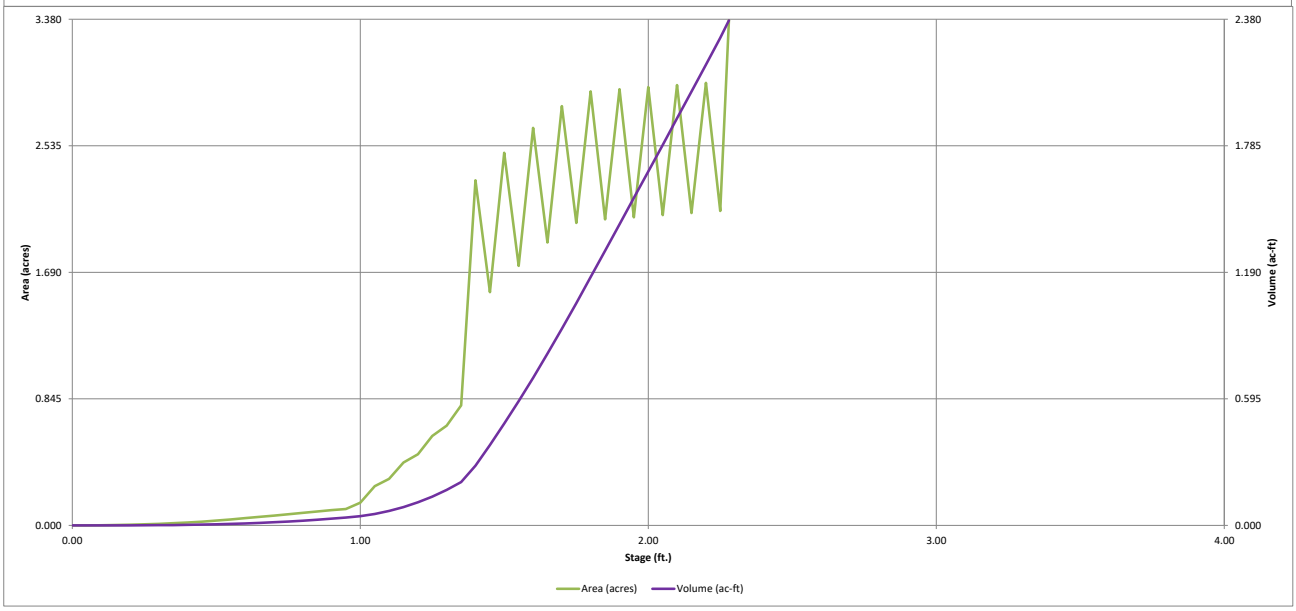
Depth Increment = 0.10 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	8	0.000	0	0.000
	--	0.10	--	--	--	47	0.001	2	0.000
	--	0.15	--	--	--	103	0.002	5	0.000
	--	0.20	--	--	--	193	0.004	13	0.000
	--	0.25	--	--	--	304	0.007	25	0.001
	--	0.30	--	--	--	453	0.010	44	0.001
	--	0.35	--	--	--	629	0.014	71	0.002
	--	0.40	--	--	--	848	0.019	108	0.002
	--	0.45	--	--	--	1,098	0.025	157	0.004
	--	0.50	--	--	--	1,399	0.032	219	0.005
	--	0.55	--	--	--	1,737	0.040	297	0.007
	--	0.60	--	--	--	2,109	0.048	393	0.009
	--	0.65	--	--	--	2,472	0.057	508	0.012
	--	0.70	--	--	--	2,862	0.066	641	0.015
	--	0.75	--	--	--	3,243	0.074	794	0.018
	--	0.80	--	--	--	3,650	0.084	966	0.022
	--	0.85	--	--	--	4,048	0.093	1,159	0.027
	--	0.90	--	--	--	4,450	0.102	1,371	0.031
	--	0.95	--	--	--	4,759	0.109	1,601	0.037
Edge of Well Pad	--	1.00	--	--	--	6,595	0.151	1,885	0.043
	--	1.05	--	--	--	11,417	0.262	2,335	0.054
	--	1.10	--	--	--	13,511	0.310	2,958	0.068
	--	1.15	--	--	--	18,294	0.420	3,753	0.086
	--	1.20	--	--	--	20,679	0.475	4,728	0.109
	--	1.25	--	--	--	26,035	0.598	5,895	0.135
	--	1.30	--	--	--	29,009	0.666	7,272	0.167
	--	1.35	--	--	--	34,907	0.801	8,869	0.204
	--	1.40	--	--	--	100,371	2.304	12,246	0.281
	--	1.45	--	--	--	67,835	1.557	16,450	0.378
	--	1.50	--	--	--	108,388	2.488	20,854	0.479
	--	1.55	--	--	--	75,470	1.733	25,449	0.584
	--	1.60	--	--	--	115,639	2.655	30,225	0.694
	--	1.65	--	--	--	82,298	1.889	35,173	0.807
	--	1.70	--	--	--	121,966	2.800	40,278	0.925
	--	1.75	--	--	--	87,995	2.020	45,526	1.045
	--	1.80	--	--	--	126,257	2.898	50,881	1.168
	--	1.85	--	--	--	89,026	2.044	56,262	1.292
	--	1.90	--	--	--	126,868	2.912	61,659	1.415
	--	1.95	--	--	--	89,636	2.058	67,070	1.540
	--	2.00	--	--	--	127,478	2.927	72,497	1.664
	--	2.05	--	--	--	90,247	2.072	77,939	1.789
	--	2.10	--	--	--	128,090	2.941	83,396	1.915
	--	2.15	--	--	--	90,859	2.086	88,869	2.040
	--	2.20	--	--	--	128,704	2.955	94,357	2.166
	--	2.25	--	--	--	91,473	2.100	99,860	2.292
	--	2.28	--	--	--	147,010	3.375	103,434	2.375
	--		--	--	--				
	--		--	--	--				
	--		--	--	--			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



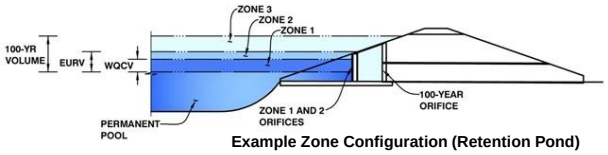


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Well Pad Storage



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.02	0.045	Orifice Plate
Zone 2 (100-year)	1.39	0.197	Weir (No Pipe)
Zone 3			
Total (all zones)		0.242	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.74						
Orifice Area (sq. inches)	0.249	3.976						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.10		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	2.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	1.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	5.20	feet	Stage at Top of Freeboard =	2.50	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	3.37	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	2.37	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

Calculated Parameters for Spillway

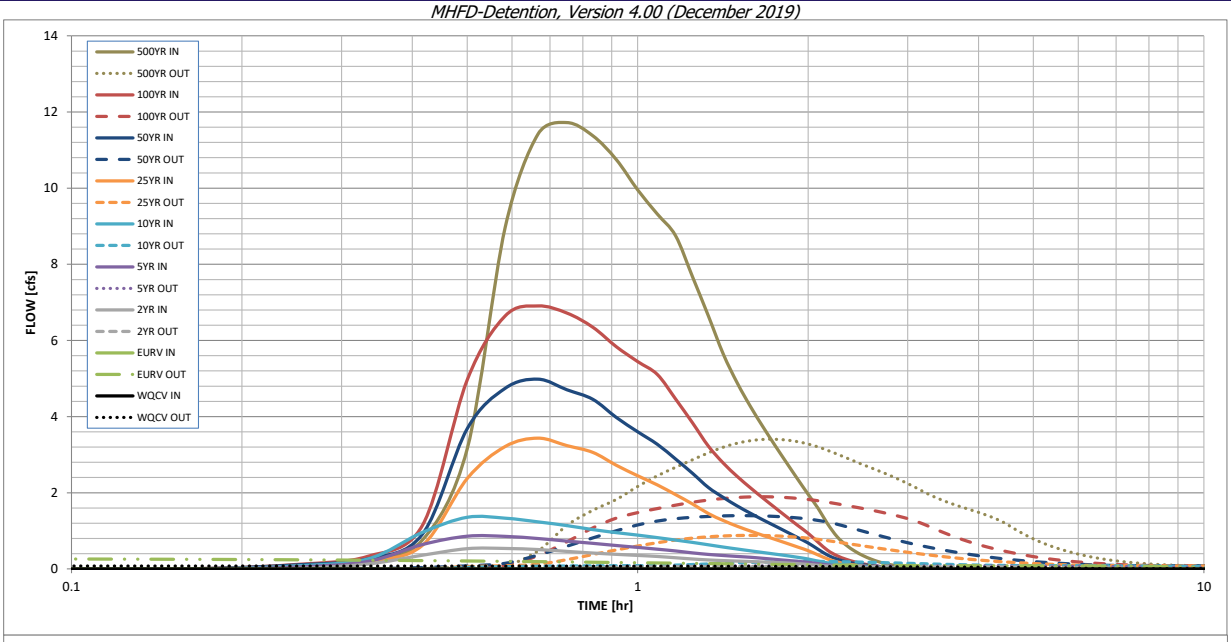
Routed Hydrograph Results

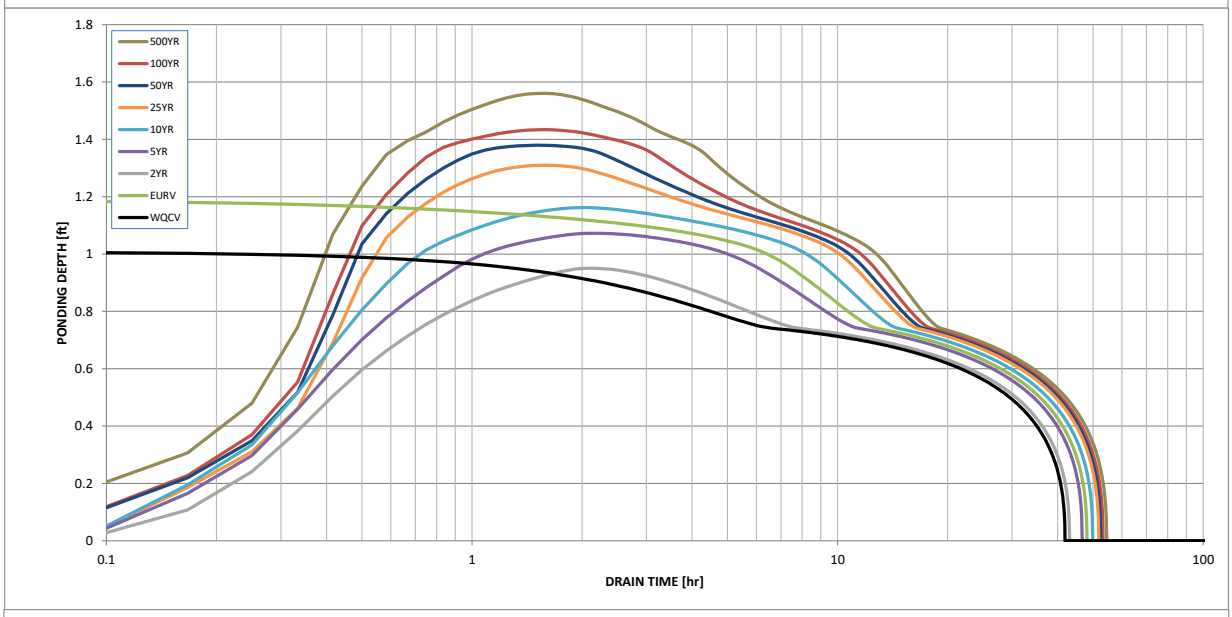
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

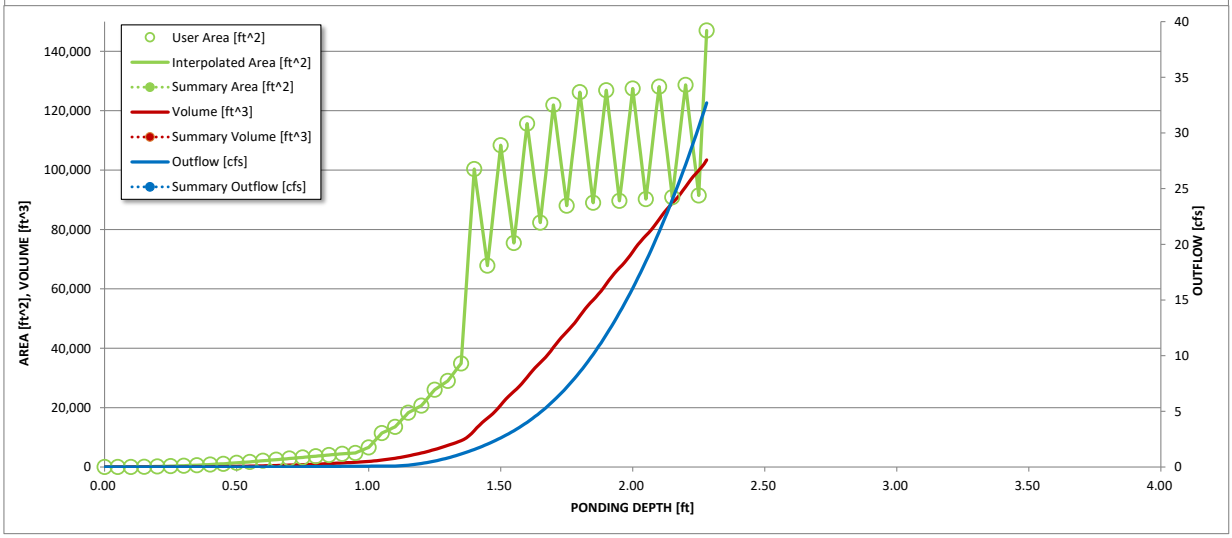
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.10	1.39	1.84	2.25	2.71	3.97
CUHP Runoff Volume (acre-ft) =	0.045	0.104	0.046	0.073	0.113	0.254	0.372	0.536	0.934
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.046	0.073	0.113	0.254	0.372	0.536	0.934
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.3	2.2	3.6	5.3	9.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.07	0.57	0.93	1.39	2.48
Peak Inflow Q (cfs) =	N/A	N/A	0.5	0.9	1.4	3.4	5.0	6.9	11.7
Peak Outflow Q (cfs) =	0.1	0.3	0.1	0.1	0.2	0.9	1.4	1.9	3.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.7	0.7	0.4	0.4	0.4	0.4
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	40	39	41	41	34	28	21	16
Time to Drain 99% of Inflow Volume (hours) =	**40**	45	42	44	46	45	43	40	34
Maximum Ponding Depth (ft) =	1.02	1.20	0.95	1.07	1.16	1.31	1.38	1.43	1.56
Area at Maximum Ponding Depth (acres) =	0.20	0.47	0.11	0.28	0.43	0.67	1.40	1.86	1.92
Maximum Volume Stored (acre-ft) =	0.047	0.109	0.037	0.059	0.090	0.167	0.226	0.344	0.602

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Appendix G:

Pipe Buoyancy Calculations

Buoyancy Calculations for Outlet Pipes
10" HDPE Pipe

$Ww = (\pi \div 4)*(Bc^2)*\gamma$

0.90 Bc = outside pipe diameter (feet)
62.42 γ = unit weight of fresh water (pounds per cubic foot)

39.71 Ww = weight of displaced water (pounds per linear foot)

$Wt = Ww - Wp$

4.73 Wp = weight of pipe (pounds per linear foot)

34.98 Wt = resultant buoyant force of the submerged pipe (pounds per linear foot)

$Hi = (FS*Wt \div Wi*Bc) - (0.1073*Bc)$

68.0 Wi = average unit weight of inundated backfill (pounds per cubic foot)
1.5 FS = factor of safety

0.76 Hi = minimum depth of inundated backfill required above top of pipe (feet)

INPUT
CALCULATED
** Assumes all backfill is inundated*
** Does not account for added weight from anti-seep collars*

Appendix H:

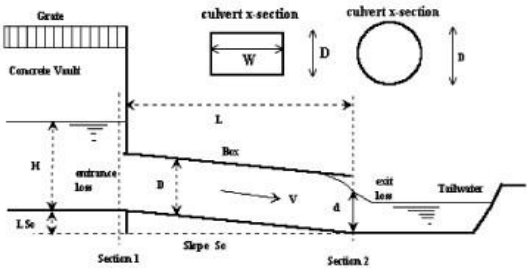
MHFD-Culvert Spreadsheet Calculations for Culvert Design

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #1 (ARC1)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	15	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4923.5	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft
	Culvert Length	L =	45	ft
	Manning's Roughness	n =	0.013	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	1.04
Sum of All Loss Coefficients	K_s =	2.24
Minimum Energy Condition Coefficient	KE_{low} =	0.0400
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

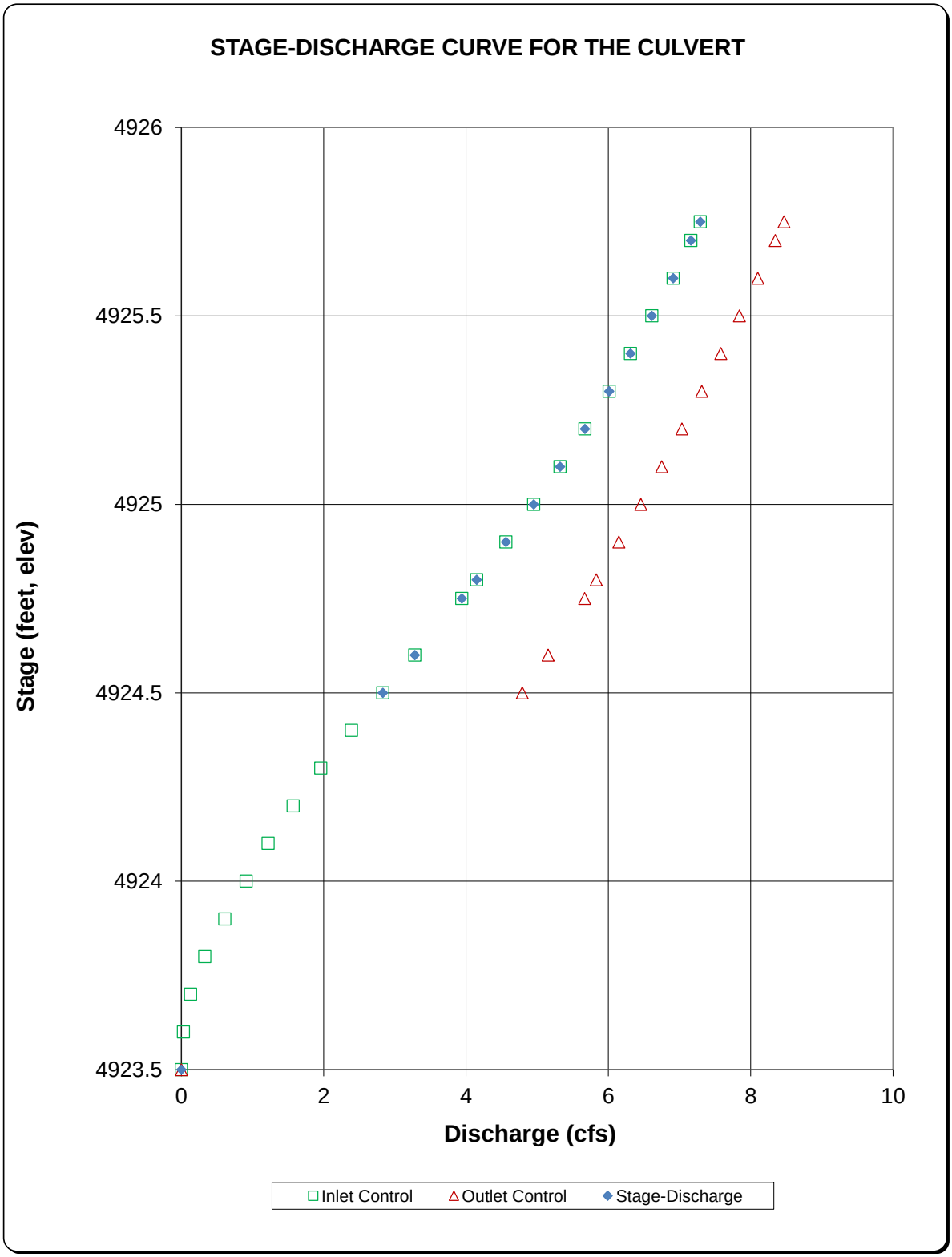
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.50		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.60		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4923.70		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4923.80		Min. Energy. Eqn.	0.33	#N/A	#N/A	#N/A
4923.90		Min. Energy. Eqn.	0.61	#N/A	#N/A	#N/A
4924.00		Min. Energy. Eqn.	0.91	#N/A	#N/A	#N/A
4924.10		Min. Energy. Eqn.	1.22	#N/A	#N/A	#N/A
4924.20		Regression Eqn.	1.57	#N/A	#N/A	#N/A
4924.30		Regression Eqn.	1.96	#N/A	#N/A	#N/A
4924.40		Regression Eqn.	2.39	#N/A	#N/A	#N/A
4924.50		Regression Eqn.	2.83	4.79	**2.83**	INLET
4924.60		Regression Eqn.	3.28	5.15	**3.28**	INLET
4924.75		Regression Eqn.	3.94	5.67	**3.94**	INLET
4924.80		Regression Eqn.	4.15	5.83	**4.15**	INLET
4924.90		Regression Eqn.	4.56	6.15	**4.56**	INLET
4925.00		Regression Eqn.	4.95	6.46	**4.95**	INLET
4925.10		Regression Eqn.	5.32	6.75	**5.32**	INLET
4925.20		Regression Eqn.	5.67	7.03	**5.67**	INLET
4925.30		Regression Eqn.	6.01	7.31	**6.01**	INLET
4925.40		Regression Eqn.	6.31	7.58	**6.31**	INLET
4925.50		Regression Eqn.	6.61	7.84	**6.61**	INLET
4925.60		Regression Eqn.	6.91	8.10	**6.91**	INLET
4925.70		Regression Eqn.	7.16	8.34	**7.16**	INLET
4925.75		Regression Eqn.	7.29	8.47	**7.29**	INLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #1 (ARC1)

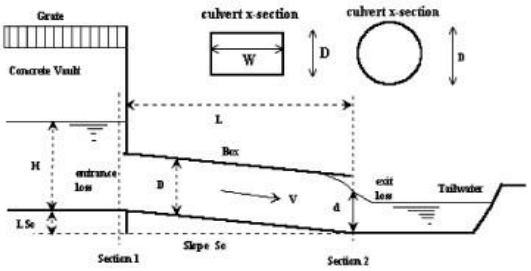


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: **McGavin 6-19HZ**

ID: **Access Road Culvert #2 (ARC2)**



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4927.1	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4927	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

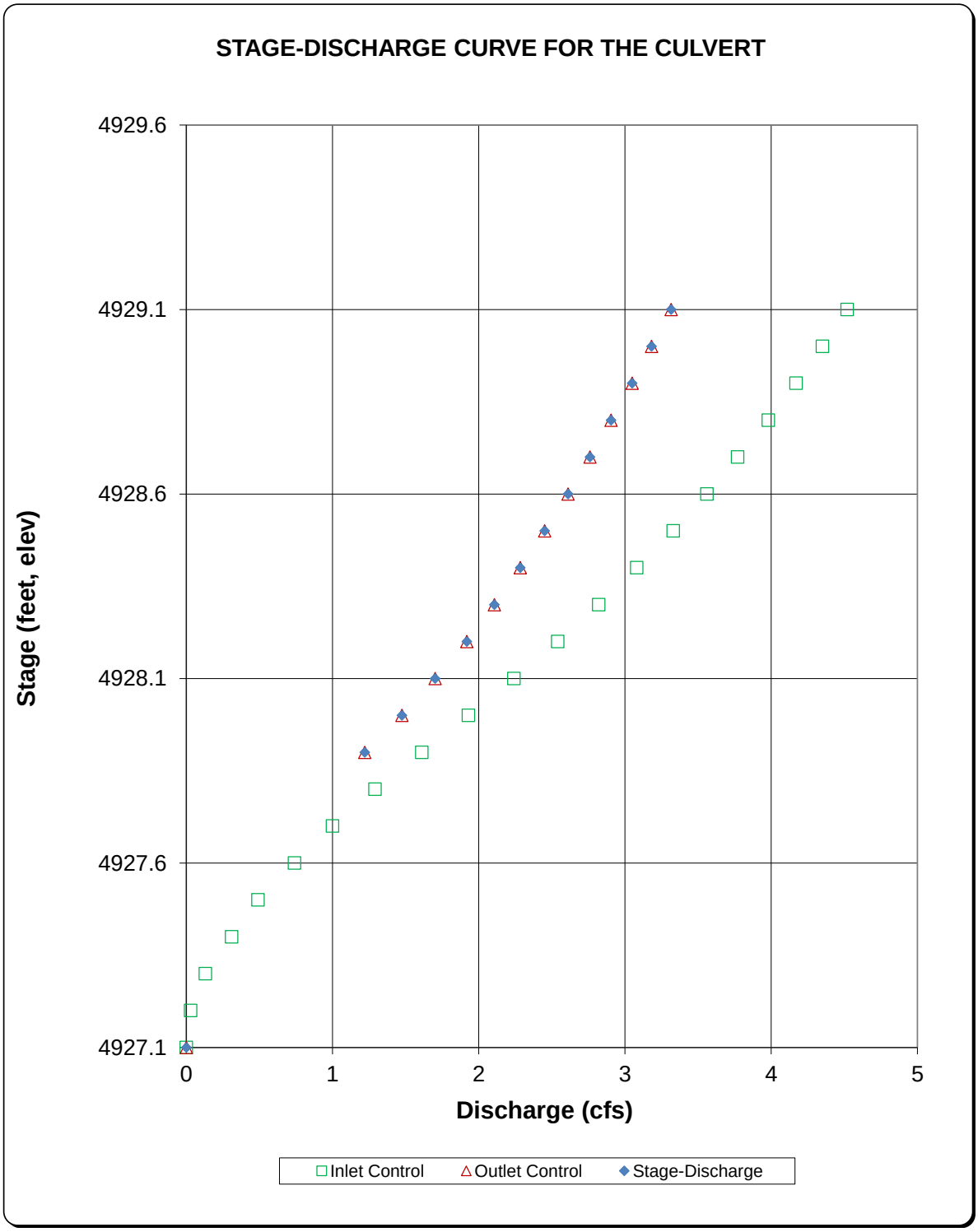
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4927.10		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4927.20		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4927.30		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4927.40		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4927.50		Min. Energy. Eqn.	0.49	#N/A	#N/A	#N/A
4927.60		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4927.70		Regression Eqn.	1.00	#N/A	#N/A	#N/A
4927.80		Regression Eqn.	1.29	#N/A	#N/A	#N/A
4927.90		Regression Eqn.	1.61	1.22	**1.22**	OUTLET
4928.00		Regression Eqn.	1.93	1.47	**1.47**	OUTLET
4928.10		Regression Eqn.	2.24	1.70	**1.70**	OUTLET
4928.20		Regression Eqn.	2.54	1.92	**1.92**	OUTLET
4928.30		Regression Eqn.	2.82	2.11	**2.11**	OUTLET
4928.40		Regression Eqn.	3.08	2.28	**2.28**	OUTLET
4928.50		Regression Eqn.	3.33	2.45	**2.45**	OUTLET
4928.60		Regression Eqn.	3.56	2.61	**2.61**	OUTLET
4928.70		Regression Eqn.	3.77	2.76	**2.76**	OUTLET
4928.80		Regression Eqn.	3.98	2.90	**2.90**	OUTLET
4928.90		Regression Eqn.	4.17	3.05	**3.05**	OUTLET
4929.00		Regression Eqn.	4.35	3.18	**3.18**	OUTLET
4929.10		Regression Eqn.	4.52	3.31	**3.31**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #2 (ARC2)

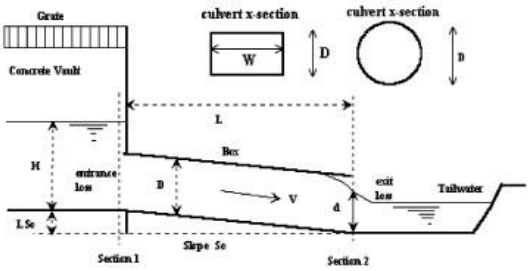


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #3 (ARC3)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4920.4	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4920.2	ft
	Culvert Length	L =	30	ft
	Manning's Roughness	n =	0.024	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Very Small Culvert
D >= 15 inches exp
For concrete, typically <= 0.016

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

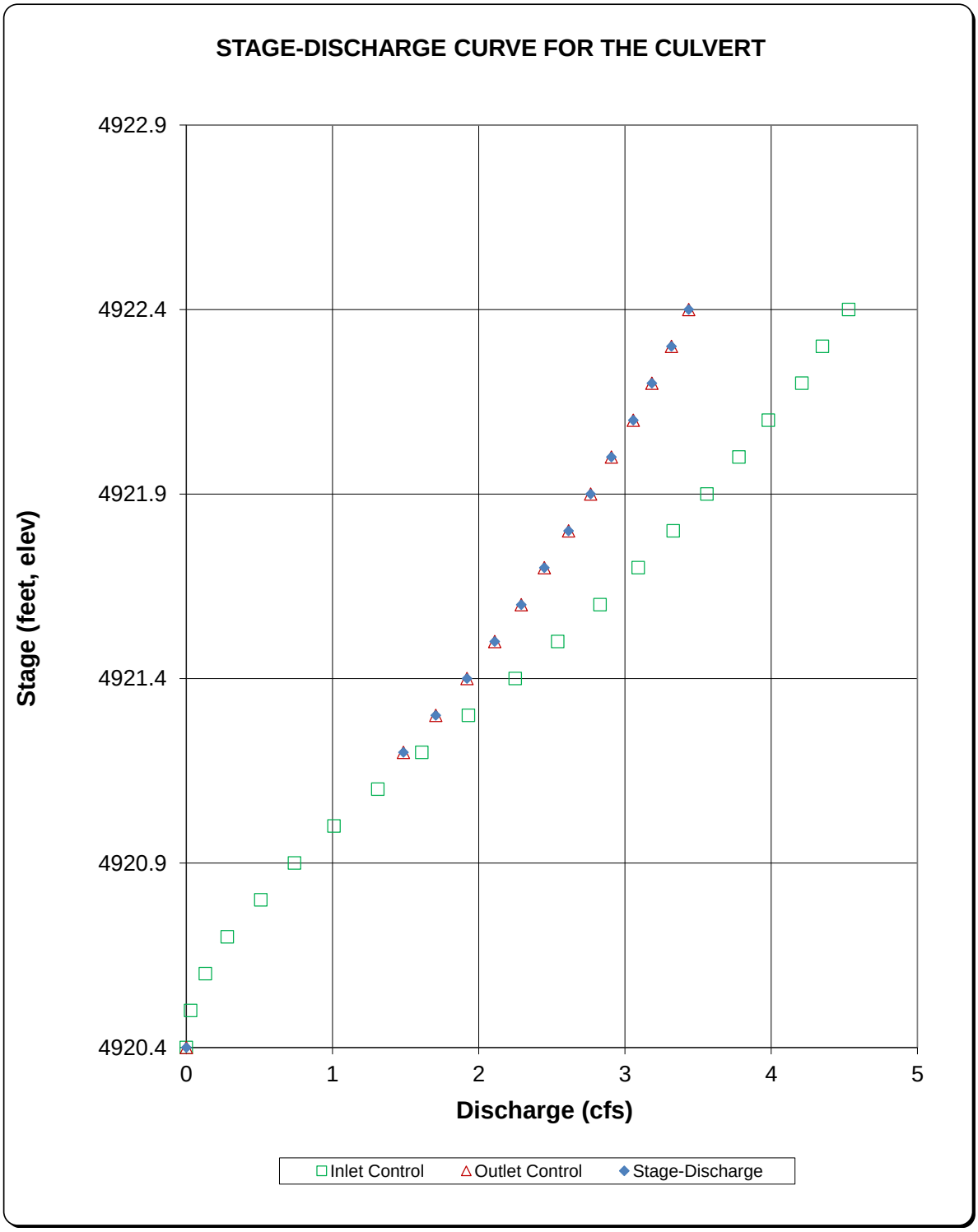
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4920.40		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4920.50		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4920.60		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4920.70		Min. Energy. Eqn.	0.28	#N/A	#N/A	#N/A
4920.80		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4920.90		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4921.00		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4921.10		Regression Eqn.	1.31	#N/A	#N/A	#N/A
4921.20		Regression Eqn.	1.61	1.48	**1.48**	OUTLET
4921.30		Regression Eqn.	1.93	1.71	**1.71**	OUTLET
4921.40		Regression Eqn.	2.25	1.92	**1.92**	OUTLET
4921.50		Regression Eqn.	2.54	2.11	**2.11**	OUTLET
4921.60		Regression Eqn.	2.83	2.29	**2.29**	OUTLET
4921.70		Regression Eqn.	3.09	2.45	**2.45**	OUTLET
4921.80		Regression Eqn.	3.33	2.61	**2.61**	OUTLET
4921.90		Regression Eqn.	3.56	2.76	**2.76**	OUTLET
4922.00		Regression Eqn.	3.78	2.91	**2.91**	OUTLET
4922.10		Regression Eqn.	3.98	3.06	**3.06**	OUTLET
4922.20		Regression Eqn.	4.21	3.18	**3.18**	OUTLET
4922.30		Regression Eqn.	4.35	3.32	**3.32**	OUTLET
4922.40		Regression Eqn.	4.53	3.44	**3.44**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #3 (ARC3)

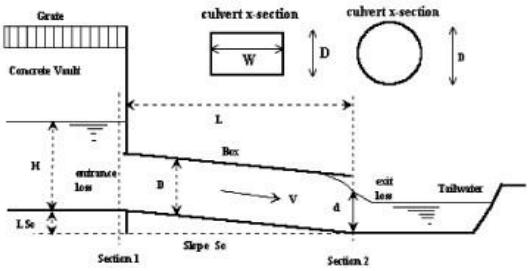


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #4 (ARC4)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4917.3	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4916.9	ft
	Culvert Length	L =	30	ft
	Manning's Roughness	n =	0.024	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Very Small Culvert
D >= 15 inches exp
For concrete, typically <= 0.016

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0669
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

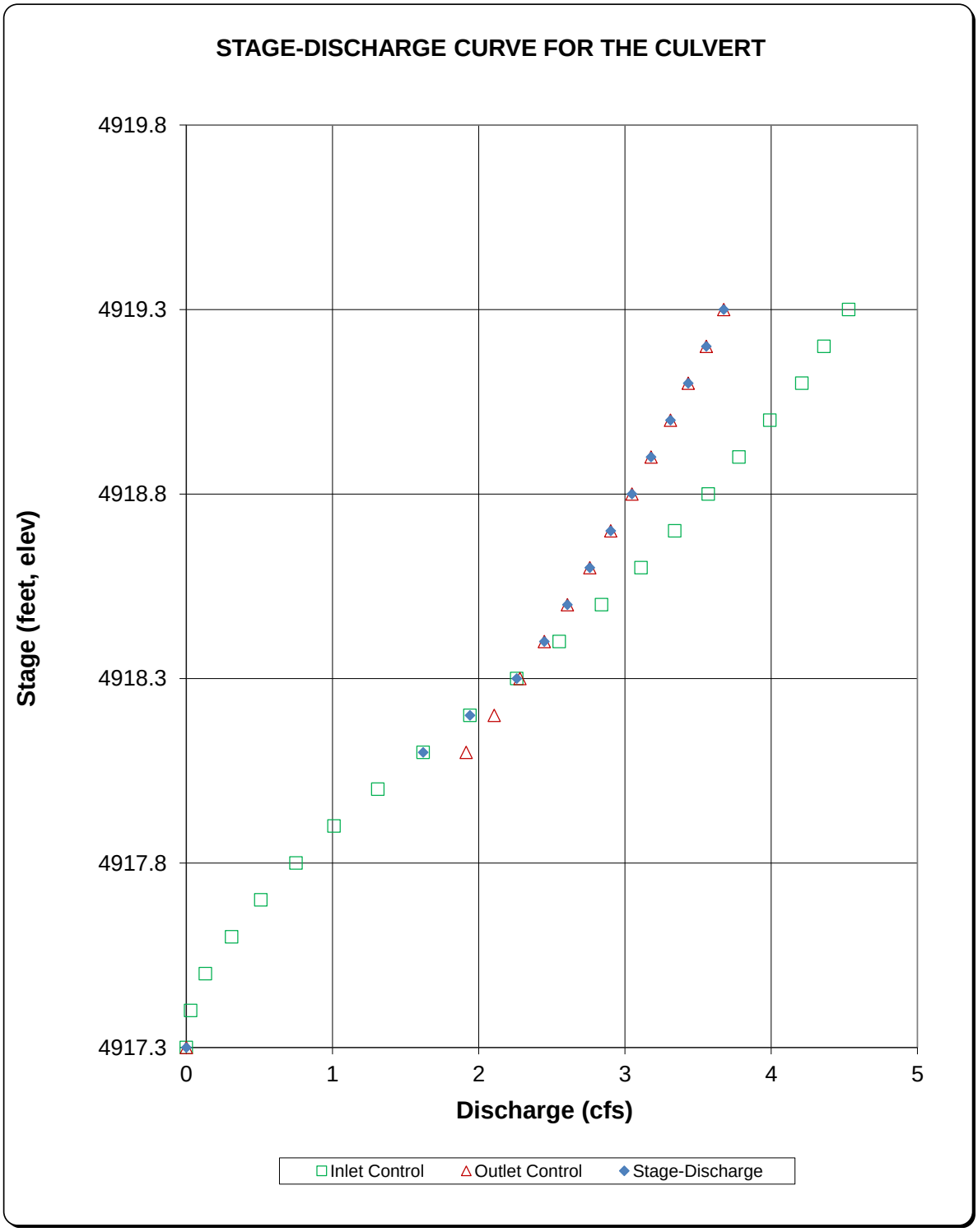
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4917.30		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4917.40		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4917.50		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4917.60		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4917.70		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4917.80		Min. Energy. Eqn.	0.75	#N/A	#N/A	#N/A
4917.90		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4918.00		Regression Eqn.	1.31	#N/A	#N/A	#N/A
4918.10		Regression Eqn.	1.62	1.91	**1.62**	INLET
4918.20		Regression Eqn.	1.94	2.11	**1.94**	INLET
4918.30		Regression Eqn.	2.26	2.28	**2.26**	INLET
4918.40		Regression Eqn.	2.55	2.45	**2.45**	OUTLET
4918.50		Regression Eqn.	2.84	2.61	**2.61**	OUTLET
4918.60		Regression Eqn.	3.11	2.76	**2.76**	OUTLET
4918.70		Regression Eqn.	3.34	2.90	**2.90**	OUTLET
4918.80		Regression Eqn.	3.57	3.05	**3.05**	OUTLET
4918.90		Regression Eqn.	3.78	3.18	**3.18**	OUTLET
4919.00		Regression Eqn.	3.99	3.31	**3.31**	OUTLET
4919.10		Regression Eqn.	4.21	3.43	**3.43**	OUTLET
4919.20		Regression Eqn.	4.36	3.56	**3.56**	OUTLET
4919.30		Regression Eqn.	4.53	3.67	**3.67**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #4 (ARC4)

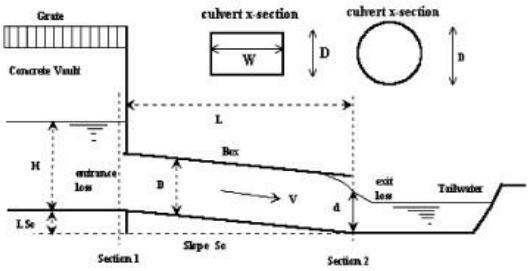


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #5 (ARC5)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4923.2	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

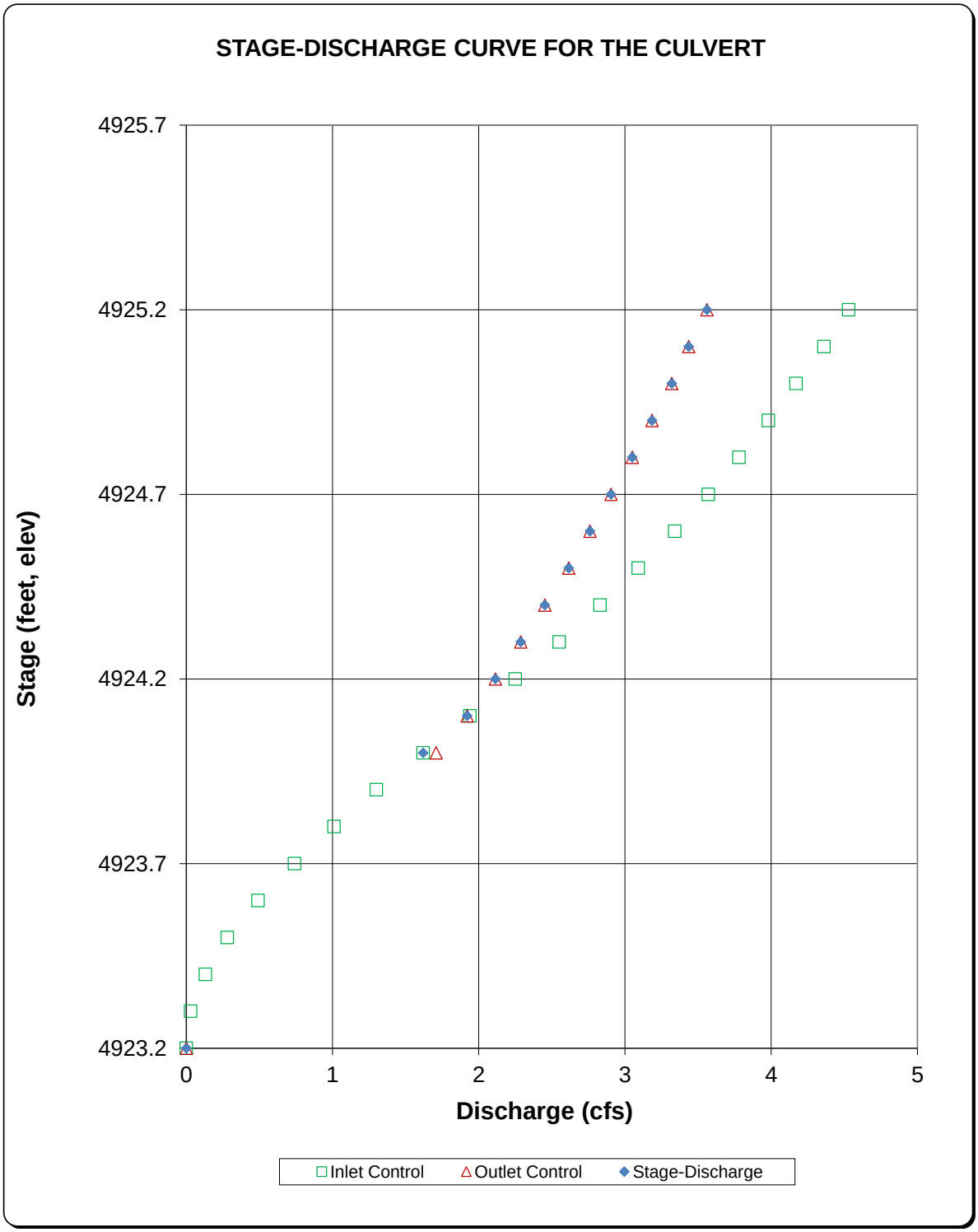
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.20		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.30		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4923.40		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4923.50		Min. Energy. Eqn.	0.28	#N/A	#N/A	#N/A
4923.60		Min. Energy. Eqn.	0.49	#N/A	#N/A	#N/A
4923.70		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4923.80		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4923.90		Regression Eqn.	1.30	#N/A	#N/A	#N/A
4924.00		Regression Eqn.	1.62	1.71	**1.62**	INLET
4924.10		Regression Eqn.	1.94	1.92	**1.92**	OUTLET
4924.20		Regression Eqn.	2.25	2.11	**2.11**	OUTLET
4924.30		Regression Eqn.	2.55	2.29	**2.29**	OUTLET
4924.40		Regression Eqn.	2.83	2.45	**2.45**	OUTLET
4924.50		Regression Eqn.	3.09	2.62	**2.62**	OUTLET
4924.60		Regression Eqn.	3.34	2.76	**2.76**	OUTLET
4924.70		Regression Eqn.	3.57	2.90	**2.90**	OUTLET
4924.80		Regression Eqn.	3.78	3.05	**3.05**	OUTLET
4924.90		Regression Eqn.	3.98	3.18	**3.18**	OUTLET
4925.00		Regression Eqn.	4.17	3.32	**3.32**	OUTLET
4925.10		Regression Eqn.	4.36	3.44	**3.44**	OUTLET
4925.20		Regression Eqn.	4.53	3.56	**3.56**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #5 (ARC5)

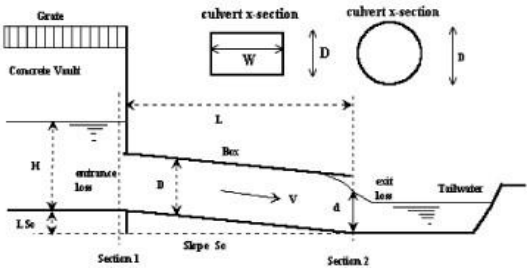


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #6 (ARC6)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4923.8	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0125
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

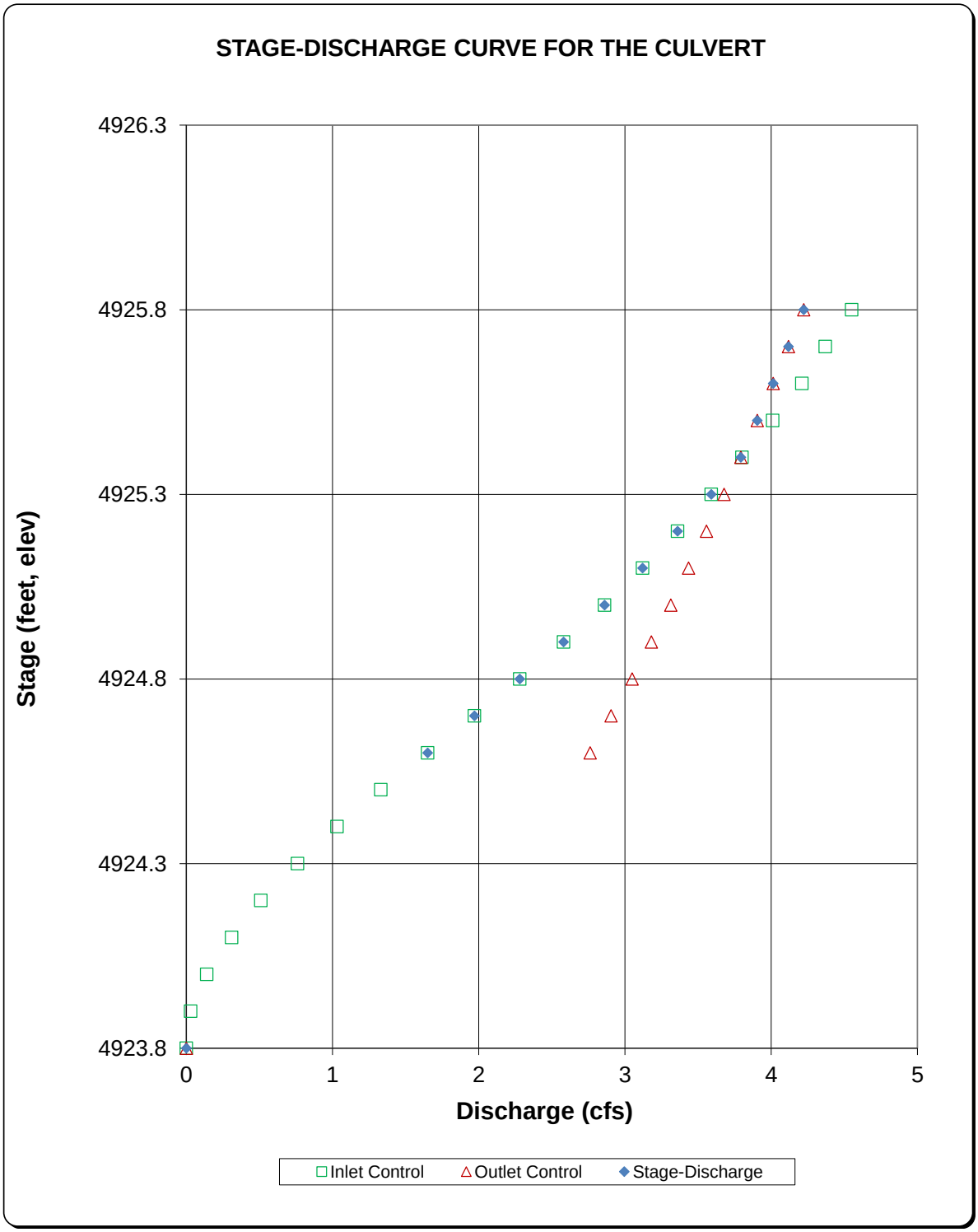
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.80		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.90		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4924.00		Min. Energy. Eqn.	0.14	#N/A	#N/A	#N/A
4924.10		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4924.20		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4924.30		Min. Energy. Eqn.	0.76	#N/A	#N/A	#N/A
4924.40		Regression Eqn.	1.03	#N/A	#N/A	#N/A
4924.50		Regression Eqn.	1.33	#N/A	#N/A	#N/A
4924.60		Regression Eqn.	1.65	2.76	**1.65**	INLET
4924.70		Regression Eqn.	1.97	2.90	**1.97**	INLET
4924.80		Regression Eqn.	2.28	3.05	**2.28**	INLET
4924.90		Regression Eqn.	2.58	3.18	**2.58**	INLET
4925.00		Regression Eqn.	2.86	3.31	**2.86**	INLET
4925.10		Regression Eqn.	3.12	3.43	**3.12**	INLET
4925.20		Regression Eqn.	3.36	3.56	**3.36**	INLET
4925.30		Regression Eqn.	3.59	3.68	**3.59**	INLET
4925.40		Regression Eqn.	3.80	3.79	**3.79**	OUTLET
4925.50		Regression Eqn.	4.01	3.90	**3.90**	OUTLET
4925.60		Regression Eqn.	4.21	4.01	**4.01**	OUTLET
4925.70		Regression Eqn.	4.37	4.12	**4.12**	OUTLET
4925.80		Regression Eqn.	4.55	4.22	**4.22**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

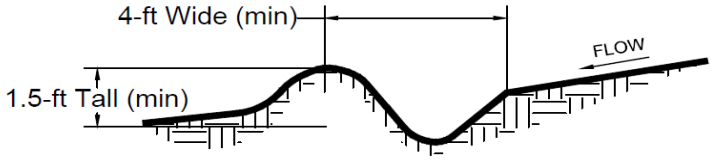
ID: Access Road Culvert #6 (ARC6)



Appendix I:

Conveyance Calculations for Diversion Ditch Design

Temporary Diversion Ditch Design (Typical)



INSTALLATION NOTES:

1. DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.
2. ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.
3. BERM HEIGHT SHALL BE A MINIMUM OF 18"
4. TEMPORARY DIVERSION SWALE SIDE SLOPES SHALL BE ~2:1 OR FLATTER

Estimated Capacity of Temporary Diversion Ditch Design (Typical)

Depth of 1ft*

n=	0.022	
A=	2	ft^2
P=	4.5	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 5.6 cfs
Calculated V= 2.79 fps

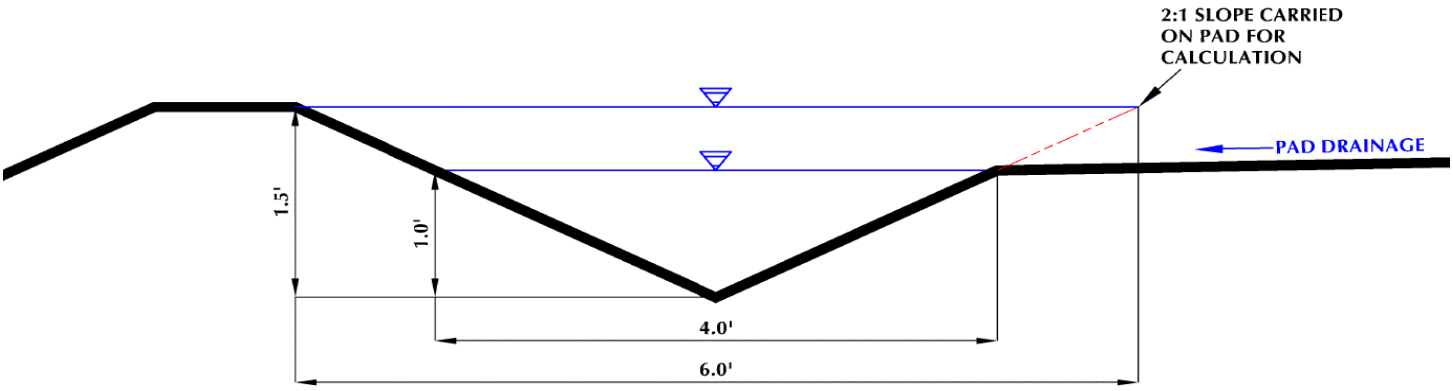
Depth of 1.5ft*

n=	0.022	
A=	4.5	ft^2
P=	6.7	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 16.5 cfs
Calculated V= 3.67 fps

* channel shape simplified to triangular geometry for conservative calculations



Appendix J:

Sediment Trap Sizing Calculations

Sediment Trap Sizing Calculations

Outlet	Ditch Length			Approximate Pad Fill Height				Minimum Design Area, ft^2	Recommended Design Size
	Total, ft	Along Fill and Soil Piles, ft	Used for Sizing, ft	Top of Pad Fill, ft NAVD 88	Sediment Trap Invert, ft NAVD 88	Calculated Pad Fill Height, ft	Used for Sizing, ft		
ST1	1550	780	**800**	4928.6	4921.3	7.3	**8**	400	20'x20' (400 ft^2)
ST2	420	250	**300**	4919.3	4917.2	2.1	**4**	100	15'x15' (225 ft^2)
ST3	1670	990	**1000**	4929.0	4923.5	5.5	**6**	380	20'x20' (400 ft^2)

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Section 6

Stormwater Management Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Stormwater Management Plan

McGavin 6-19HZ Well Pad and Facility
NW/4 Sec 19, T2N, R67W

Firestone, Colorado

Revised October 2021

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APPENDICES

APPENDIX A CDPS STORMWATER GENERAL PERMIT CERTIFICATION
APPENDIX B GRADING PLAN(S) AND DRAINAGE REPORT
APPENDIX C CONTROL MEASURE / BMP SPECIFICATIONS

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has prepared this site-specific Stormwater Management Plan (SWMP) for construction activities in Weld County, Colorado. The SWMP is intended to ensure construction activities adhere to good engineering, hydrologic, and pollution control practices, and to ensure erosion, sediment and stormwater control measures are selected, installed, implemented, and maintained to protect state waters, and minimize site erosion or degradation. This facility is a part of Kerr-McGee's Area 2 operations and is covered under CDPS Permit COR402541.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	McGavin 6-19HZ Well Pad and Facility
Location:	Sec 19, T2N, R67W / Firestone, Colorado
Total Area of Project:	25.63 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is seasonal winter wheat; primary land use is agriculture.
Percentage of Existing Vegetation Cover:	Vegetative cover on the subject location is 100%, with exception to seasonal planting/harvest and crop rotation. Method for determination: National Resource Conversation Service (NRCS) soil survey data, and on-site assessment at the time of pit excavation for planning and permitting purposes.
Soil Type(s):	47 - Olney fine sandy loam, 1-3% slopes, HSB B 72 - Vona loamy sand, 0-3% slopes, HSG A 4 - Aquolls and Aquepts, flooded, HSG D
Primary Receiving Water:	Delineated wetland approximately 200' northwest of proposed location.
Operator ID:	47120
CDPS Permit:	COR402541
Stormwater Manager:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation Office: (720) 929-6317
SWMP Administrator & Inspector:	Austin Lee, HSE Advisor Occidental Petroleum Corporation Office: (605) 920-0675
Emergency Contact:	Name: Integrated Operation Center (IOC) Office: (970) 506-5980

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

☒ Delineation of Disturbance Limits	☒ Access Road Construction	☒ Perimeter /Control Measures Installation	☒ Grading, stripping, excavation, earthwork	☒ Well drilling & Completions
☒ Facility Construction	☒ Pipeline & Flowline Installation	☒ Disturbance Reduction	☒ Interim & Final Reclamation	☒ Return to Agriculture

All construction and development shall be in accordance with the Colorado Department of Public Health and Environment's CDPS General Permit for Stormwater Discharges Associated with Construction Activity, and the Colorado Oil and Gas Conservation Commission (COGCC) 304.c.15 and 1002.f rules and requirements.

4.0 POTENTIAL POLLUTANT SOURCES

Potential pollution sources shall be placed within the project construction boundary, designated staging area(s), working surface, contained by general or sized secondary containment, and stormwater perimeter controls. Anticipated pollution sources which will be managed by appropriate BMP fact sheets or operational best management standard operating procedures include, but are not limited to:

☒ Disturbed and stored soils	☒ Vehicle/equipment maintenance and fueling	☐ Non-industrial waste
☒ Vehicle tracking of sediments	☒ Dust generating processes	☒ Potential Spills
☐ Management of contaminated soils	☒ Routine maintenance activities	☐ Spill prevention and response
☒ Loading/unloading ops	☒ On-site waste management	
☒ Outdoor storage activities	☐ Concrete truck washing	

No dedicated concrete or asphalt batch plants will be at the project location. Safety Data Sheets (SDS) for materials to be used are maintained by Kerr-McGee. Pollutants shall be managed in accordance with waste regulations administered by COGCC 900 series rules.

5.0 STORMWATER, EROSION & SEDIMENT CONTROL MEASURES / BMPS

Measures for stormwater, erosion and sediment control will be accomplished through a combination of construction techniques, structural and non-structural controls, vegetation and re-vegetation, administrative controls and good housekeeping practices. Control measures will be implemented and adjusted with changing site conditions, as well as phases of construction. All control measures deployed throughout construction, shall be identified on site specific stormwater management plan as-built maps.

The following list of control measures will be implemented during all phases of construction on the Project. Installation and detail specifications can be found in Appendix C:

BMP / Control Measure	Intended Use/Purpose	Installation Timing	Removal Timing
Limits of Construction (LOC)	*To establish a perimeter for which construction activities are managed within.*	Prior to construction	Interim / Final Reclamation
Vehicle Tracking Controls (VOC)	*Provide a stabilized construction site access to reduce off-site tracking.*	Prior to construction	Interim Reclamation
Diversion Ditch (DD)	*To divert and effectively manage run-on/run-off from the project.*	Prior to Construction	Interim Reclamation
Sediment Control Log (SCL)	*Provide a sediment barrier to intercept sheet flow run-off from disturbed areas, or as a perimeter control.*	During Construction	Interim Reclamation
Check Dams (CD)	*Slow the velocity of concentrated flow, thus reducing erosion.*	During Construction	Interim Reclamation
Sediment Basin (SB)	*Collect stormwater and provide detention and settling time of stormwater run-off.*	During Construction	Interim Reclamation or As Permitted
Culverts (C)	*Divert water under a crossing, or to direct flow to a designated point.*	During Construction	Interim Reclamation
Inlet Protection (IP)	*Reduce erosion and sediment loading into a designated culvert or inlet.*	During Construction	Interim Reclamation
Outlet Protection (OP)	*Reduce velocity and erosion from a designated culvert or outlet.*	During Construction	Interim Reclamation
Seed & Mulch (SM)	*Stabilize disturbed areas no longer in use or intended for construction and development (including stockpiles)*	Construction and Interim Reclamation	N/A

6.0 MATERIALS HANDLING AND SPILL PREVENTION

Discharges of hazardous substances or oil resulting from spills or construction operations are not authorized under the Construction General Permit or this plan. Spills or leaks will be managed by Kerr-McGee personnel or their designee, and according to the Kerr-McGee *Wattenberg Field, Colorado Spill Prevention, Control and Countermeasure (SPCC)* Plan. Kerr-McGee personnel and designees are trained to prevent, mitigate, evaluate, and respond to spills and releases. In the event of a spill, notify the Stormwater Manager, after taking emergency and internal procedures for notification. Depending on the nature of the spill and material involved, the Colorado Department of Public Health and Environment 24-hour spill reporting line (877-518-5608) will be contacted and/or downstream water users notified, as necessary.

7.0 NON-STORMWATER DISCHARGES

Sources of non-stormwater discharges include emergency fire-fighting activities or a fire hydrant, uncontaminated springs which do not originate from an area of land disturbance, and construction dewatering. In the event of construction dewatering, control measures shall be implemented and Low Risk Discharge Guidance for Uncontaminated Groundwater to Land (WQP27) shall be followed.

8.0 FINAL STABILIZATION

All soil horizons segregated for the purpose of construction shall be replaced to their original relative positions and contour for reclamation and final stabilization. Following topsoil re-distribution, the reclamation area shall be cross ripped to alleviate compaction. Soil amendments will be determined and applied as necessary, and incorporated by disking, harrowing or cultiplacking during seedbed preparation.

Seed used for reclamation will be determined based on Surface Owner consultation, and consider soil type, land use, and adjacent reference area(s) vegetation. The approved seed mix, in combination with certified weed-free mulch, shall be installed when seasonal or weather conditions are most favorable to take advantage of moisture, such as early spring or late fall, and never during windy or frozen conditions.

The Colorado Department of Health and Environment (CDPHE) defines final stabilization as, “finally stabilized means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, and the vegetation cover is capable of providing erosion control equivalent to pre-existing conditions, or equivalent permanent, physical erosion reduction methods have been employed.” Stabilized unpaved surfaces, such as gravel access roads or working surfaces, necessary for the operation of the facility or nearby facilities, also qualifies as “final stabilized”.

9.0 POST-CONSTRUCTION STORMWATER

Following final stabilization, and pursuant of COGCC rule 1002.f and rule 1004, BMPs shall be maintained under Kerr-McGee’s Post-Construction Stormwater Program, and evaluated for Tier 1 / Non-Tier 1 status as applicable and per COGCC 100 series definitions, until the facility is abandoned, and final reclamation is achieved.

10.0 INSPECTION AND MAINTENANCE PROCEDURES

10.1 Inspections

Inspections will be conducted to document the status of construction activities, stormwater control measure placement, maintenance needs, and effectiveness, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Stormwater Manager and SWMP Administrator and conducted by their designated representative(s). Inspection forms will document non-compliance conditions, including any release of sediment or other contaminants, additional control measures that are needed, or repair and maintenance work orders.

During construction, inspections shall be conducted every 14 days, and after a major precipitation or melt event, which has the potential to cause surface runoff.

For sites earthwork and construction is completed, but final stabilization is not achieved due to vegetative cover, inspections shall be conducted every 30 days and exclude precipitation or melt event response. Inspections will continue until all reclaimed areas have achieved a cover of 70% the pre-construction reference vegetation (i.e. final stabilization).

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection. All inspection records are stored for a minimum of three years after the location has achieved final stabilization.

10.2 Maintenance

For maintenance items discovered at active construction locations, action and documentation towards completing repairs identified at the time of inspection, shall be made within 24 hours of discovery.

Maintenance items discovered post-construction will be documented and coordinate with production personnel.

Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for actions requiring ground disturbance / earthwork.

APPENDIX A

CDPS STORMWATER GENERAL PERMIT CERTIFICATION

COLORADO
Department of Public Health & Environment

CERTIFICATION TO DISCHARGE
UNDER
CDPS GENERAL PERMIT COR400000
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

Certification Number: **COR402541**

This Certification to Discharge specifically authorizes:

Owner Kerr McGee Oil and Gas Onshore LP
Operator Kerr McGee Oil and Gas Onshore LP

to discharge stormwater from the facility identified as

Kerr Area 2

To the waters of the State of Colorado, including, but not limited to:

to Boulder Creek to South Platte River

Facility Activity :	Oil & Gas Field Development
Disturbed Acres:	>5 acres
Facility Located at:	See Map in File Denver & Boulder & Broomfield CO 80229 Adams County Latitude 40.081 Longitude -104.717000
Specific Information (if applicable):	

Certification is issued 4/1/2019

Certification is effective 4/1/2019

Expiration date of general permit : 3/31/2024

This certification under the permit requires that specific actions be performed at designated times. The certification holder is legally obligated to comply with all terms and conditions of the permit.

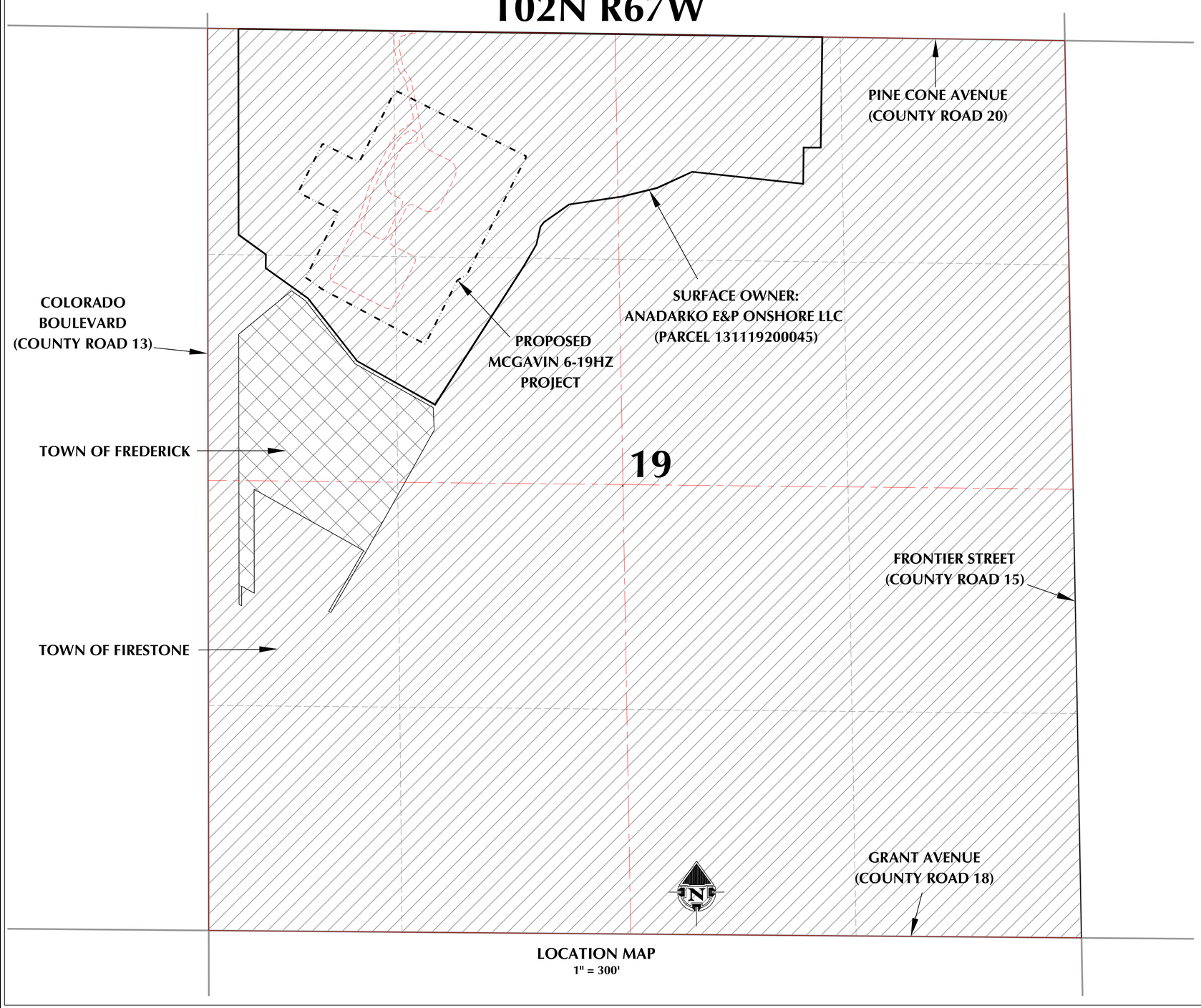
This certification was approved by:
Meg Parish, Unit Manager
Permits Section
Water Quality Control Division

APPENDIX B

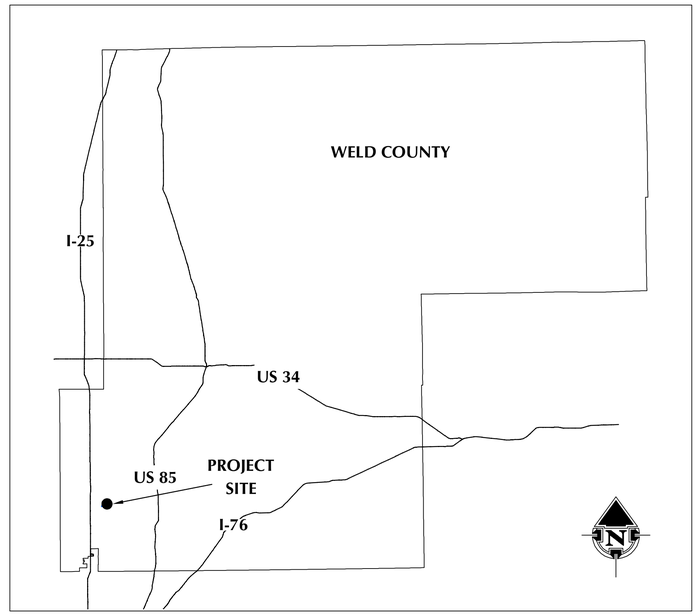
GRADING PLANS AND DRAINAGE REPORT

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'



VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - FACILITY STORMWATER STORAGE
6 - WELL PAD STORMWATER STORAGE
7 - BMP TYPICALS (A)
8 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

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Loveland, Colorado 80538
Phone 970-776-4331

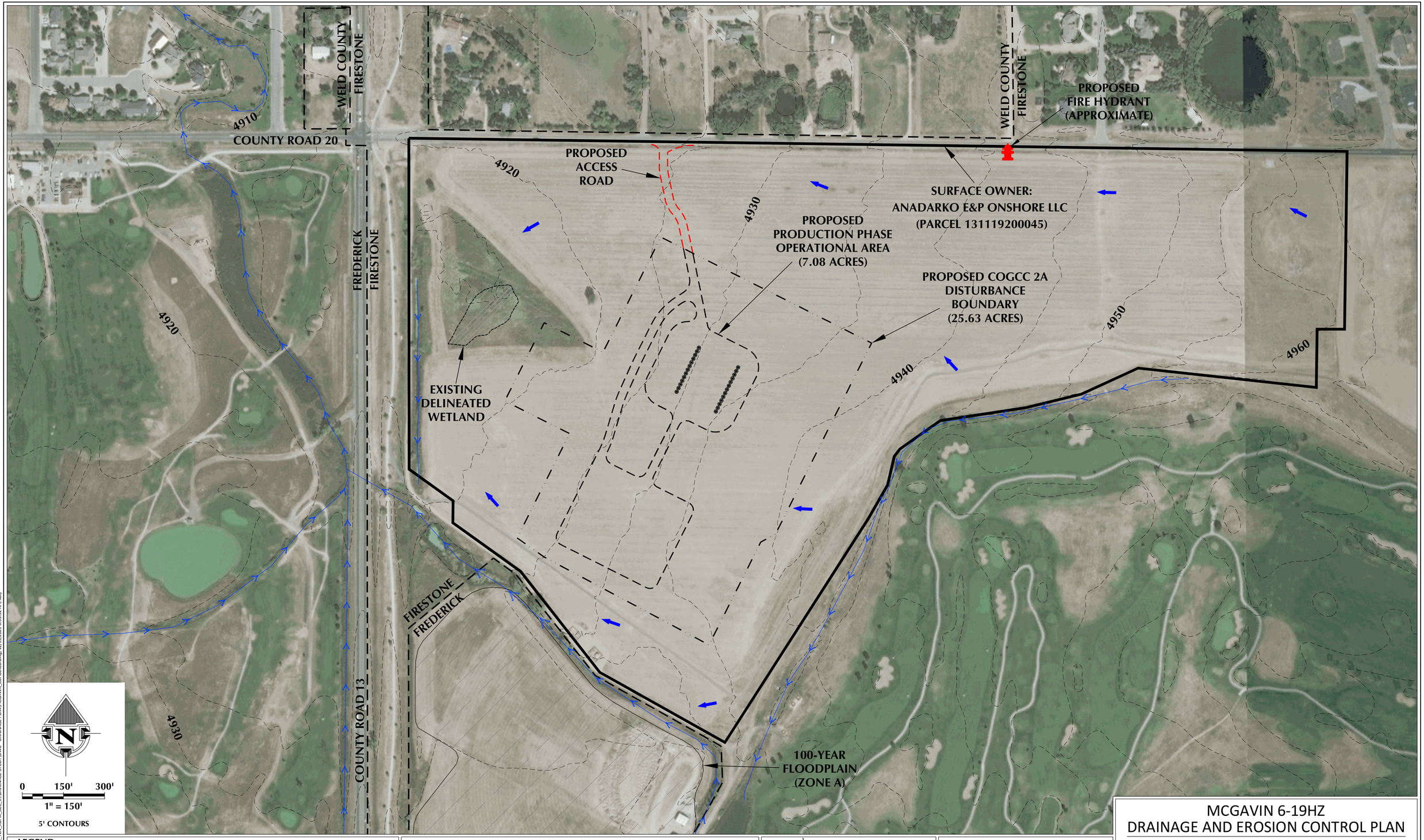
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Denver, Colorado 80202

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC2	12" CMP	30	4927.1	4927.0	0.3%
ARC3	12" CMP	30	4920.4	4920.2	0.7%
ARC4	12" CMP	30	4917.3	4916.9	1.3%
ARC5	12" CMP	30	4923.2	4922.9	1.0%

COUNTY ROAD 13
BIKE PATH
100-YEAR FLOODPLAIN (ZONE A)
EXISTING PRIVATE ROAD
DELINEATED WETLAND
15' X 15' X 3' SEDIMENT TRAP (ST2)
ACCESS ROAD CULVERT #4 (ARC4)
ACCESS ROAD CULVERT #3 (ARC3)
20' X 20' X 3' SEDIMENT TRAP (ST1)
ACCESS ROAD CULVERT #5 (ARC5)
20' X 20' X 3' SEDIMENT TRAP (ST3)
ACCESS ROAD CULVERT #1 (ARC1)
ACCESS ROAD CULVERT #2 (ARC2)
COUNTY ROAD 20
POWER POLE (TYP.)
OVERHEAD POWER LINE
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
MCGAVIN 6-19HZ MLVT
FLAT GRADED ELEVATION = 4919.3'
MCGAVIN 6-19HZ FACILITY
FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'
MCGAVIN 6-19HZ WELL PAD
FLAT GRADED ELEVATION = 4929.9'
TEMPORARY EQUIPMENT AREA
TOPSOIL STOCKPILE
4915
4920
4925
4930
4935
4940
1.1% DITCH SLOPE
1.8% DITCH SLOPE
2.0% DITCH SLOPE
1.2% DITCH SLOPE
1.3% DITCH SLOPE
1.4% DITCH SLOPE
0.5% DITCH SLOPE
0.5% SLOPE
1.0% SLOPE
0.8% SLOPE
0.6% SLOPE
CUT
FILL
SP

0 75' 150'
1" = 75'
1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 75'	PAGE:	3 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC6	12" CMP	30	4923.8	4922.9	3.0%

COUNTY ROAD 13

BIKE PATH

4915

DELINEATED WETLAND

4920

4920

EXISTING PRIVATE ROAD

100-YEAR FLOODPLAIN (ZONE A)

FACILITY WEIR & SPILLWAY

FACILITY OUTLET PIPE 4925

FACILITY STORAGE BERM

2-YEAR STORMWATER STORAGE FOOTPRINT

ACCESS ROAD CULVERT #6 (ARC6)

WELL PAD OUTLET PIPE

WELL PAD WEIR & SPILLWAY

WELL PAD STORAGE BERM

PROPOSED 6' MASONRY WALL

FILL

CUT

0.5% SLOPE

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ FACILITY

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'

0.8% SLOPE

0.5% SLOPE

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.9'

0.6% SLOPE

FILL

CUT

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ WELL PAD

WELL ELEVATION = 4929.9'

0.5% SLOPE

0.5% SLOPE

4930

4930

4930

4925

ACCESS ROAD CULVERT #1 (ARC1)

COUNTY ROAD 20

POWER POLE (TYP.)

OVERHEAD POWER LINE

4935

4935

4940

4940

PRODUCTION PHASE OPERATIONAL AREA (7.08 ACRES)

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

N

0 75' 150'

1" = 75'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

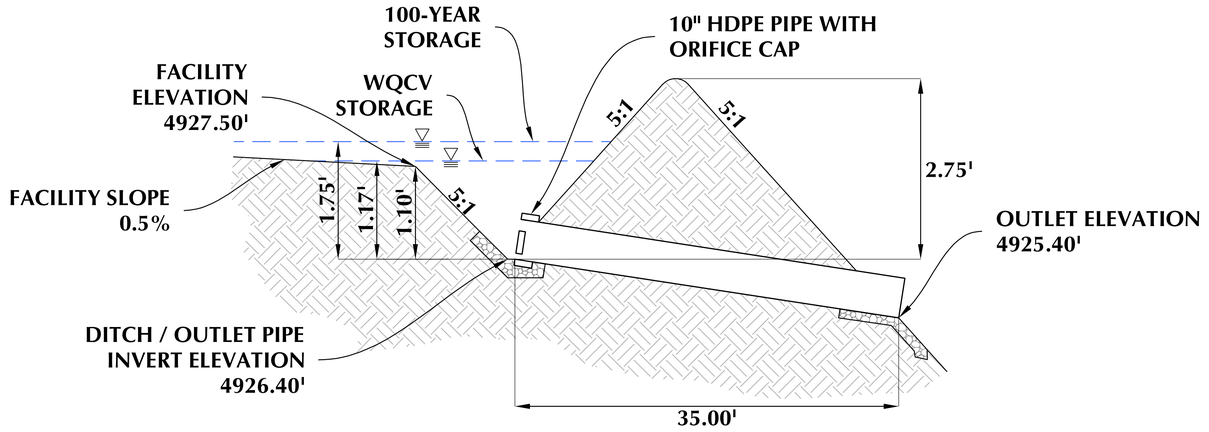
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FACILITY STORMWATER STORAGE

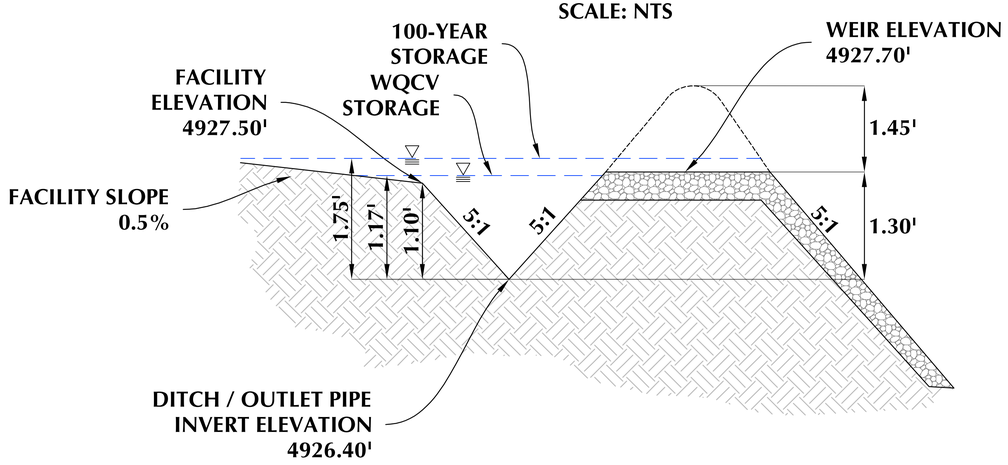
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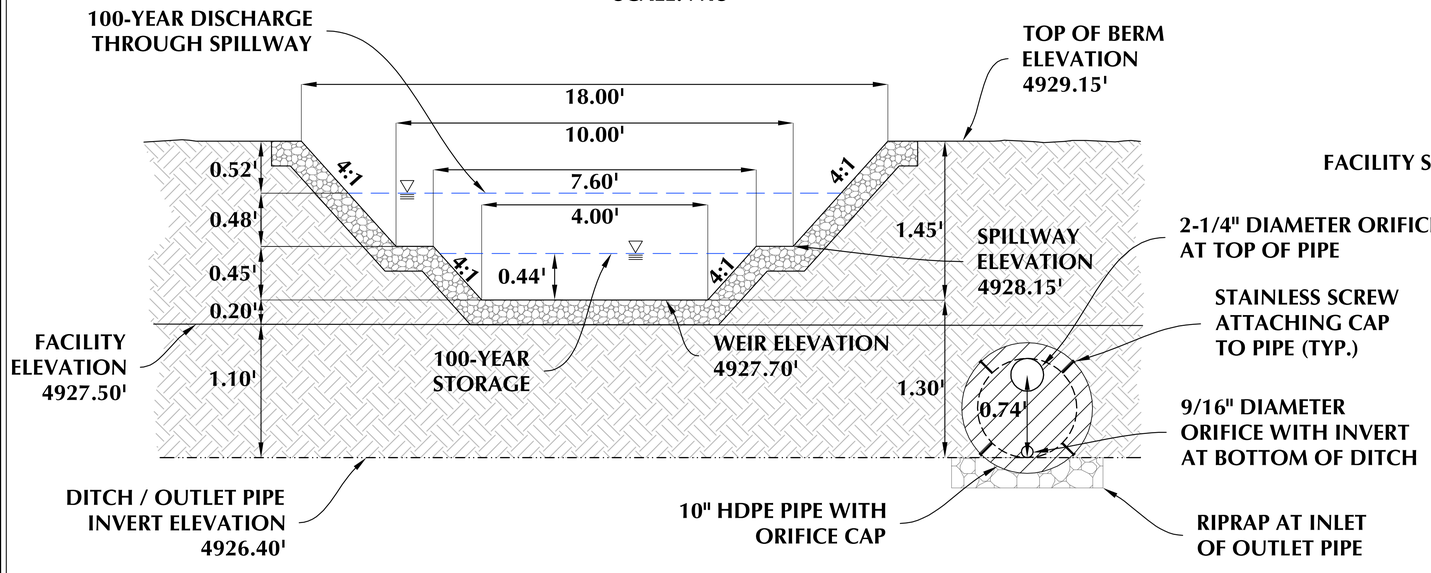
WEIR PROFILE

SCALE: NTS



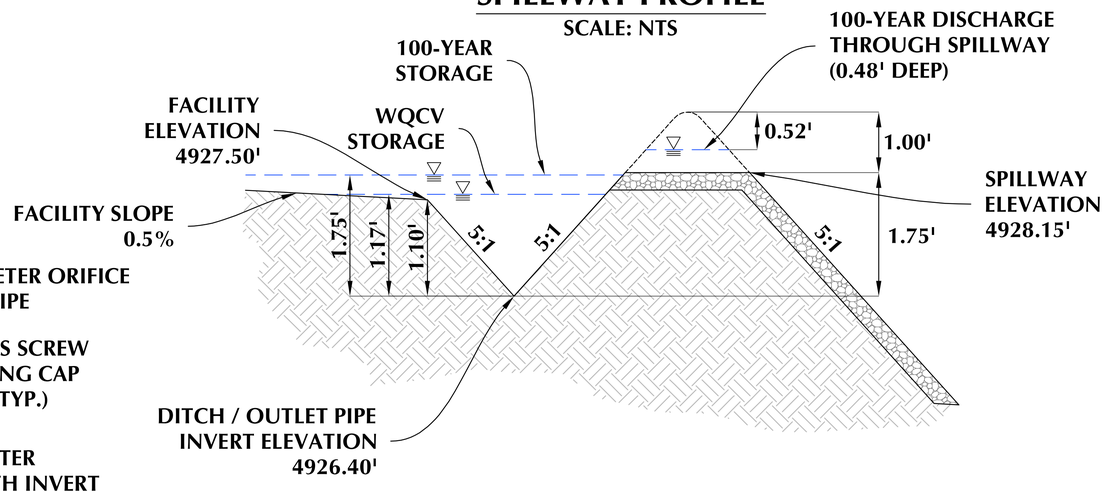
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
FACILITY STORMWATER STORAGE

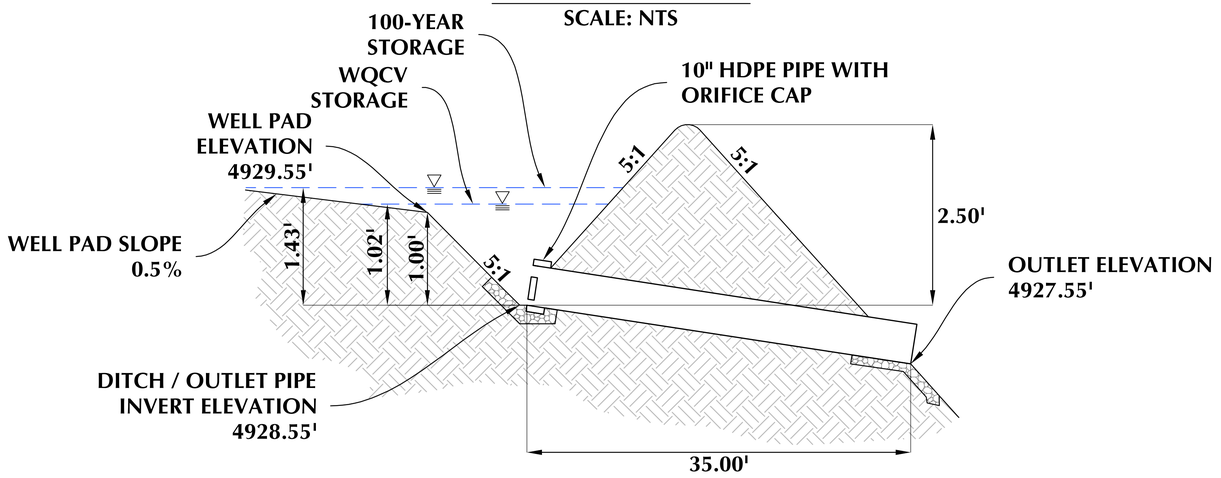
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JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	

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WELL PAD STORMWATER STORAGE

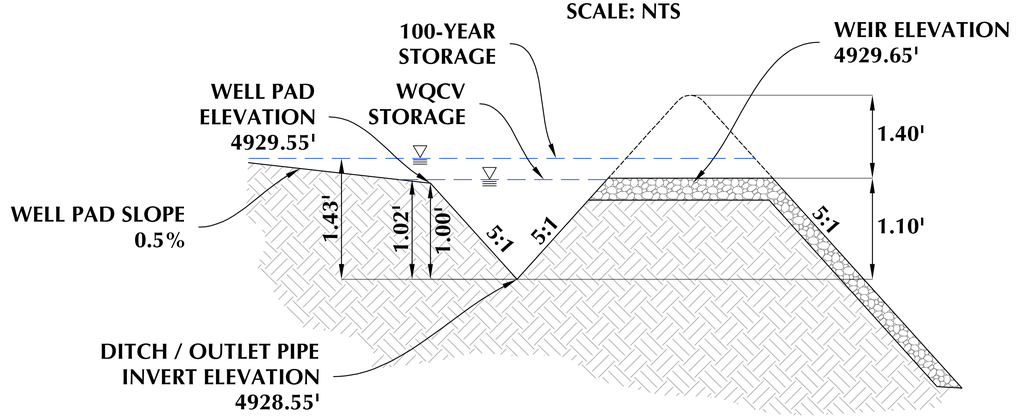
OUTLET PROFILE

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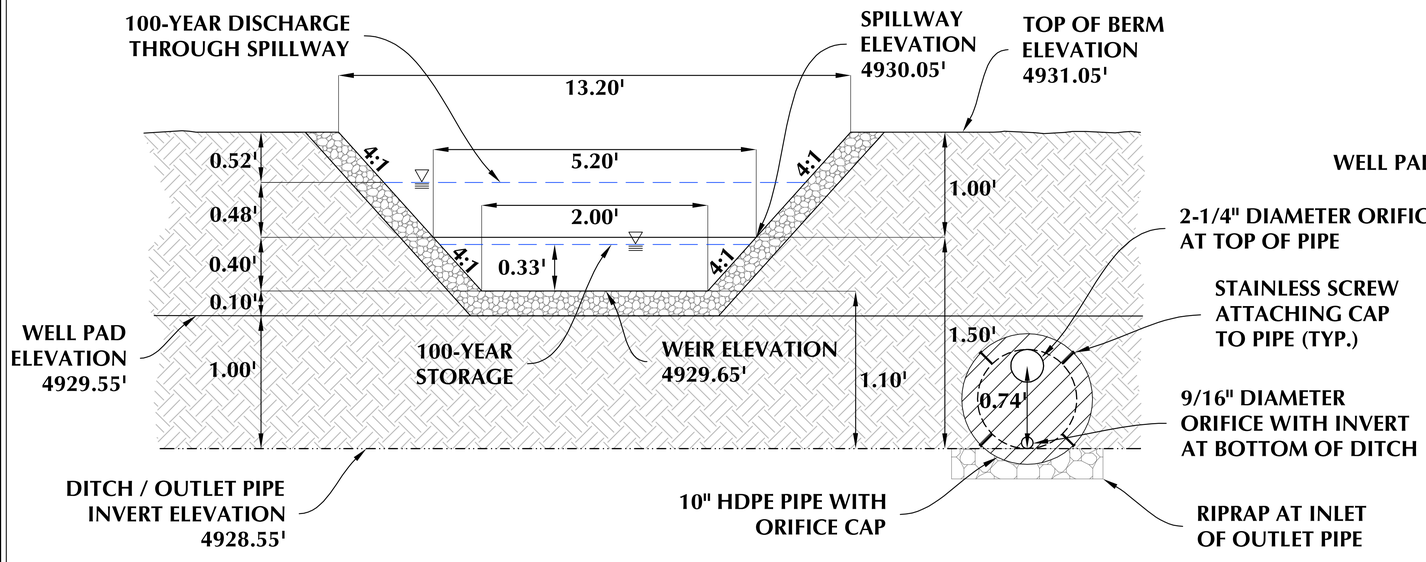
WEIR PROFILE

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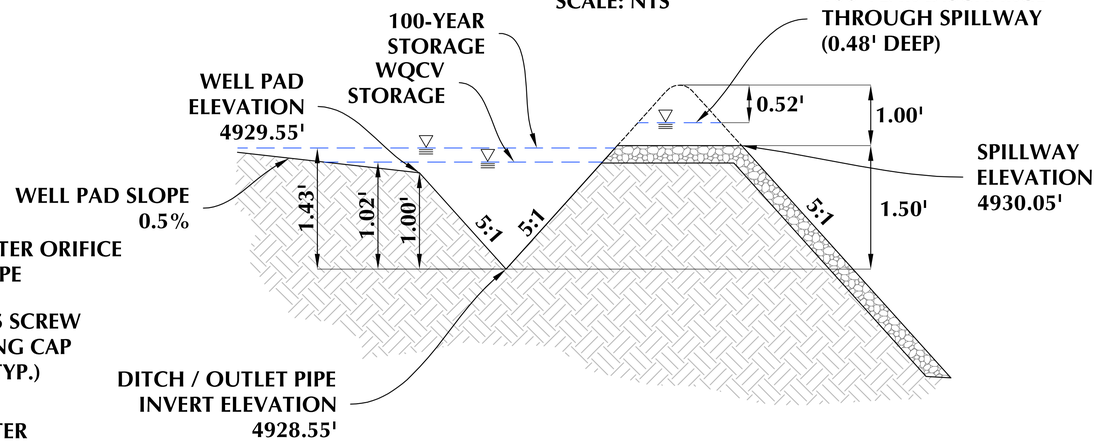
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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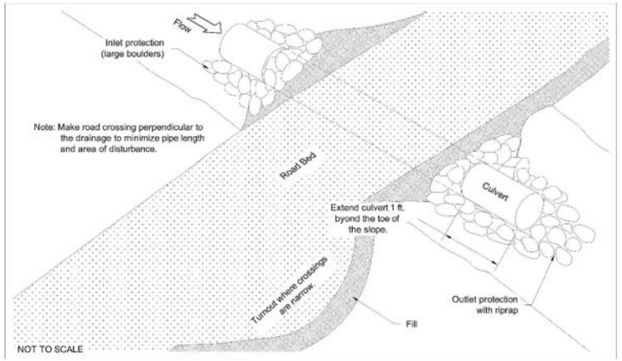
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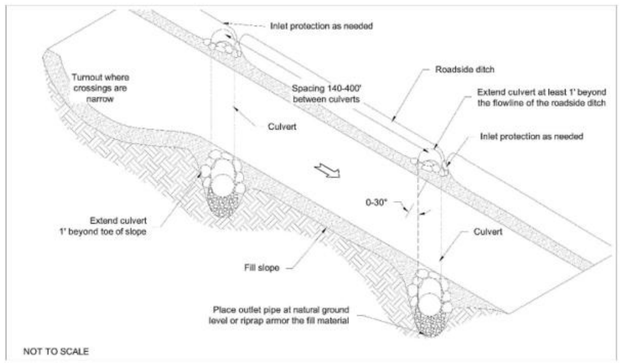
MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
WELL PAD STORMWATER STORAGE

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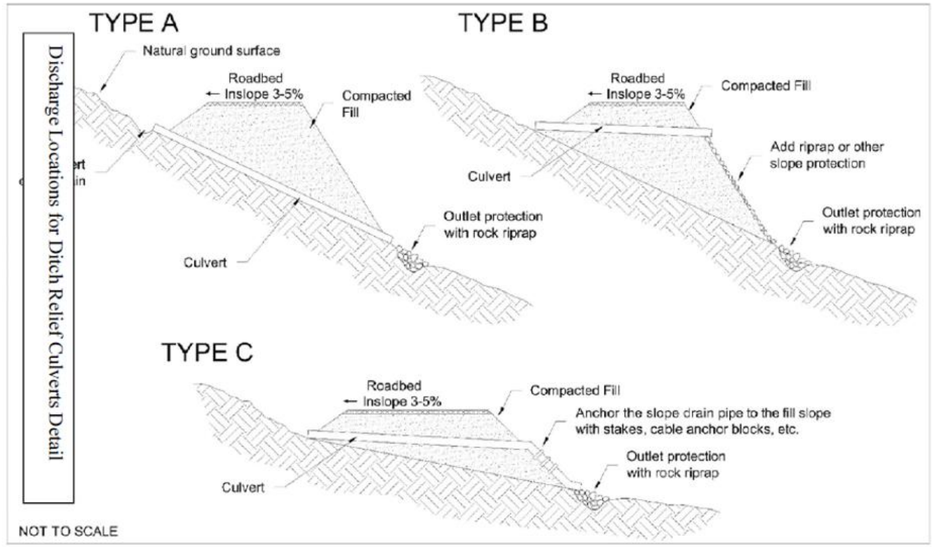
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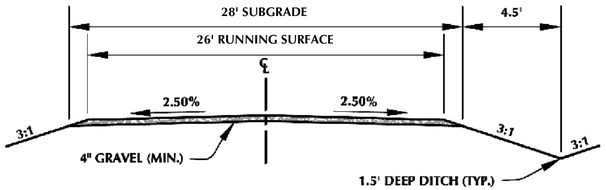
Culvert





Culvert

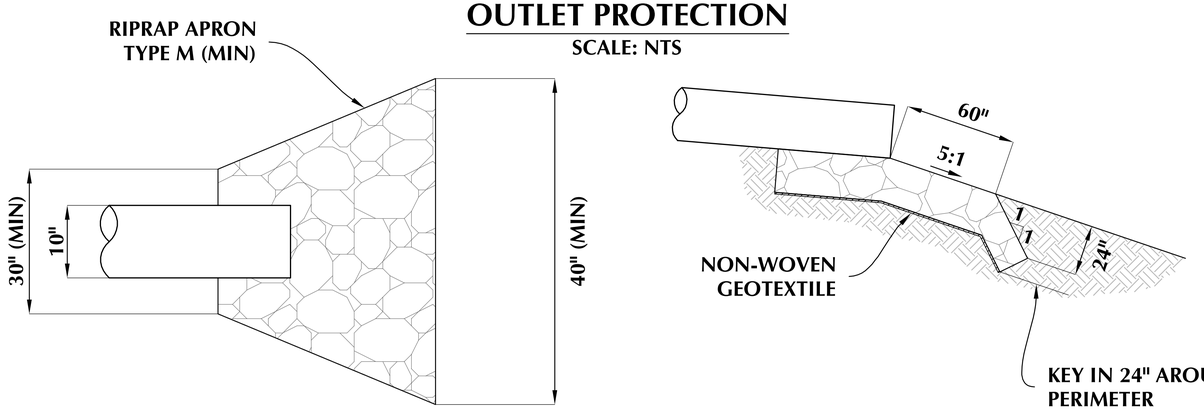




ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

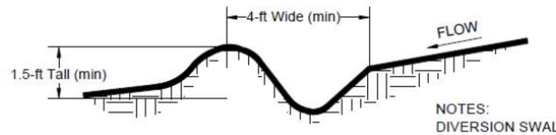
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Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

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Sediment Trap

ST

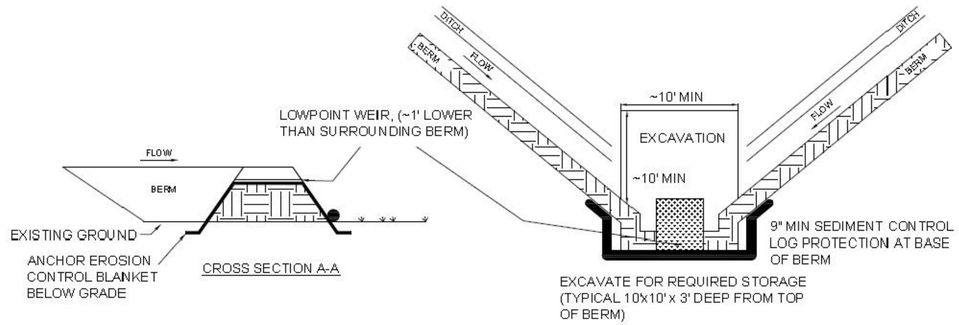
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

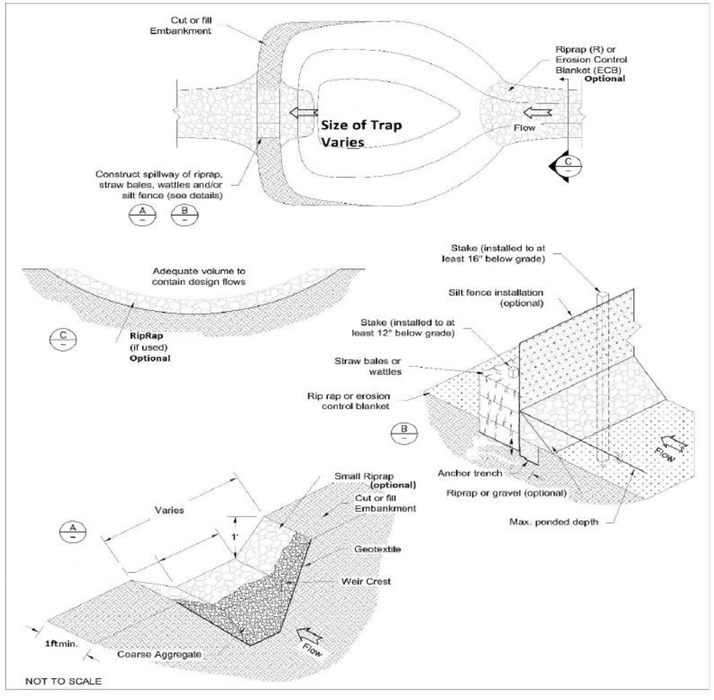
Sediment Trap

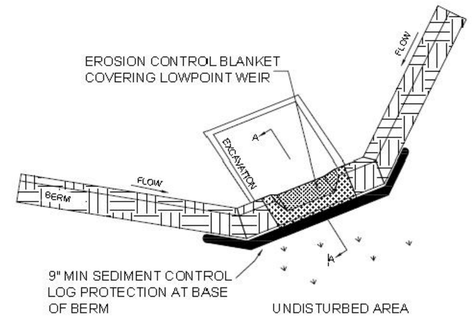
ST



Sediment Trap

ST





GENERAL NOTES:

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BMP TYPICALS (B)

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APPENDIX C

CONTROL MEASURE / BMP SPECIFICATIONS

Construction Phasing/Sequencing (CP)

CP

Description



Source: UDFCD BMP Fact Sheet

Effective construction site management to minimize erosion and sediment transport includes attention to construction phasing, scheduling, and sequencing of land disturbing activities. On most construction projects, erosion and sediment controls will need to be adjusted as the project progresses and should be documented in the SWMP. Construction phasing refers to disturbing only part of a site at a time to limit the potential for erosion from dormant parts of a site. Grading activities and construction are completed and soils are effectively stabilized on one part of a site before grading and construction begins on another portion of the site. Construction sequencing or scheduling refers to a specified work schedule that coordinates the timing of land disturbing activities and the installation of erosion and sediment control practices.

Appropriate Uses

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance. Larger projects and linear construction projects may benefit most from construction sequencing or phasing, but even small projects can benefit from construction sequencing that minimizes the duration of disturbance. Typically, erosion and sediment controls needed at a site will change as a site progresses through the major phases of construction. Erosion and sediment control practices corresponding to each phase of construction must be documented in the SWMP.

Design and Installation

BMPs appropriate to the major phases of development should be identified on construction drawings. In some cases, it will be necessary to provide several drawings showing construction-phase BMPs placed according to stages of development (e.g., clearing and grading, utility installation, active construction, final stabilization). Some municipalities in the Denver area set maximum sizes for disturbed area associated with phases of a construction project. Additionally, requirements for phased construction drawings vary among local governments within the UDFCD boundary. Some local governments require separate erosion and sediment control drawings for initial BMPs, interim conditions (in active construction), and final stabilization.

Construction Phasing/Sequencing (CP)

CP

Construction Scheduling	
Functions	
Erosion Control	Moderate
Sediment Control	Moderate
Site/Material Management	Yes

Typical construction phasing BMPs include:

- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.

- If there is carryover of stockpiled material from one phase to the next, position carryover material in a location easily accessible for the pending phase that will not require disturbance of stabilized areas to access the stockpile. Particularly with regard to efforts to balance cut and fill at a site, careful planning for location of stockpiles is important.

Typical construction sequencing BMPs include:

- Sequence construction activities to minimize duration of soil disturbance and exposure. For example, when multiple utilities will occupy the same trench, schedule installation so that the trench does not have to be closed and opened multiple times.

- Schedule site stabilization activities (e.g., landscaping, seeding and mulching, installation of erosion control blankets) as soon as feasible following grading.

- Install initial erosion and sediment control practices before construction begins. Promptly install additional BMPs for inlet protection, stabilization, etc., as construction activities are completed. Table CP-1 provides typical sequencing of construction activities and associated BMPs.

Maintenance and Removal

When the construction schedule is altered, erosion and sediment control measures in the SWMP and construction drawings should be appropriately adjusted to reflect actual "on the ground" conditions at the construction site. Be aware that changes in construction schedules can have significant implications for site stabilization, particularly with regard to establishment of vegetative cover.

Construction Phasing/Sequencing (CP)

CP

Table CP-1. Typical Phased BMP Installation for Construction Projects

Project Phase	BMPs
Pre-disturbance, Site Access	▪ Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection). ▪ Establish vehicle tracking control at entrances to paved streets. Fence as needed. ▪ Use construction fencing to define the boundaries of the project and limit access to areas of the site that are not to be disturbed. **Note: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.**
Site Clearing and Grubbing	▪ Install perimeter controls as needed on downgradient perimeter of site (silt fence, wattles, etc). ▪ Limit disturbance to those areas planned for disturbance and protect undisturbed areas within the site (construction fence, flagging, etc). ▪ Preserve vegetative buffer at site perimeter. ▪ Create stabilized staging area. ▪ Locate portable toilets on flat surfaces away from drainage paths. Stake in areas susceptible to high winds. ▪ Construct concrete washout area and provide signage. ▪ Establish waste disposal areas. ▪ Install sediment basins. ▪ Create dirt perimeter berms and/or brush barriers during grubbing and clearing. ▪ Separate and stockpile topsoil, leave roughened and/or cover. ▪ Protect stockpiles with perimeter control BMPs. Stockpiles should be located away from drainage paths and should be accessed from the upgradient side so that perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period. ▪ Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but that will be inactive for an extended period. ▪ Water to minimize dust but not to the point that watering creates runoff.

Construction Phasing/Sequencing (CP)

CP

Project Phase	BMPs
Utility And Infrastructure Installation	**In Addition to the Above BMPs:** ▪ Close trench as soon as possible (generally at the end of the day). ▪ Use rough-cut street control or apply road base for streets that will not be promptly paved. ▪ Provide inlet protection as streets are paved and inlets are constructed. ▪ Protect and repair BMPs, as necessary. ▪ Perform street sweeping as needed.
Building Construction	**In Addition to the Above BMPs:** ▪ Implement materials management and good housekeeping practices for home building activities. ▪ Use perimeter controls for temporary stockpiles from foundation excavations. ▪ For lots adjacent to streets, lot-line perimeter controls may be necessary at the back of curb.
Final Grading	**In Addition to the Above BMPs:** ▪ Remove excess or waste materials. ▪ Remove stored materials.
Final Stabilization	**In Addition to the Above BMPs:** ▪ Seed and mulch/tackify. ▪ Seed and install blankets on steep slopes. ▪ Remove all temporary BMPs when site has reached final stabilization.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Description

Vehicle tracking controls provide a stabilized construction site access where vehicles merge onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface. There are a number of different types of vehicle tracking controls. Rock pads are the most common and effective, but other forms include cattle guards and mud mats.



Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking. Source: UDFCD BMP Fact Sheet

Applicability

Typically, vehicle tracking controls are installed at locations where construction traffic leaves or enters an existing paved road.

Limitations

- Although installing vehicle tracking control is a good way to help reduce the amount of sediment leaving a site, some soil may still be deposited from vehicle tires onto paved surfaces. To further reduce the chance of these sediments polluting stormwater runoff, sweeping of the paved area adjacent to the access is recommended.
- Heavy traffic and wet conditions will result in more frequent maintenance.
- May not be needed when access points are off unpaved roads.

Construction Specifications

Aggregate Vehicle Tracking Control (VTC)

This is a coarse-aggregate surfaced pad. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires. Typically, a geotextile should be placed between the rock and the soil surface. If the aggregate surfaced pad is not anticipated to be in use for a long duration and/or if it has limited traffic, the geotextile may be omitted.

Cattle Guard (CG)

A prefabricated rack, such as a cattle guard, may be used to reduce the amount of sediment that leaves the site on vehicle tires.

Mud Mat or TRM (MM)

This type of control may be appropriate for access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove significant sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Maintenance and Removal

Inspect the area for degradation and replace the aggregate or material used for a stabilized entrance/exit as needed. If the area becomes clogged and ponds water, remove and dispose of excess sediment or replace material with a fresh layer of aggregate as necessary.

With aggregate vehicle tracking controls, ensure rock and debris from this area do not enter the public right-of-way.

Remove sediment that is tracked onto the public right of way daily or more frequently as needed. Excess sediment in the roadway indicates that the stabilized construction entrance requires maintenance.

Ensure that drainage ditches at the entrance/exit area remain clear.

A stabilized entrance should be removed only when the potential for off-site vehicle tracking no longer exists. This is typically after the site has been stabilized.

When wheel wash equipment is used, be sure that the wash water is discharged to a sediment trap prior to discharge. Also inspect channels conveying the water from the wash area to the sediment trap, and stabilize areas that may be eroding or have the potential to erode.

When a construction entrance/exit is removed, excess sediment from the aggregate should be removed and disposed of appropriately. The entrance should be promptly stabilized with a permanent surface following removal, typically by paving.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

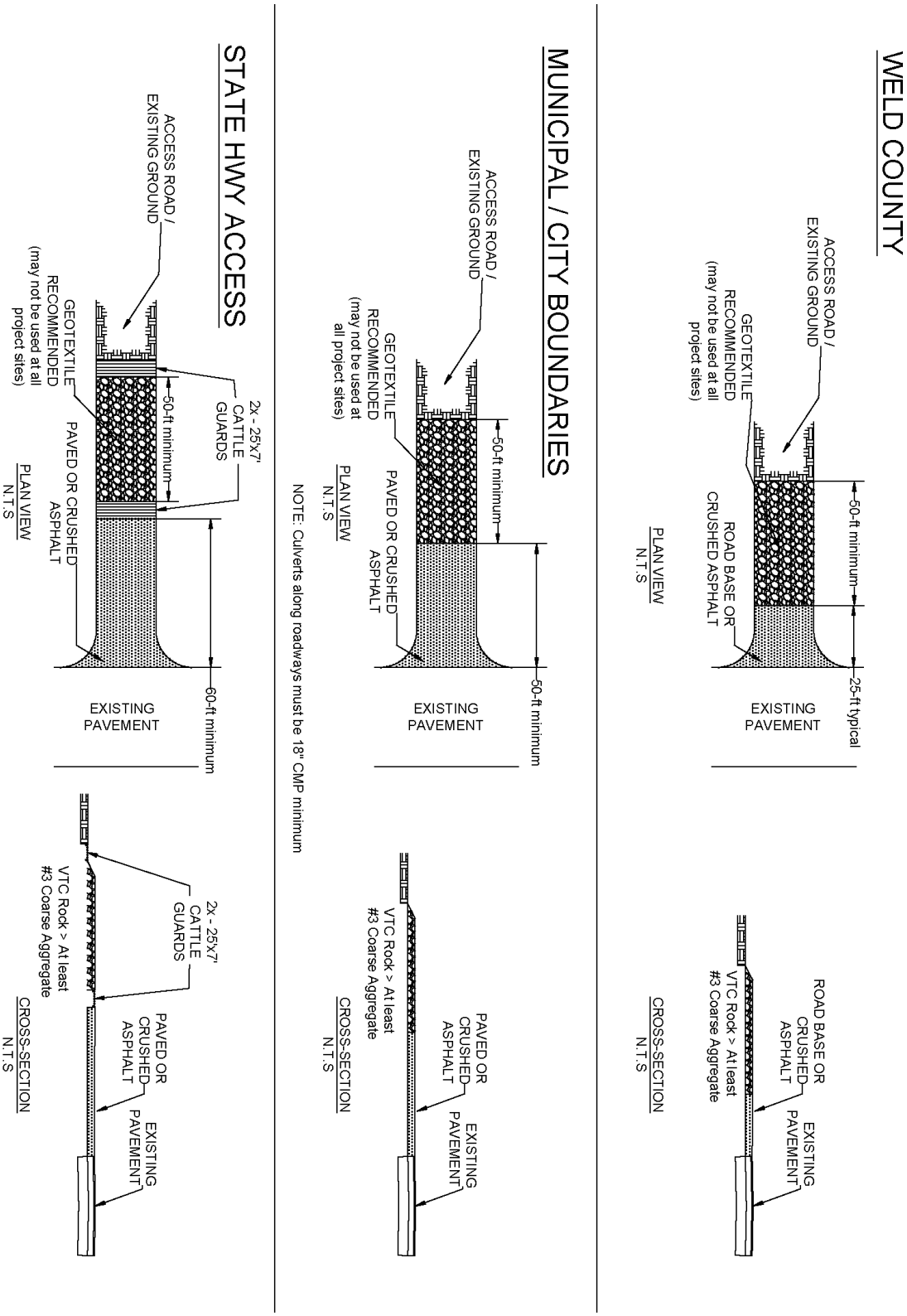
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United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

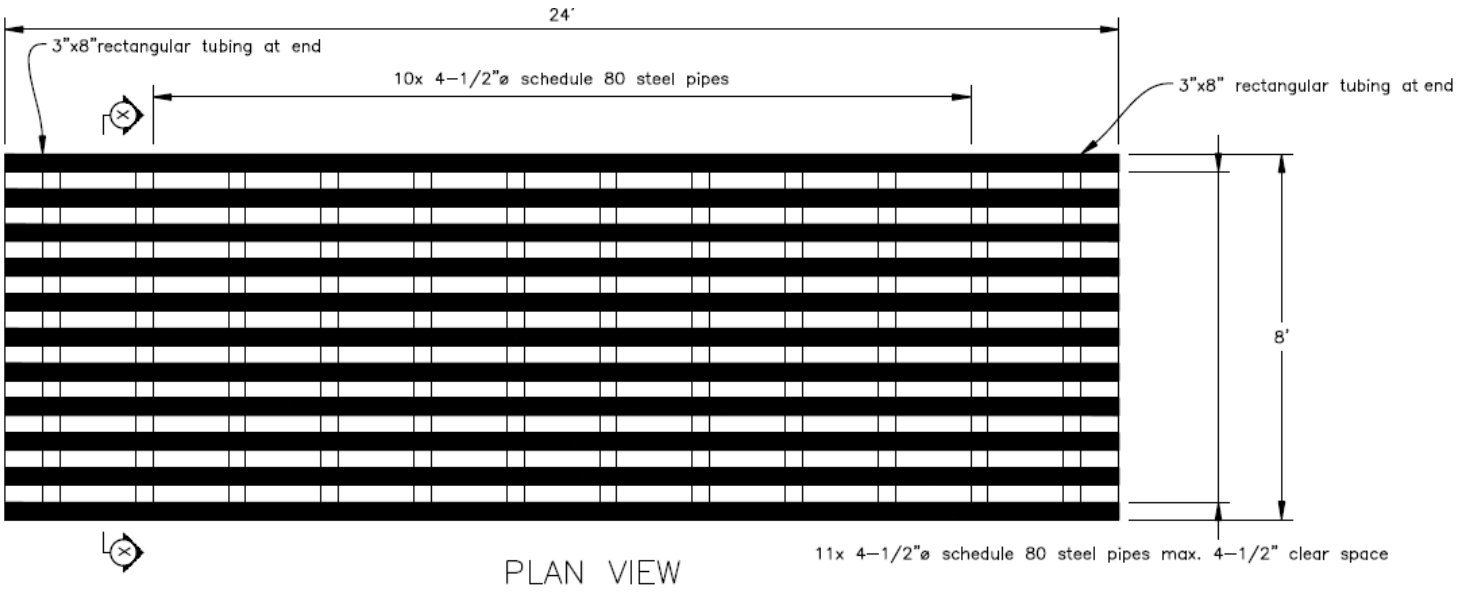
VTC/CG/MM

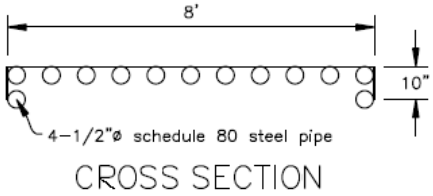


AGGREGATE VEHICLE TRACKING CONTROL DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM





These are typical dimensions for cattle guards; however, variations can be made per landowner agreements.

Typically 4- or 4½-inch pipe is used on the top but can be less if requested by landowner.

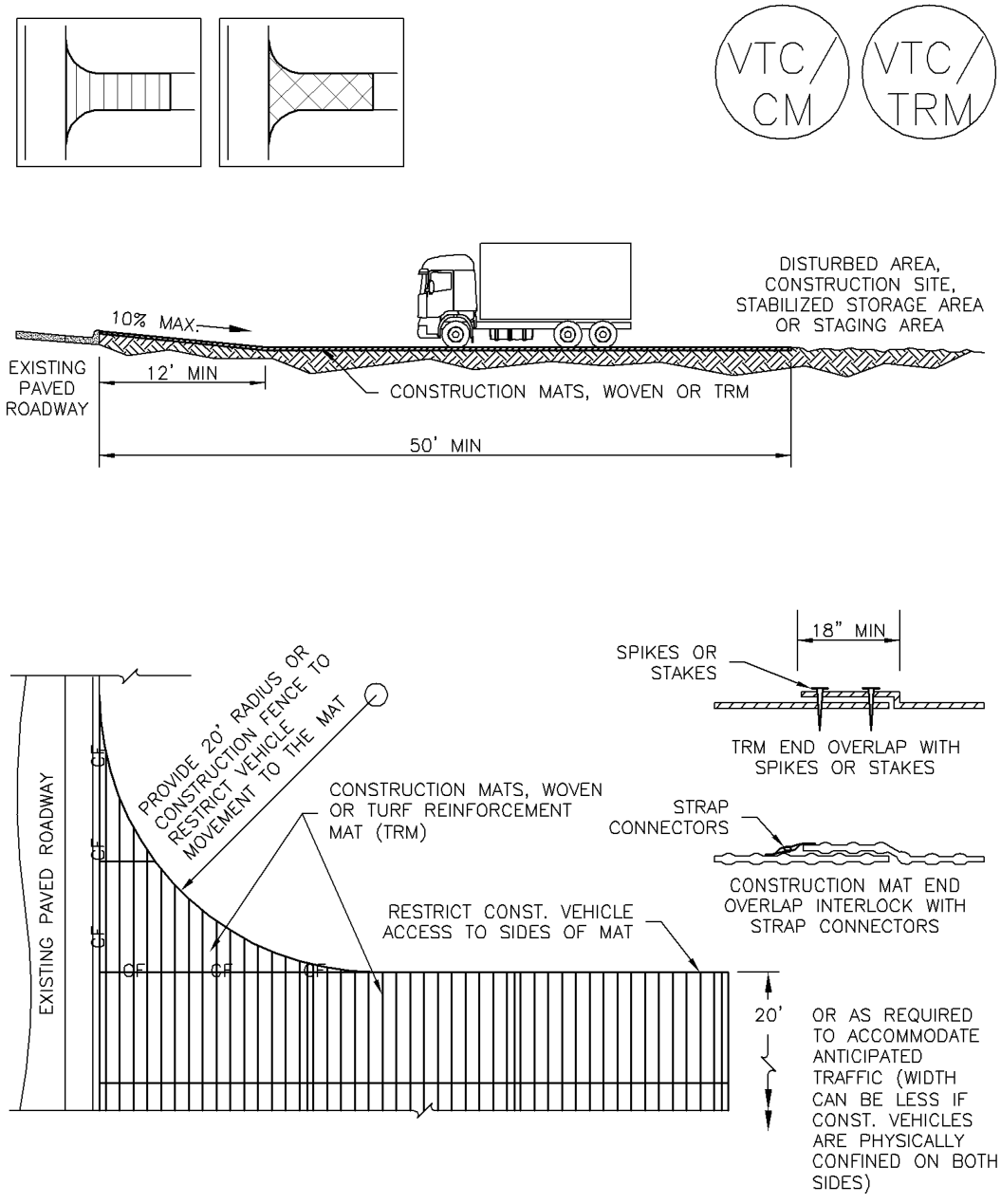




CATTLE GUARD DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM



VTC–3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM)

MUD MAT OR TRM DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S).
   –TYPE OF CONSTRUCTION ENTRANCE(S)/EXITS(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).

2. CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.

3. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT–OF–WAYS.

4. STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

5. A NON–WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.

6. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.

5. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

Diversion Ditch and Berm

DD

Definition



A ditch and berm is a drainage swale with a parabolic or trapezoidal cross-section and a supporting ridge on the lower side that is constructed across the slope. The purpose of a ditch and berm diversion is to prevent off-site stormwater runoff from entering a disturbed area, to prevent sediment laden storm runoff from leaving the construction site or disturbed area, and to direct sediment laden runoff to a sediment control feature.

Applicability

Ditch and berms may be designed for temporary or permanent use. The maximum drainage area for a temporary ditch and berm is ten acres. For undisturbed drainage areas larger than ten acres, a permanent earthen dike / berm may be designed or used for larger flows. Ditch and berms may be used for:

- The upslope of cut or fill slopes to convey or divert flows away from disturbed areas;
- The downslope of cut or fill slopes to divert on-site runoff to a stabilized outlet or sediment control feature;
- The outer edge of a well pad to ensure that runoff remains on the pad and is diverted to a sediment pond or trap, if available;
- Where runoff from higher areas has the potential for causing erosion, or for interfering with and/or preventing the establishment of vegetation on lower areas;
- Where the length of slopes need to be reduced so soil loss will be kept to a minimum; and
- The perimeter of a site or disturbed area.

Limitations

- The area around the ditch and berm that is disturbed during its construction shall be stabilized (typically by maintaining existing vegetation).
- To effectively manage erosion, ditch and berms must be directed into a stabilized outlet, well-vegetated area, or to alternative sediment control measures.
- Temporary ditch and berms should be designed to avoid crossing vehicle pathways.
- Ditch and berms should be used with caution on soils subject to slippage.

Design Criteria

For a temporary ditch and berm (drainage less than 10 acres), no formal design is necessary.

Location

Ditch and berms are usually located above or below cut or fill slopes. Exact ditch and berm location(s) shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, and the development layout. Whenever possible, preserve existing vegetation between the edge of the cut or fill slope and the ditch and berm.

Diversion Ditch and Berm

DD

Capacity

For a permanent design, constructed ditch and berm features shall have the capacity to carry, at a minimum, the peak discharge from a 10-year frequency rainfall event with freeboard of no less than 0.3 feet.

Cross section See Figure DD-1 for details.

The ditch and berm shall be parabolic or trapezoidal in shape, if possible. The ditch and berm shall have compacted, stable, side slopes. The side slopes shall be flat enough to ensure ease of maintenance of the ditch and berm.

Velocity and grade

The permissible velocity for the specific soil type will determine the maximum grade. The maximum permissible velocity for sand and silt channels is 3 feet per second, and 5 feet per second for clay vegetated channels. Ditch and berms are usually not applicable below high sediment producing areas unless structural measures, designed to prevent accumulations of sediment within the channel, are installed within the ditch and berm.

Construction Specifications

General

- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the ditch and berm.
- All ditch and berms shall have uninterrupted positive grade to an outlet.
- Diverted runoff from a disturbed area shall be conveyed to a sediment control measure.
- Diverted runoff from an undisturbed area shall outlet to a sediment control measure or into an undisturbed stabilized area at non-erosive velocities.

Temporary diversion ditch and berm (typically at edge of disturbance) See figure DD-1

- The ditch and berm shall be excavated or shaped to line, grade, and cross section as required to meet the site-specific criteria. **The ditch and berm must be compacted.**
- This is accomplished by excavation of a U-shaped or trapezoidal trench or ditch, and compaction of the fill on the downslope side of the cut.
- Stabilization with vegetation is not required, so long as adequate sediment traps or other sediment control devices are provided at outlets.
- Inspect the ditch for adequate capacity, erosion, or damage. If there is reoccurring erosion, consider installing check dams or lining the channel.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Channels should be cleared of sediment and repairs made when necessary. Maintain ditch and berm capacity, ridge height, especially if high-sediment yielding areas are in the

drainage area above the ditch and berm. Redistribute the sediment as necessary to maintain the capacity of the ditch and berm.

Removal

Temporary ditch and berms shall remain in place only until the disturbed areas are re-graded and prepared for permanent stabilization. Permanent ditch and berms shall remain in place.

References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February, 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

United States Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), *Field Office Technical Guide.* 2002. http://www.nrcs.usda.gov/technical/efotg/

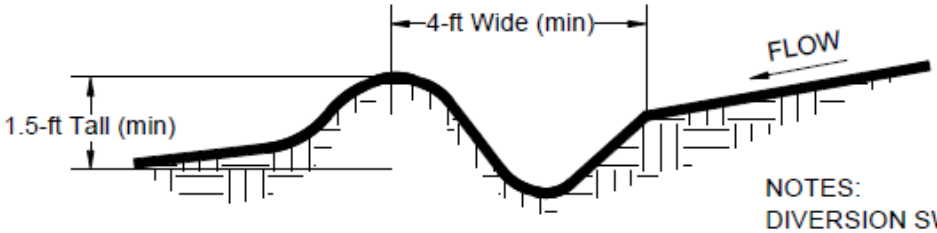
Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011. http://www.mde.state.md.us/PROGRAMS/WATER/STORMWATERMANAGEMENTPROGRAM/SOILEROSIONANDSEDIMENTCONTROL

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control.* 2012. https://www.codot.gov/business/designsupport/standard-plans/2012-m-standards-plans/2012-m-standards-pdfs/10-temproary-erosion-control/m-208-1-temp-erosion-control

Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

References: Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011.

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control*. 2012.

Sediment Control Log (SCL)

SCL

Description

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.





Photographs SCL-1 and SCL-2. Sediment control logs used as 1) a perimeter control around a soil stockpile; and, 2) as a "J-hook" perimeter control at the corner of a construction site.
Source: UDFCD BMP Fact Sheet

Appropriate Uses

Sediment control logs can be used in the following applications to trap sediment:

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

Design and Installation

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

Sediment Control Log	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	No

Sediment Control Log (SCL)

SCL

Although sediment control logs initially allow runoff to flow through the BMP, they can quickly become a barrier and should be installed is if they are impermeable.

Design details and notes for sediment control logs are provided in Detail SCL-1. Sediment logs must be properly trenched and staked into the ground to prevent undercutting, bypassing and displacement. When installed on slopes, sediment control logs should be installed along the contours (i.e., perpendicular to flow).

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

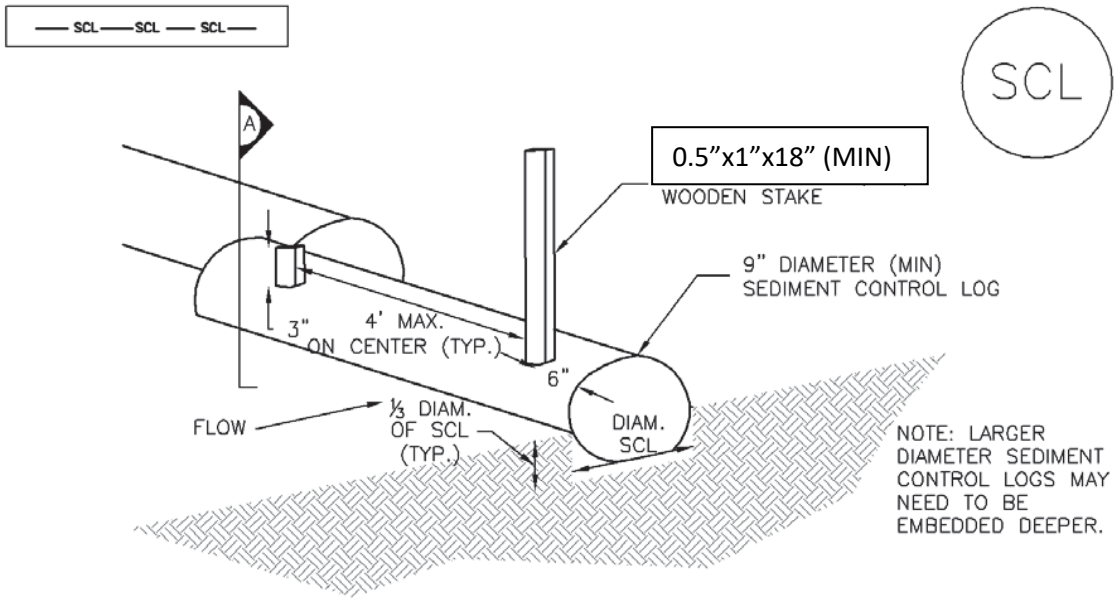
Maintenance and Removal

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

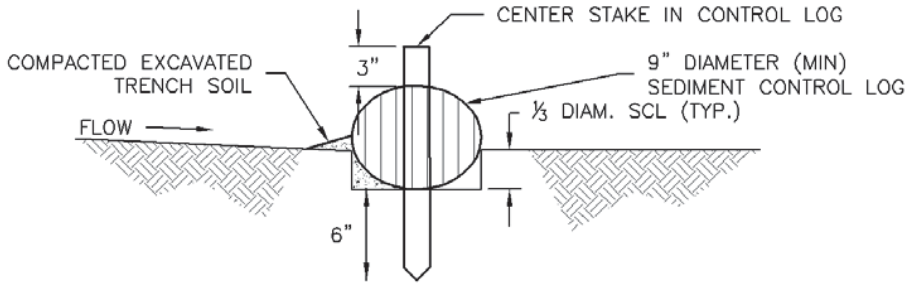
Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

Sediment Control Log (SCL)

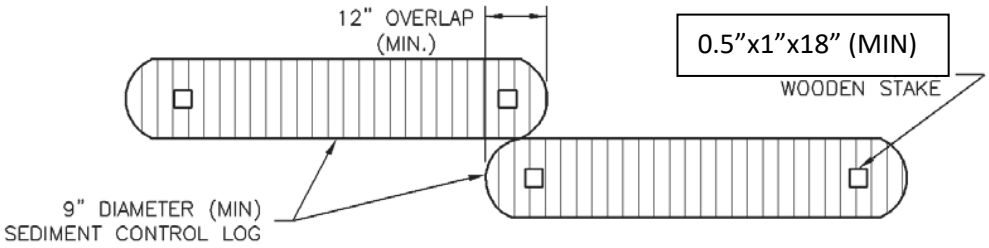
SCL



SEDIMENT CONTROL LOG



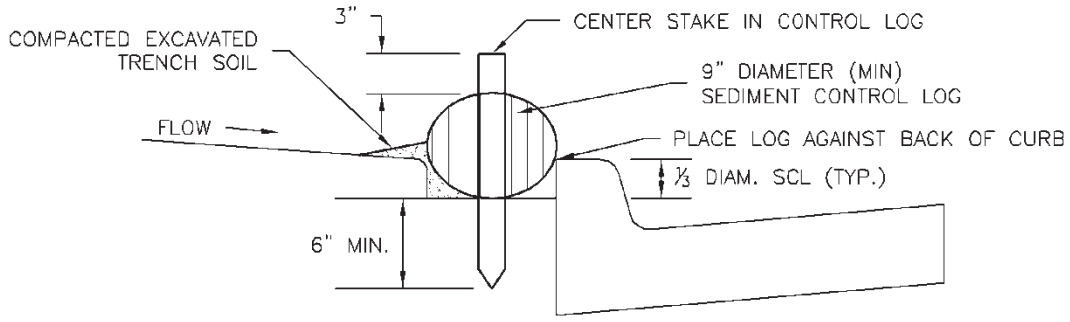
SECTION A



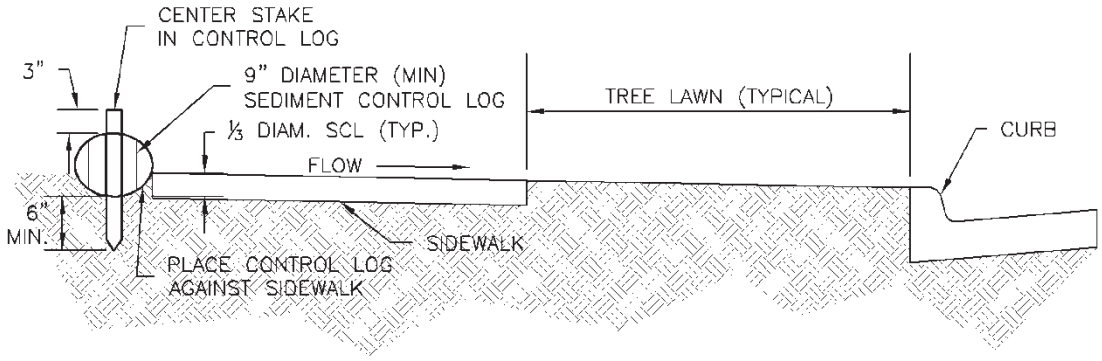
SEDIMENT CONTROL LOG JOINTS

SCL–1. SEDIMENT CONTROL LOG

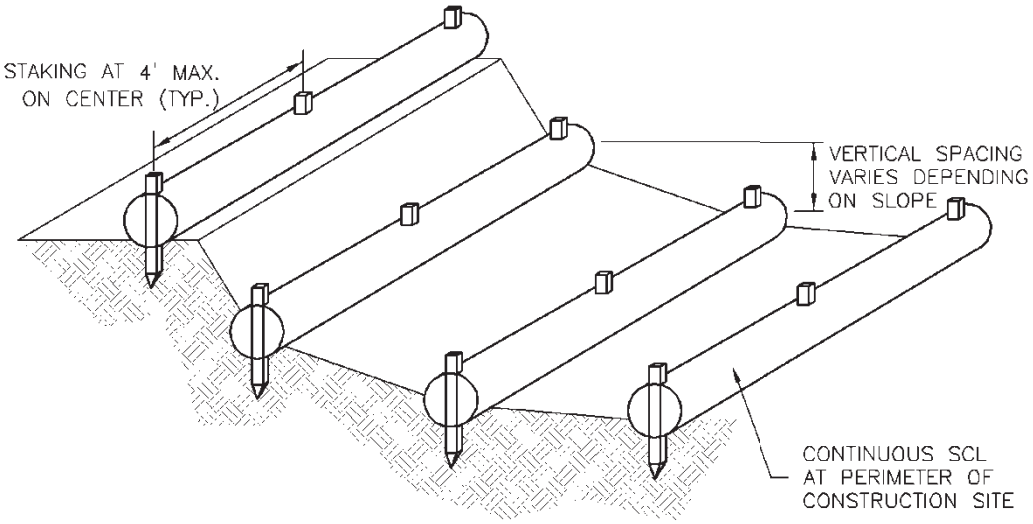
Sediment Control Log (SCL)



SCL–2. SEDIMENT CONTROL LOG AT BACK OF CURB



SCL–3. SEDIMENT CONTROL LOG AT SIDEWALK WITH TREE LAWN



SCL–4. SEDIMENT CONTROL LOGS TO CONTROL SLOPE LENGTH

Sediment Control Log (SCL)

SCL

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.

2. SEDIMENT CONTROL LOGS *THAT ACT* AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR *TO* ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.

3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.

4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES. HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE WAYS.

5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND *TO* A DEPTH OF APPROXIMATELY .l3 OF THE DIAMETER OF THE LOG. IF TRENCHING *TO* THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT *TO* DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST STAKING

6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.

7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4' CENTERS AND EMBEDDED A MINIMUM OF 6" INTO THE GROUND. 3" OF THE STAKE SHALL PROTRUDE FROM THE TOP OF THE LOG. STAKES THAT ARE BROKEN PRIOR *TO* INSTALLATION SHALL BE REPLACED.

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY *TO* MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED *TO* MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY)2 OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.

5. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO. JEFFERSON COUNTY, COLORADO, DOUGLAS COUNTY, COLORADO, AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Check Dam (CD)

CD

Description



Check dams are small, temporary dams constructed across a swale or roadside ditch. Check dams can be constructed using rock, sandbags, gravel bags, earth with erosion control blanketing, sediment control logs, or synthetic materials to slow the velocity of concentrated flow in a channel and thus reduce erosion. As a secondary function, check dams can also be used to catch sediment from the channel itself or from the contributing drainage area as stormwater runoff flows through or over the structure.

Applicability

Check dams are most often used in small, open channels with contributing drainage area of less than 10 acres and side slopes of 2:1 or less. Check dams may be used in the following applications.

- In swales or roadside ditches where it is not practical to line the channel or implement other flow control and sediment control practices;
- In swales or roadside ditches where temporary seeding has been recently implemented but has not had time to take root and fully develop;
- As a series of check dams, spaced at appropriate intervals, used in one of the above two applications.

Rock ditch checks should be **perpendicular** to the flowline of the ditch and must be designed so that water can flow over them, not around them. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the low point on the crest of the check. Where multiple check dams are used, the top of the lower dam should be at the same elevation as the toe of the upper dam.

The following table provides check spacing for a given ditch grade:

Ditch Grade (Percent)	Check Spacing (feet)	Check Spacing (meters)
5	59	18
6	49	15
7	43	13
8	36	11
9	33	10
10	30	9

Limitations

- Check dams should not be used in live, continuously flowing streams unless approved by an appropriate regulatory agency.
- Check dams may require frequent removal of accumulated sediments. Dams should therefore be located in areas accessible to maintenance vehicles.
- Leaves have been shown to be a significant problem by clogging check dams in the fall. Therefore, increased inspection and maintenance may be required in the fall.
- Sediment control log check dams decompose over time, and may be consumed by livestock.

Construction Specifications

- Install straw bale check dams, rock check dams, and other check dams according to design criteria outline at the end of the BMP Fact Sheet.
- Check dams should be located in areas accessible to maintenance vehicles for the periodic removal of accumulated sediments.
- Check dams should be installed with careful placement of the construction material. Do not dump rocks into the drainage channel carefully place material to construct the check dams.
- Check dams can be constructed from a number of different materials. Most commonly, they are made of sediment control log or rock. When using rock, the material diameter should be four to eight inches depending on the expected velocity and quantity of runoff within the channel. Sand/gravel bags may also be used. Silt fence is not an appropriate material for check dams.
- When reinforced check dams are used, install erosion control fabric around the dam to prevent erosion on the upstream and downstream sides. Each section of the check dam should be keyed in with good contact with the ground surface and extend to the top of the swale/ditch.
- When installing more than one check dam in a channel, outlet erosion stabilization measures should be installed below the final dam in the series because this area is likely to be vulnerable to further erosion. Riprap, erosion control blanket lining, or some other stabilization measure can be used for this outlet/energy dissipation.

Maintenance and Removal

Replace missing rocks causing voids in the check dam. If gravel bags or sandbags are used, replace or repair torn or displaced bags.

Remove accumulated sediment, as needed to maintain BMP effectiveness, typically before the sediment depth upstream of the check dam is within ½ of the crest height. Remove accumulated sediment prior to mulching, seeding, or chemical soil stabilization. Removed sediment can be incorporated into the earthwork with approval from the Project Manager, or disposed of at an alternate location in accordance with the standard specifications.

Check dams constructed in permanent swales should be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment should be removed, and the area seeded and mulched, or otherwise stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm
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Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

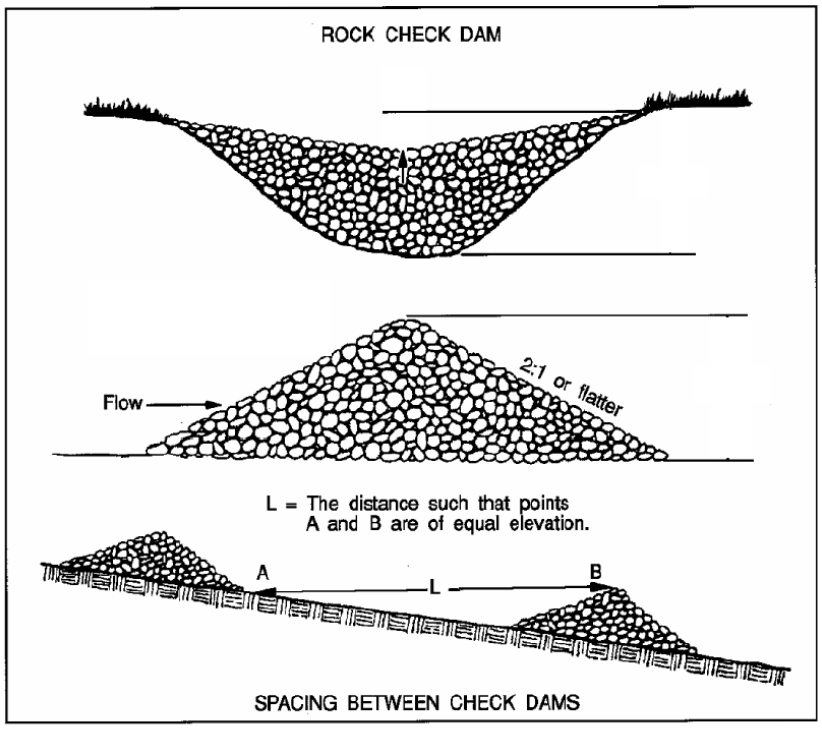
North Dakota Department of Health Division of Water Quality, *A Guide to Temporary Erosion-Control Measures for Contractors, Designers and Inspectors, June 2001.*

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

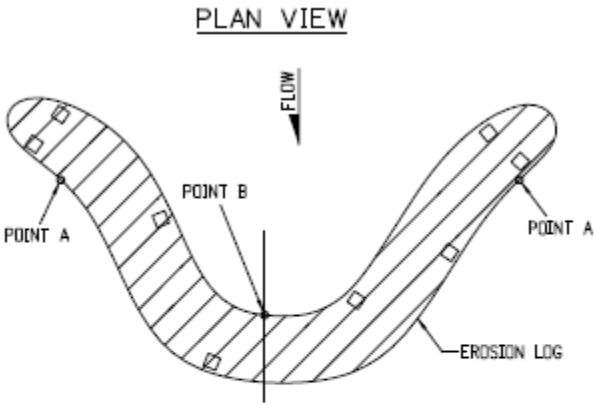
Check Dam (CD)

CD

Design Criteria

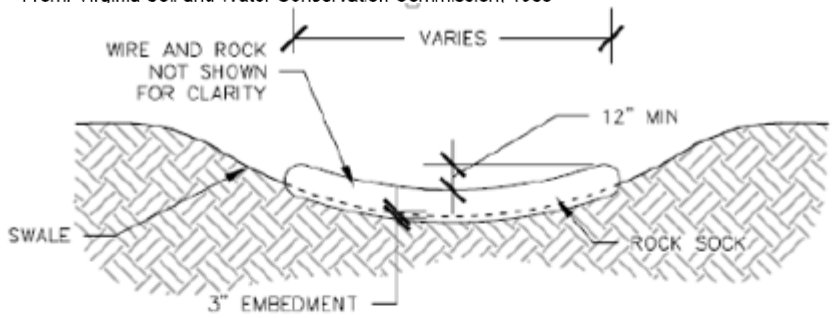


From: Virginia Soil and Water Conservation Commission, 1985

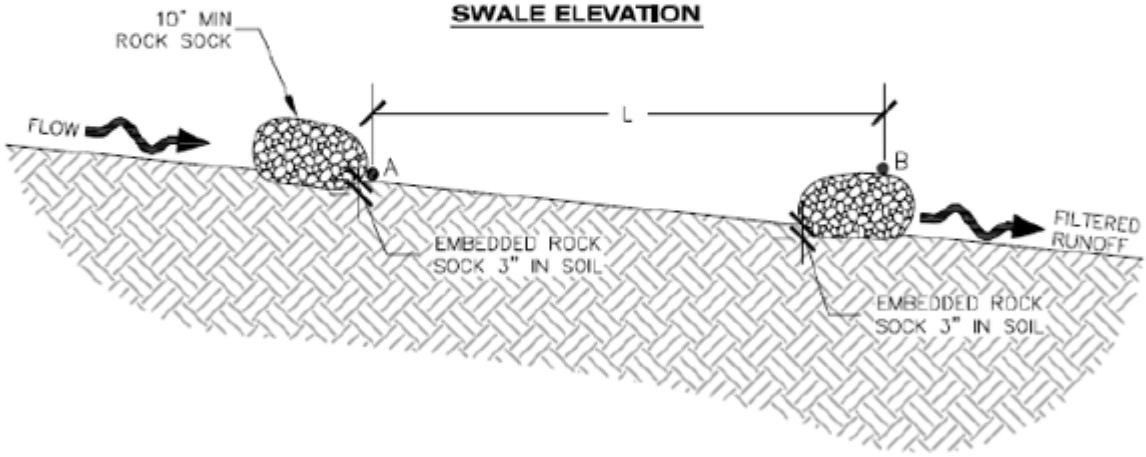


NOTES

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. STAKES SHALL BE EMBEDDED TO A MINIMUM DEPTH OF 12 INCHES.
3. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.



SWALE ELEVATION



L = THE DISTANCE SUCH THAT POINT A AND B ARE OF EQUAL ELEVATION.

SWALE SPACING

ROCK SOCK IN SWALE

CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF CHECK DAMS.
   - –CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - –LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).

2. CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.

3. RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").

4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.

5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.

5. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

6. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Basin (SB)

SB

Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.



Photograph SB-1. Sediment basin at the toe of a slope. Photo courtesy of WWE. Source: UDFCD BMP Fact Sheet

Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume**: Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent "clean" runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft^3/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft^3/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.

- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.

- **Dam Embankment**: It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- **Inflow Structure**: For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins

Imperviousness (%)	Additional Storage Volume (ft^3) Per Acre of Tributary Area
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works**: The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:

  - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.

  - **Orifice Plate or Riser Pipe**: Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.

  - **Floating Skimmer**: If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.

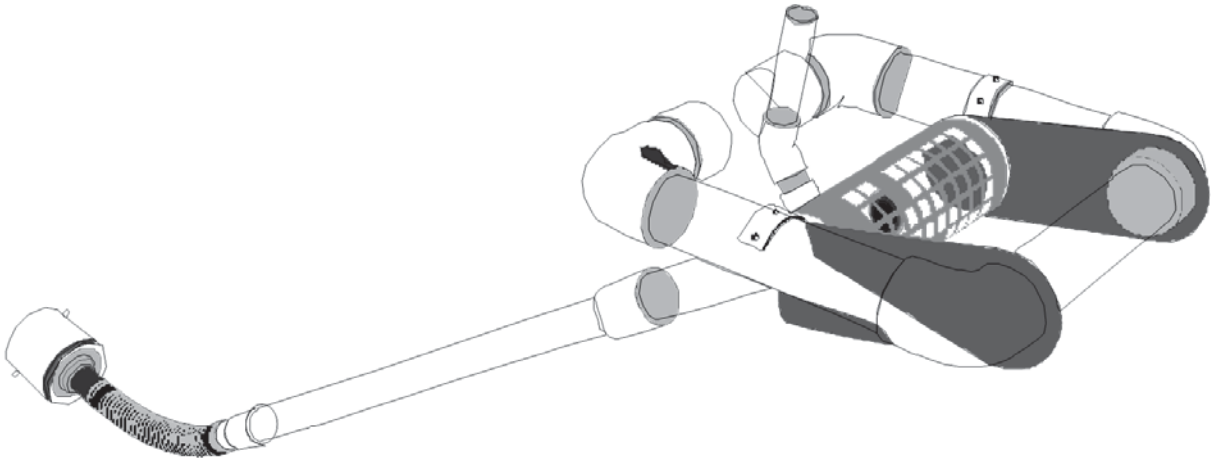


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

Maintenance and Removal

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

Sediment Basin (SB)

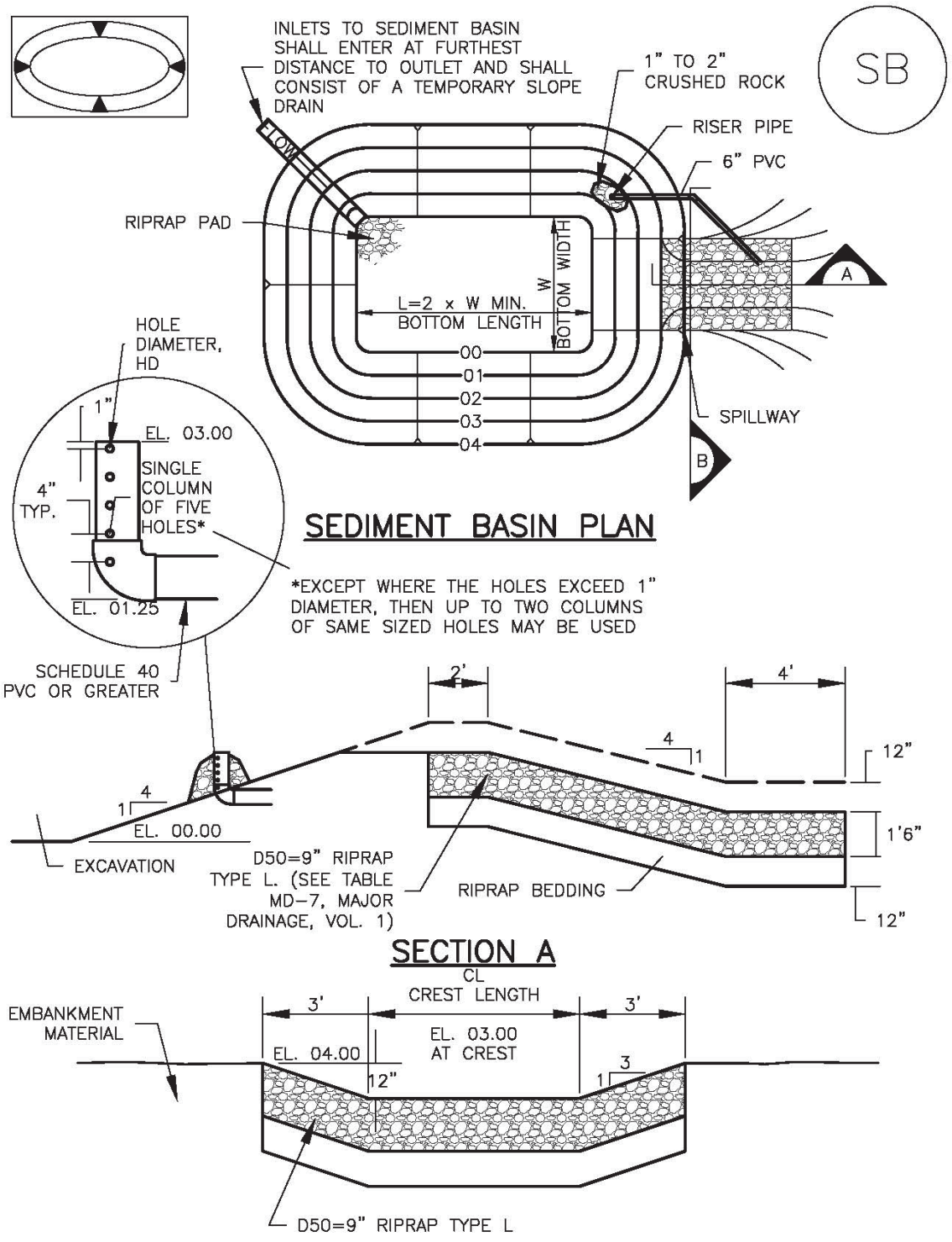


TABLE SB–1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 ½	2	9/32
2	21	3	13/16
3	28	5	½
4	33 ½	6	9/16
5	38 ½	8	21/32
6	43	9	21/32
7	47 ¼	11	25/32
8	51	12	27/32
9	55	13	⅞
10	58 ¼	15	15/16
11	61	16	31/32
12	64	18	1
13	67 ½	19	1 1/16
14	70 ½	21	1 ⅛
15	73 ¼	22	1 3/16

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF SEDIMENT BASIN.
   - –TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
   - –FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
   - –FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.

2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.

3. SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.

4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.

5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.

6. PIPE SCH 40 OR GREATER SHALL BE USED.

7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).

5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.

6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Trap

ST



Description

Sediment traps are small collection areas that allow sediment to settle out of stormwater runoff. They are usually installed in a drainage way or other point of discharge from a disturbed area. Sediment traps are formed by excavating below grade and/or by constructing an earthen embankment.

Applicability

Sediment traps are generally temporary control measures used at the outlets of stormwater diversion structures, channels, slope drains, construction site entrance wash racks, or any other runoff conveyance that discharges waters containing erosion sediment and debris. Sediment traps should be used for drainage areas less than five acres. The effective life span of these temporary structures is usually limited to 24 months. Traps may be located in a series to allow for backup control in case one trap fails.

Limitations

- Regular maintenance is needed to remove sediment. Traps should be located near roads or where accessible to remove sediment.
- Although sediment traps allow eroded soils to settle, due to the short detention periods for stormwater, traps typically do not remove fine particles such as silts and clays.
- Water may remain in sediment traps for extended periods causing mosquitoes and other insects to gather. Locate the trap in a sunny spot if possible.
- Never construct a sediment trap on a live flow stream or in wetlands.

Design Criteria

Location

Traps should be located at points of discharge from disturbed areas. The location will be determined by the natural terrain, drainage pattern of the runoff, and the accessibility for maintenance. Sediment traps should not be located in areas where their failure due to stormwater runoff excess can lead to further erosive damage of the landscape. Alternative diversion pathways should be designed to accommodate these potential overflows. Sediment trap locations should also allow for easy maintenance access for the periodic removal of accumulated sediment.

Storage capacity

A sediment trap should be designed to maximize surface area for infiltration and sediment settling. This will increase the effectiveness of the trap and decrease the likelihood of backup during and after periods of high runoff intensity. The designed capacity of the sediment trap shall be determined based on site-specific conditions. The orientation of the sediment trap will be limited by the amount of space on a site especially at boundaries.

Construction Specifications

See Figure ST-1 for installation details.

- If possible, sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.
- Traps should be located above the floodplain, where possible. If there are space constraints, several small sediment traps may be constructed in series.
- Area under embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared.
- The fill material for the embankment shall be free of roots and other woody vegetation as well as over-sized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Seeding of the embankment should be performed as soon as possible after construction of the sediment trap. Erosion control blanketing may also be used to cover the embankment in combination with seeding or during time periods when seeding is ineffective.
- The spillway may consist of a stone section in the embankment formed by a combination coarse aggregate/riprap to provide for filtering/detention capability. Riprap shall be 4-inch to 8-inch rock, while the coarse aggregate shall be ½ to ¾ inches. A Geotextile may be placed at the stone-soil interface to act as a separator.
- Another option for the spillway is to use straw bales or wattles at the overflow point in the trap and line the rest of the spillway with an erosion control blanket (see EROSION CONTROL BLANKET [ECB]).

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). The primary maintenance consideration for temporary sediment traps is the removal of accumulated sediment from the basin to ensure the continued effectiveness of the sediment trap. Sediments should be removed when the basin reaches approximately 50% sediment capacity. Inspectors should also ensure that the trap is draining properly and check the structure for damage from erosion. The depth of the spillway should be checked and maintained at a minimum of 1.5 feet below the low point of the trap embankment.

Sediment Trap

ST

Removal

The structure shall be removed and the area stabilized when the drainage area has been properly stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide.* 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

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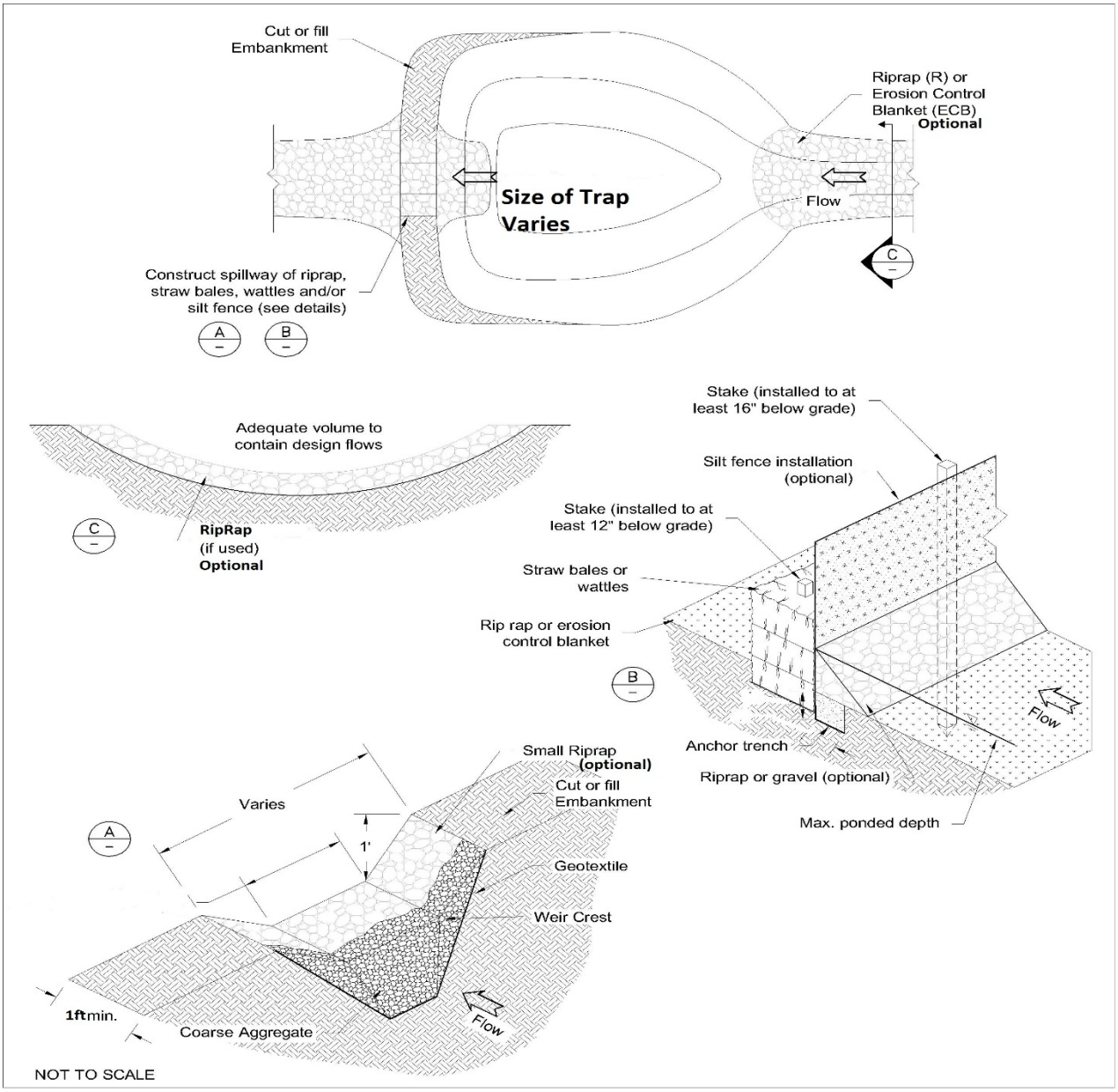

Cut or fill
Embankment
Riprap (R) or
Erosion Control
Blanket (ECB)
Optional
Size of Trap
Varies
Flow
C
Construct spillway of riprap,
straw bales, wattles and/or
silt fence (see details)
A
B
Adequate volume to
contain design flows
C
RipRap
(if used)
Optional
Stake (installed to at
least 16" below grade)
Silt fence installation
(optional)
Stake (installed to at
least 12" below grade)
Straw bales or
wattles
Rip rap or erosion
control blanket
B
Flow
Anchor trench
Riprap or gravel (optional)
Max. ponded depth
Small Riprap
(optional)
Cut or fill
Embankment
Varies
A
1'
Geotextile
Weir Crest
1ftmin.
Coarse Aggregate
Flow
NOT TO SCALE

Figure ST-1.

Sediment Trap

ST

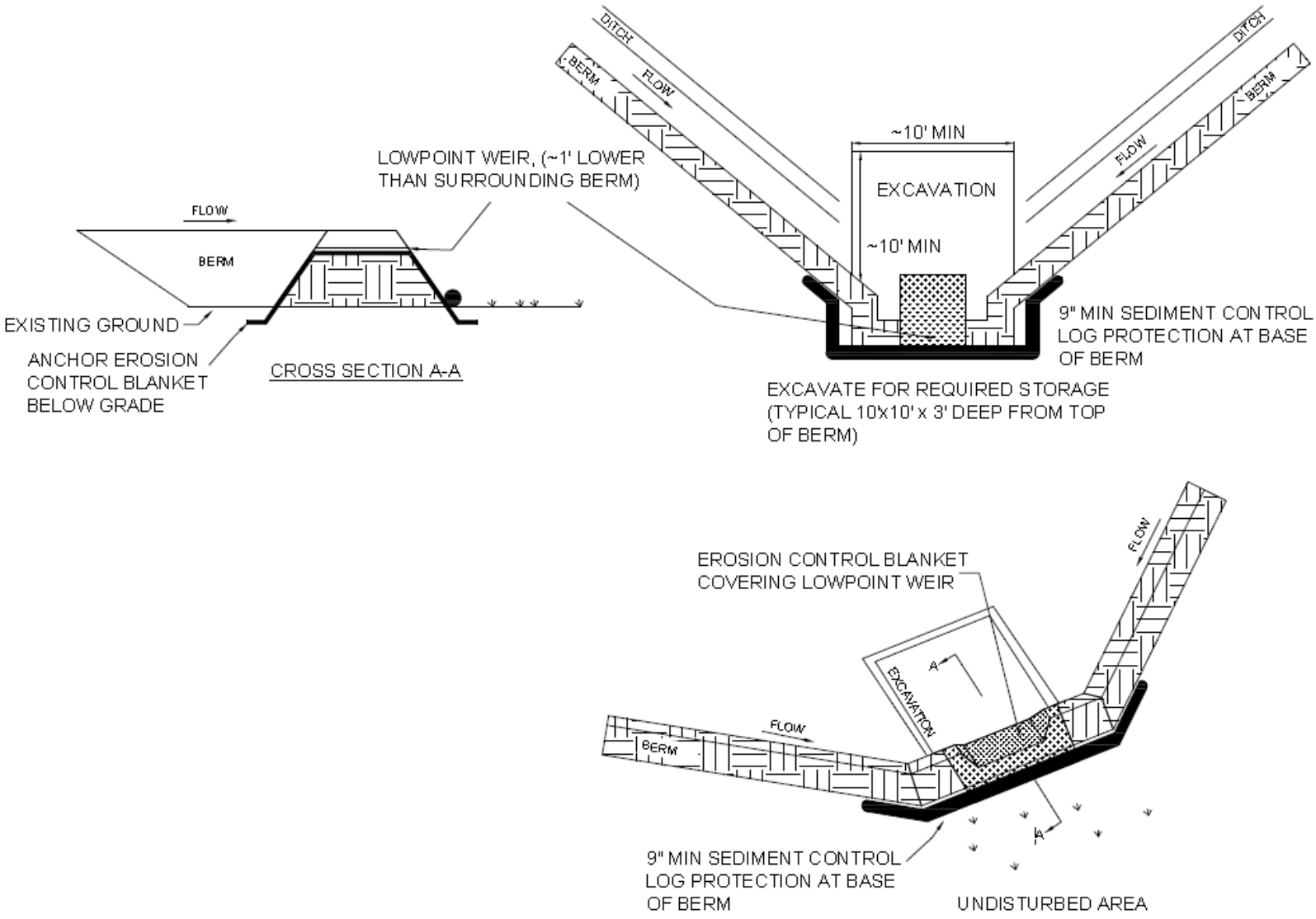


Figure ST-2.

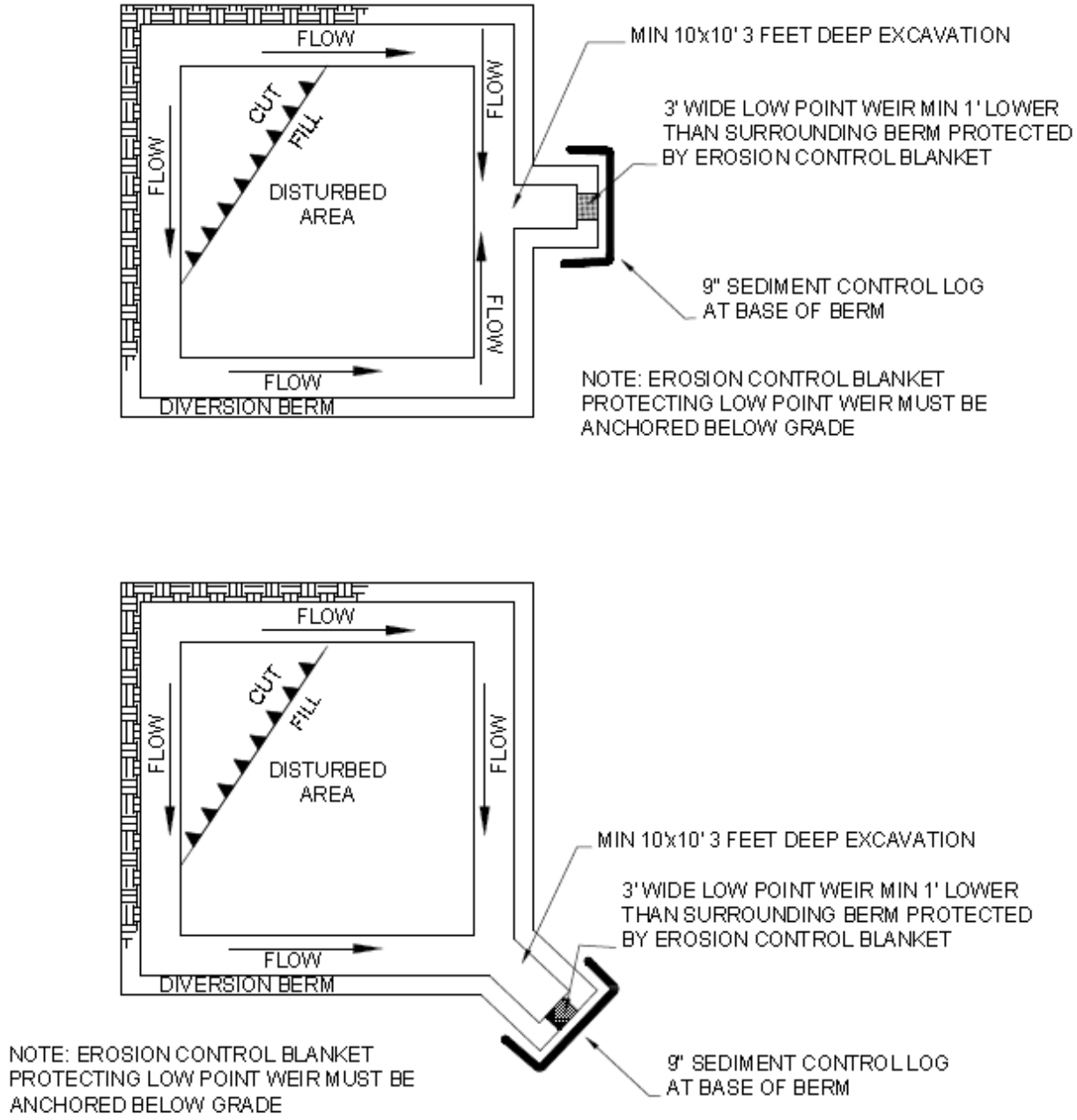


Figure ST-3.

minor revisions to
detail 02/21/2017

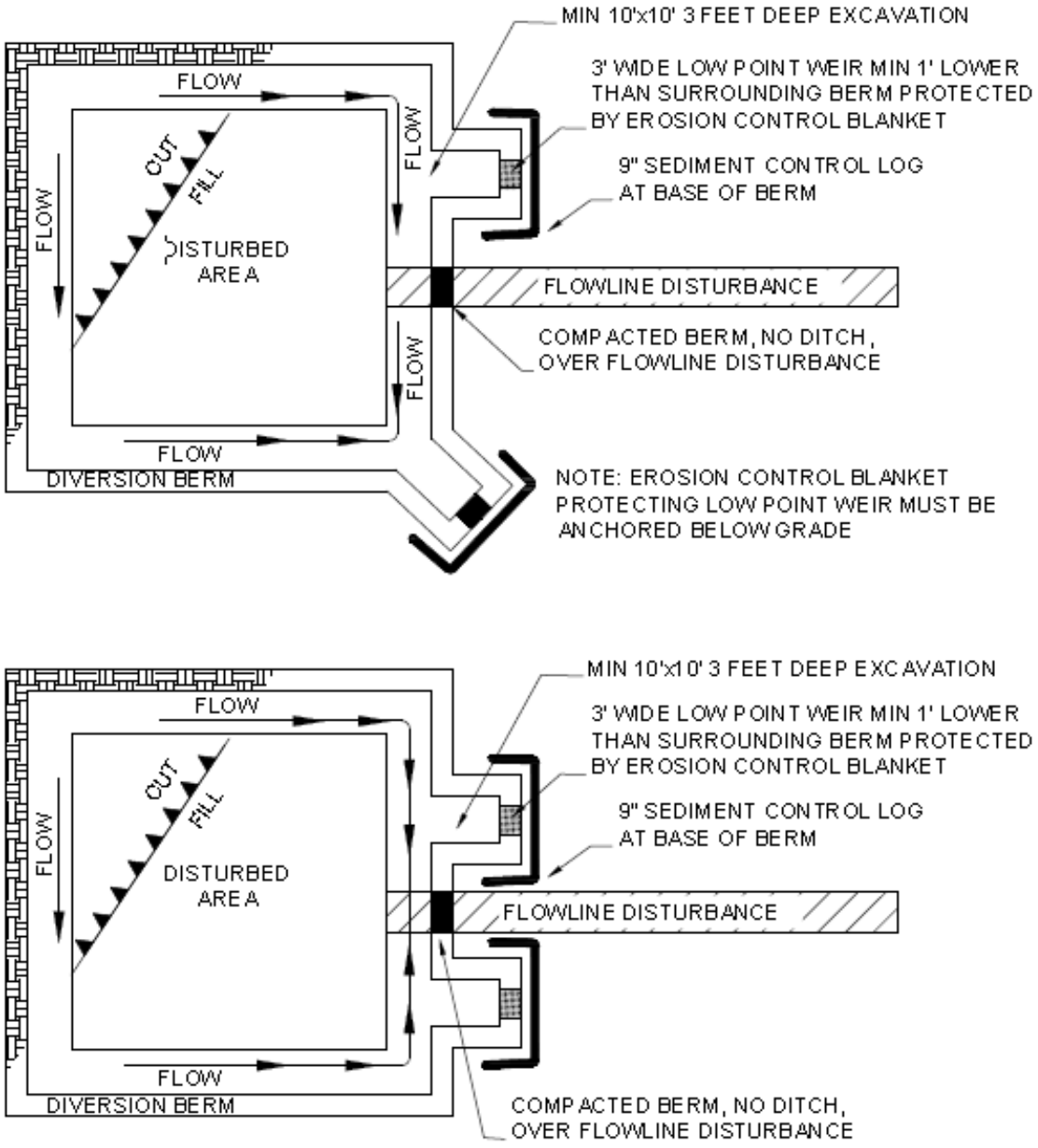


Figure ST-4.

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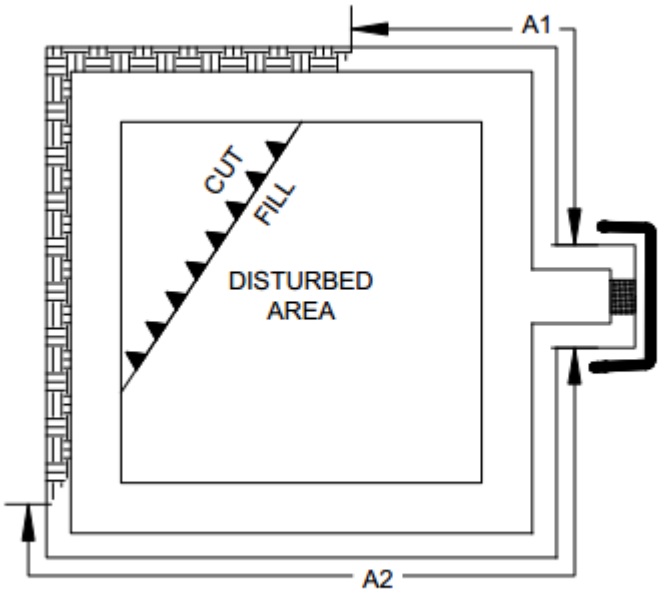


Figure ST-5. A1 + A2 = Total ditch and berm diversion length used to size sediment trap (ft).

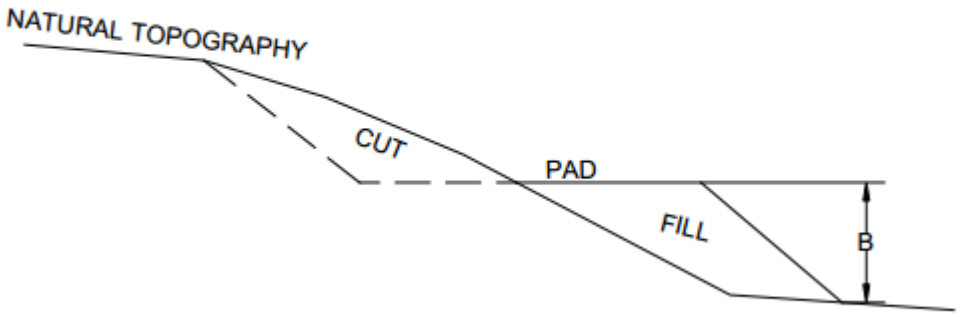


Figure ST-6. B = Pad fill height (ft), at pad low point.

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	**4**	**6**	**8**	**10**	**12**
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	**Area of 3.0' Deep Sediment Trap (ft^2)**					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Culvert

C

Description



Culverts are typically concrete, steel, aluminum, or plastic pipe used to move water under a road or to direct flow under the road or construction area.

Applicability

Culverts are ideal on roads with grades of less than 15%. For grades over 15%, it is best to use frequently spaced relief culverts and drainage crossing culverts, with armored ditches. Culverts may be used in the following applications:

- As drainage crossing culverts in streams and gullies to allow normal drainage to flow under the traveled way;
- As ditch relief culverts to periodically relieve the inside ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway.

Limitations

- Undersized culverts are susceptible to plugging and will require cleaning.
- Culverts will not filter sediment.
- Culverts are easily crushed if not properly designed.

Design Criteria and Construction Specifications

Pipe size can be determined for culverts in Weld County by using their criteria. According to the Weld County Drainage Criteria, a minimum culvert capacity is the capacity required to convey the 10-yr storm. However, the minimum culvert diameter allowed in public right-of-way is 15-inches. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties. Culvert sizing needs to account for the Weld County requirement that a road cannot be overtopped by more than 6-inches of water during the 10-yr event. In jurisdictions other than Weld County, use the jurisdiction's applicable culvert sizing criteria. Table C-1 may be used as a general design guide, but size is ideally based upon site-specific hydrologic analysis.

Culvert

C

Table C-1

Drainage Area (acres)	Size of Drainage Structure (diameter and area)			
	Steep Slopes (Light Vegetation) C=0.7		Gentle Slopes (Heavy Vegetation) C=0.2	
	Round Pipe (In)	Area (sq.ft)	Round Pipe (In)	Area (sq.ft)
0-10	30"	4.9	18"	1.8
10-20	42"	9.6	24"	3.1
20-35	48"	12.6	30"	4.9
35-75	72"	28.3	42"	9.6
75-125	84"	38.5	48"	12.6
125-200	96"	50.3	60"	19.6

* Due to site specific conditions this table may not be used.

Depth

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost to road use and erosion. Weld County requires a minimum of 1–foot of cover. If 1-foot of cover is not possible, the culvert material must be rated for a minimum of HS-20 loading or the largest expected loads crossing it (oil rigs, semis, etc.)

Firmly compact well-graded fill material (soil or road base) around culverts, particularly around the bottom half, using placement in layers to achieve a uniform density. Use slightly plastic sandy gravel with fines. Avoid the use of fine sand and silt rich soils for bedding material because of their susceptibility to piping. Pay particular attention to culvert bedding and compaction around the haunches of the pipe. Do not allow the compaction to move or raise the pipe. In large fills, allow for settlement.

End Sections

Culverts installed in Weld County public right-of-ways must be equipped with a flared end section on the entrance and outlet. Erosion protection such as riprap may be required. See Culvert Protection BMP Fact Sheet for details on riprap installation.

Drainage crossing culverts

Make road crossings of natural drainages perpendicular to the drainage to minimize pipe length and area of disturbance (See Drainage Crossing Culvert Detail).

Use single large pipes versus multiple smaller diameter pipes to minimize plugging potential in most channels (unless roadway elevation is critical). In very broad channels, multiple pipes are desirable to maintain the natural flow spread across the channel. All culverts should be concrete corrugated metal pipe made of steel or aluminum, or properly bedded and backfilled corrugated plastic pipe.

Culvert

C

Align culverts in the bottom and middle of the natural channel flowline so that installation causes no change in the stream alignment or stream bottom elevation. Culverts should not cause damming or pooling or increase stream velocities significantly.

Extend the outlet of the culvert at least one foot beyond the toe of the slope to prevent erosion of the fill material. Alternatively, use retaining walls (headwalls) to hold back the fill slope.
It may be necessary to install rip rap, erosion control blanketing, or a combination of both or other energy-dissipater device at the outlet end of the culvert to reduce soil erosion or to trap sediment (See Culvert Protection BMP Fact Sheet).

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Ditch Relief Culverts See Ditch Relief Culvert Detail and the Discharge Locations for Ditch Relief Culverts Detail for installation details.

Ditch relief culverts can provide better flow when skewed 0 to 30 degrees perpendicular to the road.

The culvert gradient should be at least 2% greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris from plugging the culvert inlet. Discharge the culvert at natural ground level where possible (see Discharge Locations For Ditch Relief Culverts Detail, Type A), on firm, non-erosive soil or in rocky or bushy areas. If discharging on fill slopes, armor outlets with riprap or logging slash (see Discharge Locations For Ditch Relief Culverts Detail, Type B.)

Extend the inlet of the culvert at least one foot beyond the flowline of the roadside ditch. Extend the outlet of the culvert at least one foot beyond the toe slopes to prevent erosion of the fill material.

It may be necessary to install riprap or other energy-dissipater devices at the outlet end of the culvert to prevent soil erosion or to trap sediment (see Culvert Protection BMP Fact Sheet). Spacing of culverts is dependent on the road gradient, soil types, and runoff characteristics according to the table below.

Soil Type	Road Grade		
	3-4%	5-8%	9-12%
Highly Corrosive Granitic or Sandy	240'	180'	140'
Intermediate Erosive Clay or Load	310'	260'	200'
Low Erosive Shale or Gravel	400'	325'	250'

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Maintenance and Removal Considerations

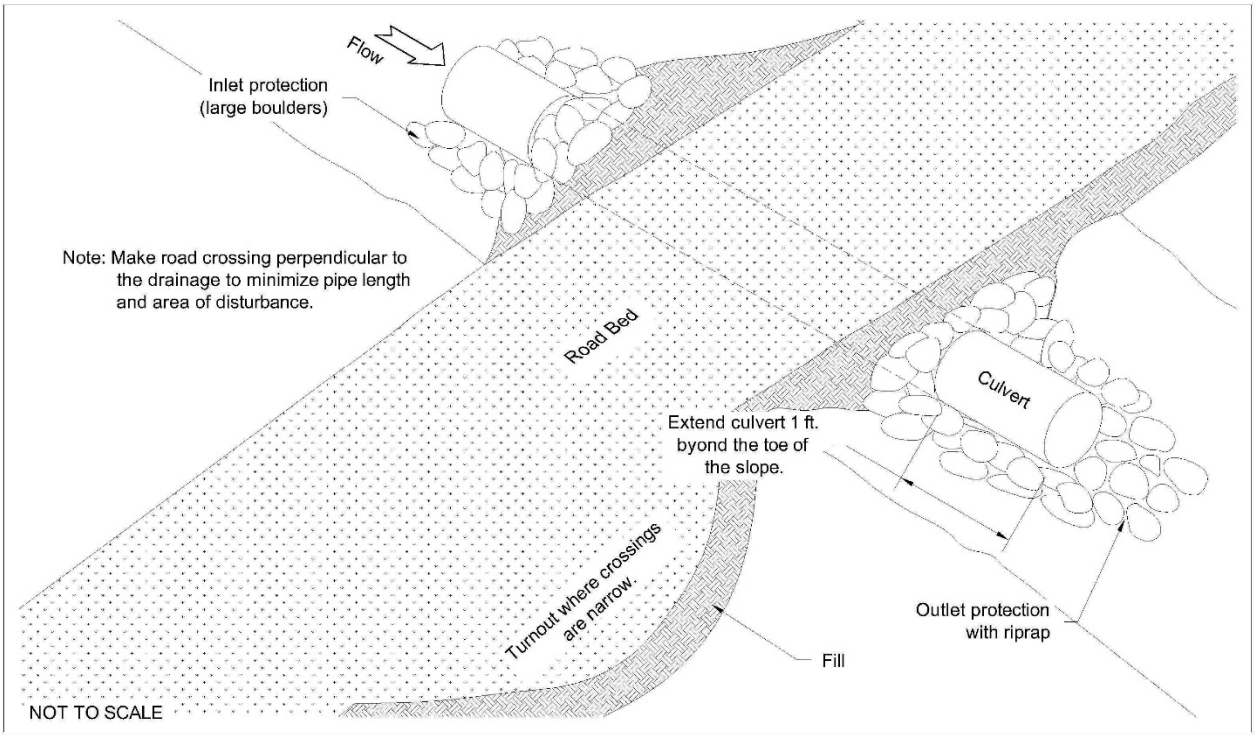
The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). If any damage to culvert or inlet/outlet protection is noted or if there is any evidence of scour, repairs should be made immediately. Any debris that may be blocking the culvert inlet or outlet should be removed. Culverts are typically left in place for permanent drainage for the site.

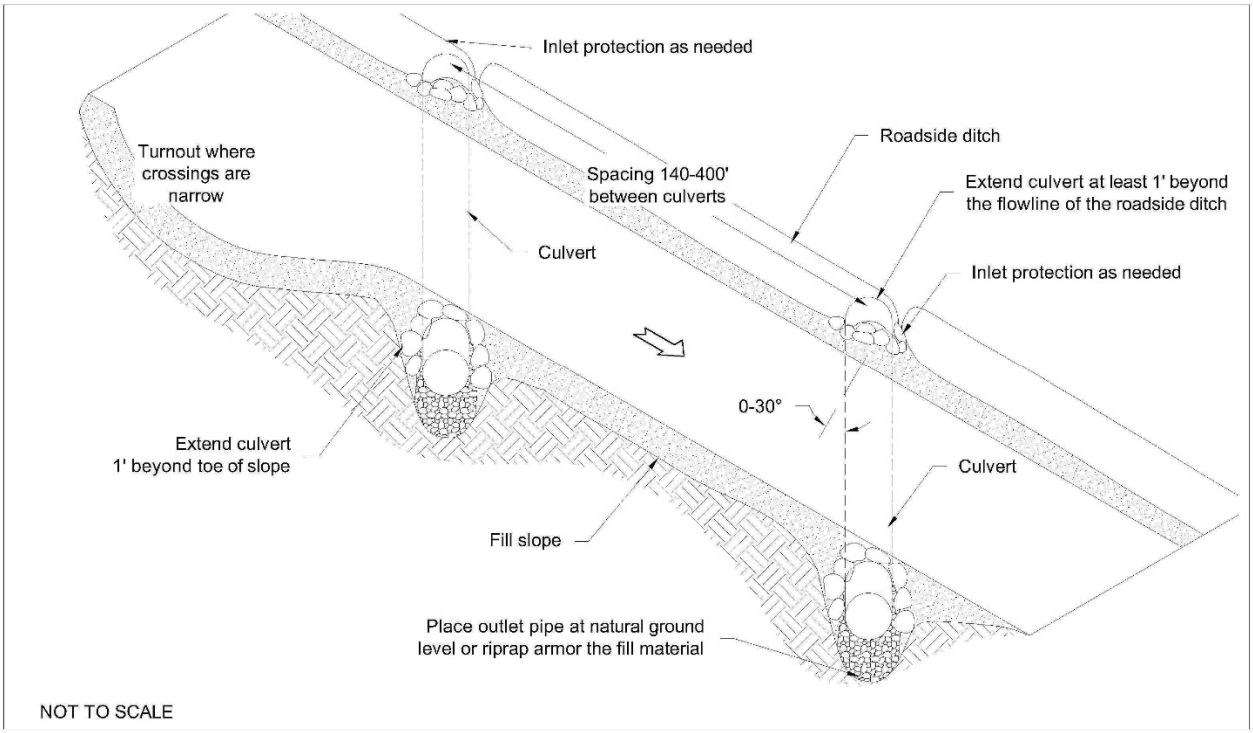
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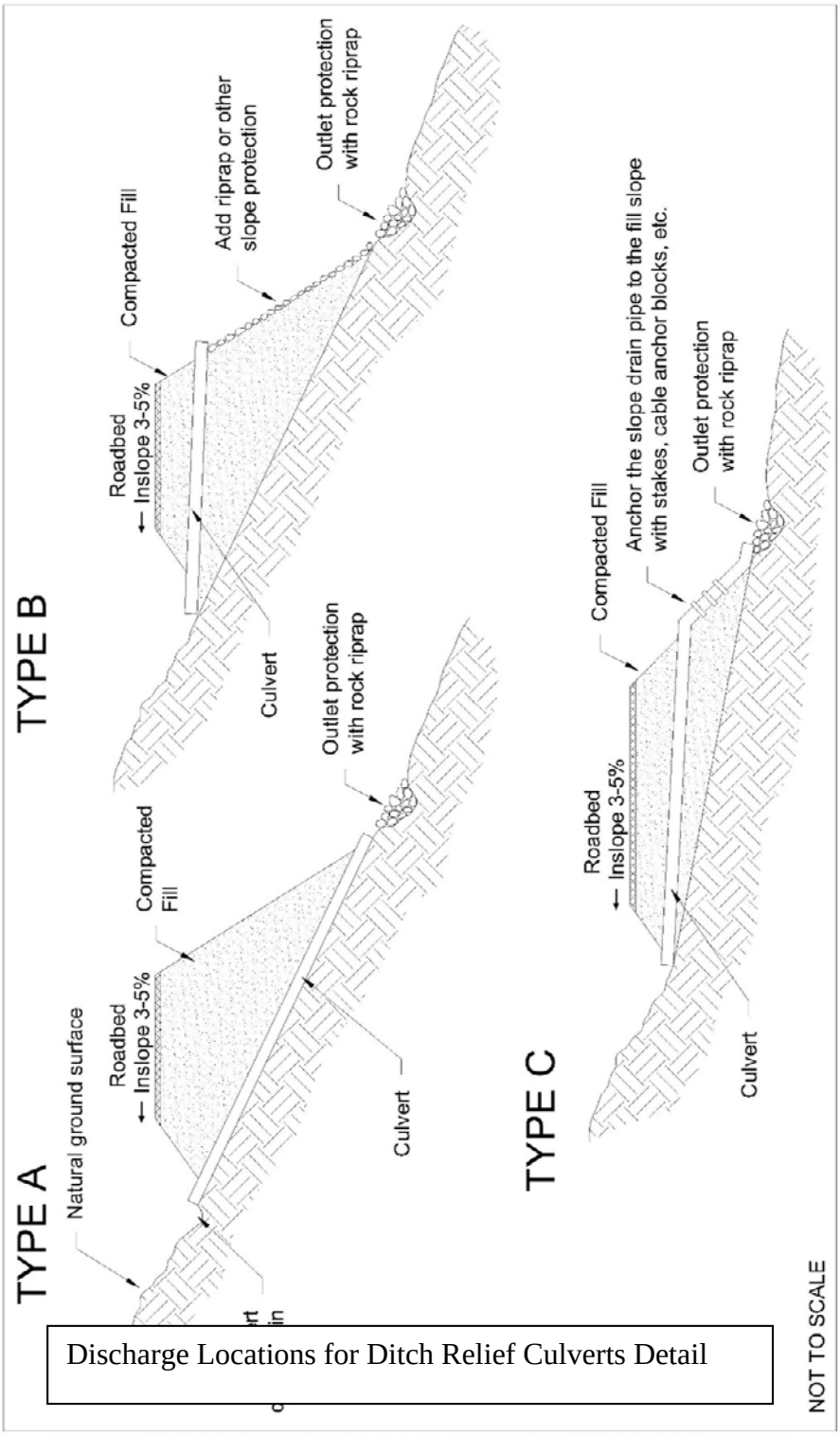




Ditch Relief Culverts Detail

Culvert

C



Discharge Locations for Ditch Relief Culverts Detail

Culvert Protection

IPC/OPC

Description

Culvert protection may be required at the inlet (upstream side) of the culvert and/or the outlet side of the culvert (downstream side).



Photograph. Riprap outlet protection with flared end

Culvert inlet protection may involve placing riprap, gabions, sediment control logs, rock socks, erosion control blankets/turf reinforced mats, and/or any other protection at the inlet pipes. Riprap, or other energy-dissipating devices, will reduce the velocity of stormwater flows and armor the banks, thereby preventing erosion and helping to protect the inlet structure. Sediment control logs minimize the potential for sediment from upgradient construction activities to enter the culvert.

Culvert outlet protection typically involves placing riprap or other appropriate energy-dissipating devices at the outlets of the pipes to reduce the velocity of stormwater flows, reducing the scour potential at stormwater outlets, protecting the outlet structure, and minimizing the potential for erosion downstream. Sediment control logs are also frequently used on the outlet to minimize erosion; however, they do not provide the energy dissipation that rock does.

Applicability

To prevent erosion from occurring at the culvert inlet and outlet, and to reduce the potential for sediment to enter into the culvert, culvert protection may be necessary. Riprap should be used where velocities and energies at the inlets and outlets of culverts are sufficient to erode the structure or the next downstream reach.

Limitations

Inlet protection should not block flow into the culvert. Rock aprons at the culvert outlets should not be placed on slopes steeper than 10 percent. Runoff from pipe outlets at the top of cut/fills or on slopes steeper than 10 percent should be routed via slope drains or riprap chutes to a rock apron at the toe of the slope. Otherwise, the flow will re-concentrate and gain velocity as the flow leaves the apron.

Design Criteria and Construction Specifications

Culvert Inlet protection

Erosion control blanket, riprap, gabions, rock socks or sediment control logs at culvert inlets shall be designed according to the appropriate BMP Fact Sheet for that material.

Culvert Inlet Protection Detail shows typical culvert inlet protection. However, site specifics shall dictate actual design. Modification which differ from the detail sheet must be based on good engineering and hydrologic design and documented in the SWMP.

Culvert Protection

IPC/OPC

Culvert Outlet Protection

Sediment control logs may also be used for temporary outlet protection during construction (see Sediment Control Log Culvert Outlet Protection Detail). If additional erosion protection and energy dissipation are required, riprap may be needed. If riprap is required and the riprap will be in place less than two years, the Temporary Outlet Protection Riprap Detail may be used. If the riprap will be permanently installed, the design methodologies outlined in the Hydraulic Structures chapter of the UDFCD Manual (Volume 2) must be followed.

Maintenance and Removal Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Inspect for debris at the entrance to culverts and within culverts. Inspect culvert protection for damage and erosion. The maintenance needs are usually very low for properly installed riprap aprons at culvert outlets; however, inspect for evidence of scour beneath the riprap at outlet aprons or dislodged stones which have moved beyond the outlet structure. Corrective action items found to reduce the effectiveness of the culvert or culvert outlet protection should be repaired immediately. See additional notes at the end of the details for maintenance.

References

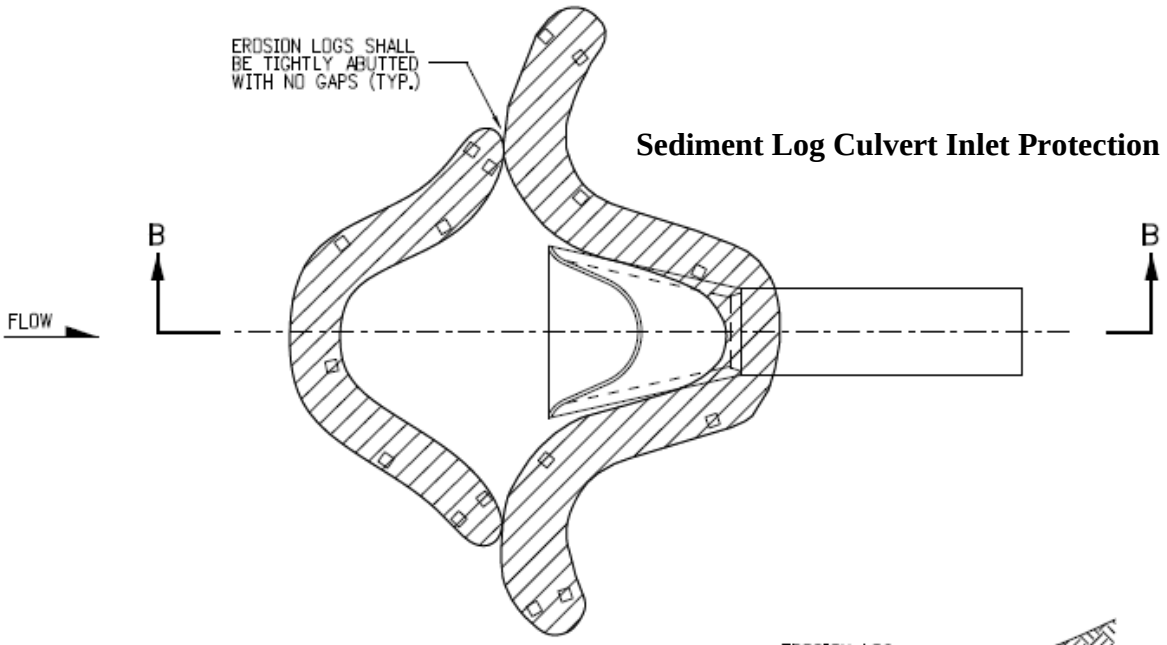
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New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

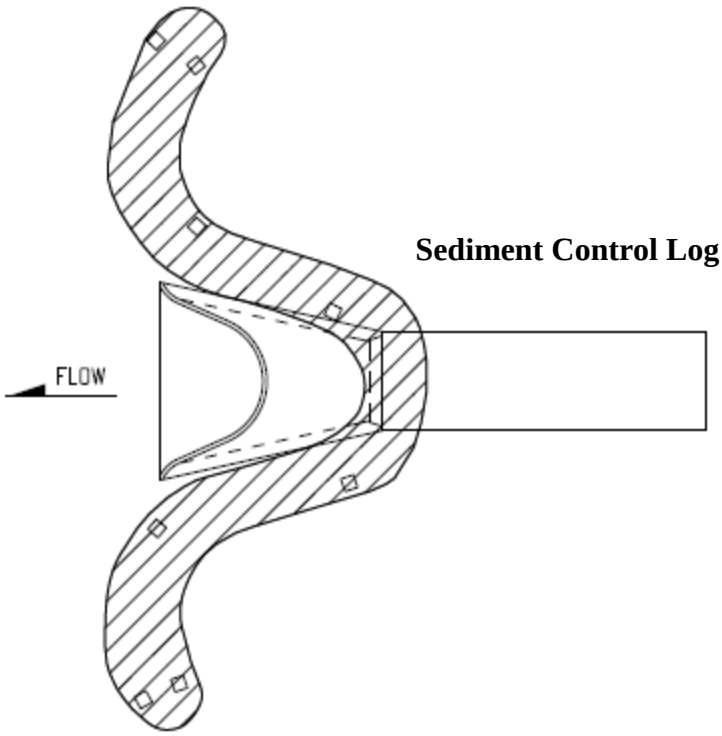
Urban Drainage and Flood Control District (UDFCD), *Urban Storm Drainage Criteria Manual, Volume 3*. 2010.

Culvert Protection

IPC/OPC



Sediment Log Culvert Inlet Protection

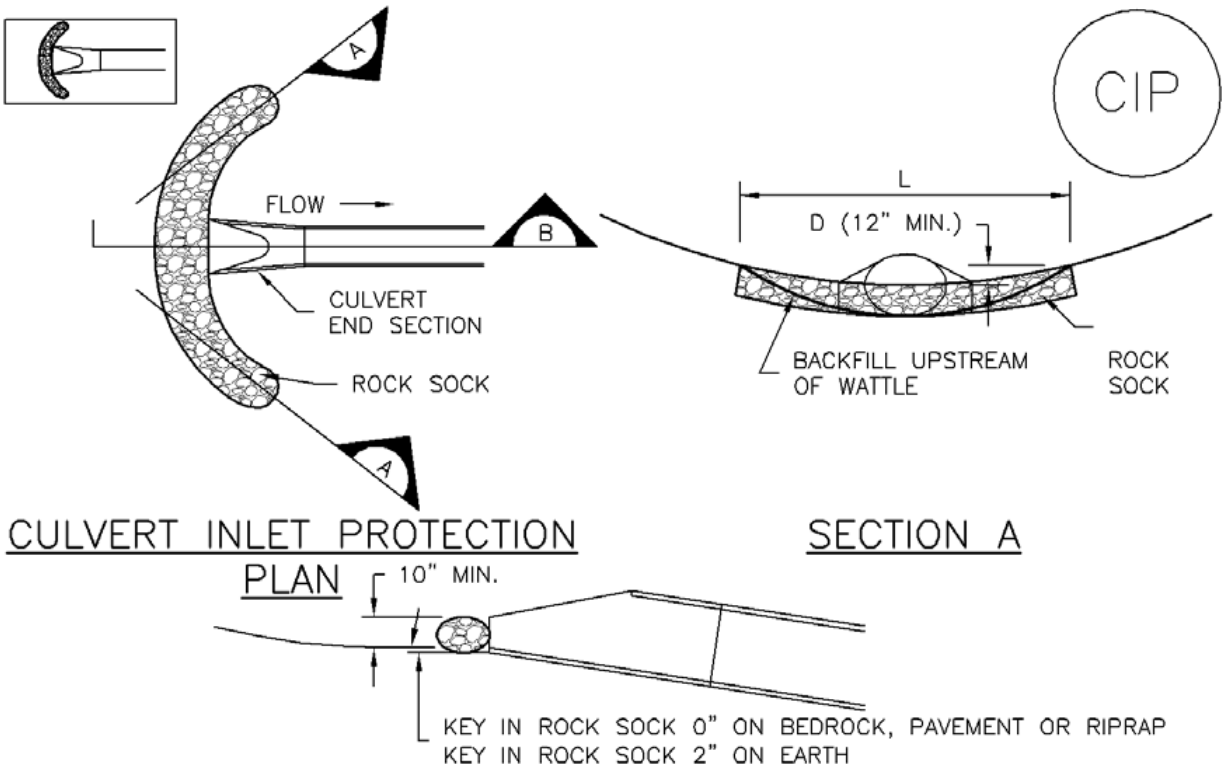


Sediment Control Log Culvert Outlet Protection

Culvert Protection

IPC/OPC

CULVERT PROTECTION DETAIL



CIP-1. CULVERT INLET PROTECTION – ROCK SOCK DETAIL

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CULVERT INLET PROTECTION.

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL OR SEDIMENT CONTROL LOG.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

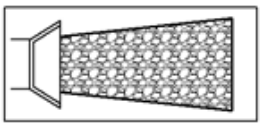
(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

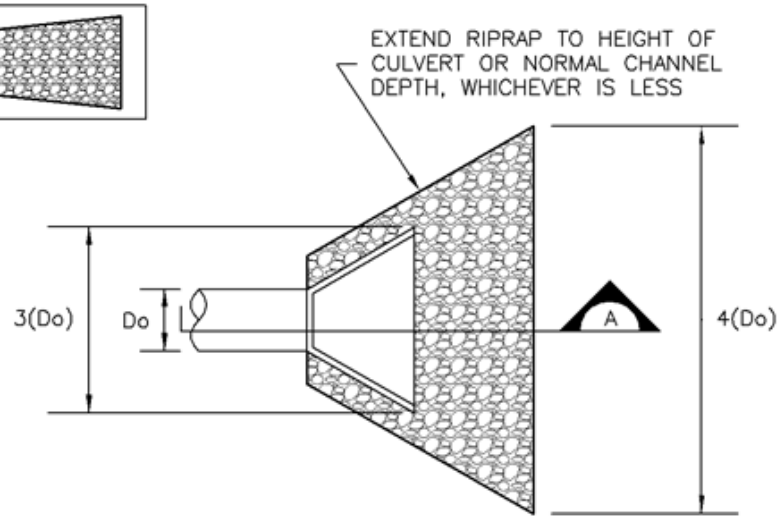
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Culvert Protection

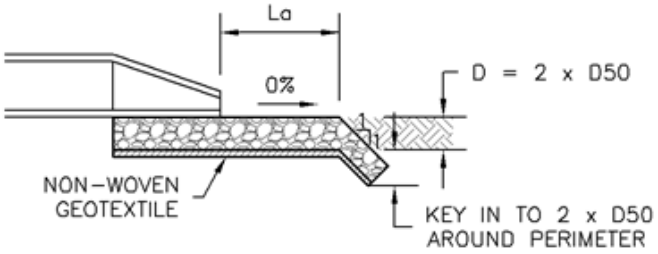
IPC/OPC

OP





TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

TEMPORARY OUTLET PROTECTION RIPRAP DETAIL

Culvert Protection

IPC/OPC

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   - –LOCATION OF OUTLET PROTECTION.
   - –DIMENSIONS OF OUTLET PROTECTION.

2. DETAIL IS INTENDED FOR PIPES WITH SLOPE $\leq$ 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Temporary and Permanent Seeding (TS/PS)

TS/PS

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.



Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period, proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms,

rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period, plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. See applicable seed mixes and/or landowner agreements for revegetation requirements. Other seed mixes may be used if the site conditions warrant a different seed mix.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Various Known Seeding Mixes for Kerr-McGee

Anadarko Dryland Pasture Mix (Lot 20071)

Kind and Variety	Pure%	Germ%	Origin
Tetraploid Perennial Ryegrass	19.68	91	OR
Smooth Brome, Lincoln	18.66	96	KS
Intermediate Wheatgrass, Oahe	14.76	91	SD
Dahurain Wildrye	14.44	93	WA
Orchardgrass, Paiute	14.29	94	OR
Pubescent Wheatgrass, Luna	13.35	97	CAN
Crop: .23% Inert: 3.94% Weeds: .15% Net Wt: 27.9167# (25 pls) 1 ac			

H2 Salty Dog Mix (Lot 20195)

Kind and Variety	Pure%	Germ%	Origin
Newhy Saltlander Wheatgrass	36.34	97	MT
Western Wheatgrass	15.85	98	KS
Canada Wildrye	15.48	97	CAN
Indian Ricegrass	13.19	94	WA
Tall Fescue	8.61	91	OR
Alkali Grass, Fults	3.44	95	WA
Alkali Sacaton	.82	80	OK
Crop: .00% Inert: 5.75% Weeds: .52% Net Wt: 15.34# (13.78 pls) 1 ac			

Temporary and Permanent Seeding (TS/PS)

TS/PS

Sandy Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.4	9.0	15%
Intermediate Wheatgrass	Thinopyrum intermedia	4.5	9.0	15%
Sand Dropseed	Sporobolus cryptandrus	0.1	9.0	15%
Indian Ricegrass	Achnatherum hymenoides	2.8	9.0	15%
Green Needlegrass	Nassella viridula	2.2	9.0	15%
Sideoats Grama	Bouteloua curtipendula	2.05	9.0	15%
Switchgrass	Panicum virgatum	0.7	6.0	10%
Total	--	12.6	60.0	100%

Clay Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	3.3	12.0	20%
Sideoats Grama	Bouteloua curtipendula	2.7	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Green Needlegrass	Nassella viridula	1.4	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	11.8	60.0	100%

Temporary and Permanent Seeding (TS/PS)

TS/PS

Salty Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Alkaligrass (Fults)	Puccinellia distans	0.5	15.0	25%
Newhy Saltlander	Hybrid wheatgrass	4.3	12.0	20%
Tall Fescue	Festuca arundinacea	2.3	12.0	20%
Indian Ricegrass	Achnatherum hymenoides	1.9	6.0	10%
Alkali sacatons	Sporobolus airoides	0.1	6.0	10%
Western Wheatgrass	Pascopyrum smithii	1.2	3.0	5%
Canada Wildrye	Elymus Canadensis	2.3	6.0	10%
Total	--	12.6	60.0	100%

Lowland Equine Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Green Needlegrass	Nassella viridula	2.9	12.0	20%
Timothy	Phleum Prantense	0.4	12.0	20%
Intermediate Wheatgrass	Thinopyrum intermedia	5.9	12.0	20%
Sand Dropseed	Sporobolus cryptandrus	0.1	12.0	20%
Sideoats Grama	Bouteloua curtipendula	1.4	6.0	10%
Little Bluestem	Schizachyrium scoparium	1.0	6.0	10%
Total	--	11.7	60.0	100%

Lowland Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Mountain brome	Bromus marginatus	5.8	12.0	20%
Blue grama	Bouteloua gracilis	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	1.6	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	12.4	60.0	100%

Arkansas Valley Seed, Inc.

Premium Irrigated Pasture Mix

A mixture of perennial, cool season grasses formulated with varieties that produce the highest quality and yielding forage. These grasses are palatable and excellent for grazing and hay production. Performs well in the Intermountain West as well as the High Plains of the Rocky Mountain region.

Characteristics:

Grows 2-6 feet tall
Premium varieties
High yielding and quality irrigated forage

Seeding Rate:

New Seeding
Broadcast: 30-35 lbs/acre
Drilled: 20-25 lbs/acre
Overseeding
Broadcast: 15-20 lbs/acre
Drilled: 10-15 lbs/acre

Mix Contains:

25% Elite Tetraploid Perennial Rye

Bunchgrass with ermination in 5-10 days.
One of the most widely used grasses and is adaptable to a wide variety of soils and climate conditions. A leafy pasture type perennial rye.

25% Potomac Orchardgrass

Bunchgrass with germination in 14-21 days.
One of the earliest species to exhibit growth in the spring, making tremendous forage potential under cooler conditions. Performs well on different textured soils. Found throughout the west, this grass is great forage and hay producer.

20% Improved Meadow Brome

Bunchgrass with germination in 10-14 days.
Meadow Brome is a long-lived perennial that is slow to establish. It is very palatable and highly productive.

15% Crown Royale Orchardgrass

Bunchgrass with germination in 14-21 days.
Similar to Potomac, but with a later maturity date.

10% Manchar Smooth Bromegrass

Sod-forming grass with germination in 10-14 days.
Smooth bromegrass is resistant to drought and extremes in temperature. It is the most widely used of the cultivated brome grasses. Grows throughout most of the US.

Foothills Mix

A mixture developed for elevations of 3,000 to 8,000 feet to provide natural cover under dryland conditions. Contains both cool and warm season grasses adapted to the Western Great Plains and Southwest region. Has excellent cold and drought tolerance. Good for soil stabilization on poor soils.

Characteristics:

Grows 36-60 inches with average rainfall
Excellent natural cover for dryland areas

Seeding Rate:

New Seeding
Broadcast: 20-25 lbs/acre
Drilled: 15-20 lbs/acre
Overseeding
Broadcast: 10-15 lbs/acre
Drilled: 5-10 lbs/acre

Mix Contains:

25% Annual Ryegrass

Cool season bunchgrass with germination in 5-10 days.
Noted for quick germination. Provides fast green up and root structure to stabilize soil.

15% Slender Wheatgrass

Cool season bunchgrass with germination in 21-28 days.
A native species to the mountain and intermountain areas of the western United States and the northern Great Plains.

12% Pubescent Wheatgrass

Cool season bunchgrass with germination in 14-21 days.
Drought tolerant, and winter hardy grass with deep rooted system making an excellent soil binder.

10% Mountain Brome

A cool-season bunchgrass with germination in 10-14 days.
Survives on thin, dry or coarse soils, and displays strong winter hardiness. Will produce best in moist deep fertile soils.

10% Hard Fescue
Cools bunchgrass with germination in 7-10 days.
Well adapted to many soil types and often used for erosion control.

10% Canada Bluegrass
Cool season bunchgrass with germination in 14-21 days.
Often used for soil stabilization.

6% Sideoats Grama
Warm season bunch/sod forming grass with germination in 14-21 days.
A medium-sized perennial 15 – 30" tall, it is adapted to most soil conditions.

6% Big Bluestem
Warm season sod-former with germination in 14-21 days.
It is tall grass, reaching a height of 6 to 8 feet on most sites when left un-grazed.

5% Blue Grama (Coated)
Warm season bunchgrass with germination in 7-10 days.
This grass demonstrates good drought, fair salinity, and moderate alkalinity tolerances.

5% Switchgrass
Warm season bunchgrass with germination in 21-28 days.
Very tolerant of poor soils, flooding and drought. Often used in reclamation of sand dunes and dikes.

1% Sand Dropseed
Warm season bunchgrass with germination in 14-21 days.
Commonly grows on sandy soils but is adapted to medium textured soils also.

Landowners may also have special requests for specific seed mixes. In these cases, those seed mixes will take precedence.

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

Section 7

Dust Suppressant Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP (KMOG)
Dust Mitigation Plan - McGavin 6-19HZ

KMOG has developed this Dust Mitigation Plan in compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 427.

427.a(1) Soil Type



Map Unit Symbol	Map Unit Name
47	Olney fine sandy loam, 1 to 3 percent slopes
4	Aquolls and Aquepts, flooded
72	Vona loamy sand, 0 to 3 percent slopes

427.a(2) Proposed Vehicle Speed Limits to Minimize Dust

- 10 mph on lease road from CR 20/ Pine Cone Ave. south into location and 5 mph once vehicles reach well pad/ facility

427.a(3) Total Area of Disturbance (In Acres)

- 25.63 acres (Well pad and Facility)

427.a(4) Whether Access Roads are Paved

- Access roads are not paved

427.a(5) Number of Anticipated Truck Trips During Each Phase

- Construction Phase (includes pad and production facility construction) – 7,829 truck trips
- Drilling Phase – 15,236 truck trips
- Completions Phase – 23,046 truck trips
- Production Phase – 602 / average annual truck trips

427.a(6) A plan for Suppressing Fugitive Dust Caused Solely by Wind

- On active locations, in the event dust is caused solely by the wind KMOG will have fresh water deployed to suppress dust for the duration of the wind event
- In addition, disturbed soils will be placed to minimize ability for soil particles to become airborne. Various techniques to be used depending on soil type specific to each location:
    - Track pack/compact topsoil piles, consolidate soil used to construct perimeter ditch/berm and sediment traps
    - Hydro mulch and/or hydroseed topsoil piles and/or other stormwater BMP features
    - Seed/straw crimp disturbed soils where feasible
    - Place and compact gravel layer on working pad surfaces and access roads

427.a(7) Best Management Practices

- KMOG will proactively deploy fresh water to suppress dust along access road to well pad/ facility during all phases of pre-production operations
- Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach well pad/ facility
- Access roads and Vehicle Tracking Control will receive maintenance as needed throughout operations
- In the event of high winds that generate dust that cannot be mitigated with an application of water, KMOG will shut down construction operations
- KMOG will proactively street sweep any sediment tracking that could have occurred from truck traffic onto CR 20/Pine Cone Ave. in front of our location entrance.

Section 8

Wildlife Assessment and Weed Management Plans

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

June 16, 2021

Joseph Riemer
Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Subject: Summary of the Environmental and Cultural Considerations Pertaining to the McGavin Project

Dear Mr. Riemer,

Two Dot Consulting, LLC (2DOT) has prepared this letter on behalf of Kerr-McGee Oil & Gas Onshore, LP (KMOG) to summarize the current environmental considerations pertaining to the environmental surface inspection (Survey) for the McGavin multi well pad and production facility (Project). The environmental and cultural considerations covered by the Survey include the following: a wildlife and wildlife habitat assessment, an evaluation of the impacts of the proposed operation on wildlife and wildlife habitat, an evaluation and assessment of Waters of the United States (WOTUS) and wetlands, an updated Phase I Environmental Site Assessment (ESA), a cultural desktop review, and a summary of the ecological site characteristics. 2DOT prepared this letter following a site survey performed on 6/16/2021.

1. Project Location and Site Conditions

The Project is located within the city of Firestone in section 19, township 2N, range 67W, Weld County, CO (**Appendix A**: *Figure 1*). The Project is approximately 25.6 acres and is situated entirely on agricultural land with an existing oil and gas wellhead located within the Project boundary (**Appendix A**: *Figure 1*). Weld County Road (WCR) 20 is located approximately 320 feet north and WRC 13 is approximately 500 feet west of the Project (**Appendix A**: *Figure 2*).

2. Wildlife and Wildlife Habitat Assessment/Evaluation of Impacts to Wildlife and Wildlife Habitat

A. Raptors

2DOT conducted the site visit on 3/11/2021. During the site visit, no raptor nests were observed within 0.5 mile of the Project (**Appendix A**: *Figure 3*). There are trees suitable for nesting raptors within close proximity to the Project. Raptor surveys are recommended if the Project is constructed between 2/15 and 7/31, or until nest has fledged if active nest is observed. No current constraints.

B. Eagles

There were no bald or golden eagle nests or bald eagle winter night roosts observed within 0.5 mile of the Project. The nearest mapped eagle nest, Nest_13, is located approximately 2.5 miles southeast of the Project. The nearest bald eagle winter night roost is located over three miles west of the Project along Boulder Creek. There are no current constraints pertaining to bald or golden eagles.

C. Burrowing Owls

Suitable burrowing owl habitat was not observed within 0.25 mile of the Project during the site visit on 3/11/2021. No current constraints.

D. Preble's Meadow Jumping Mouse

The Project is located within Colorado Parks and Wildlife (CPW) mapped Preble's Meadow Jumping Mouse (PMJM) overall range. The U.S. Fish and Wildlife Service (USFWS) recommends that projects within 300 feet of the 100-year floodplain associated with rivers, creeks, and their tributaries (and projects which may have potential secondary impacts to such areas) be assessed as to their potential direct and indirect impacts to PMJM and PMJM's habitat. A PMJM survey was performed on 4/22/2021, and 2DOT concluded that no suitable habitat was observed within the Project. On behalf of KMOG, 2DOT is requesting concurrence from the USFWS. No constraints are expected pertaining to PMJM.

E. Ute Ladies'-Tresses Orchid

No suitable habitat was identified for the Ute ladies'-tresses orchid. There are no current constraints pertaining to the Ute ladies'-tresses orchid.

3. WOTUS and Wetlands

A delineated freshwater emergent wetland is located adjacent to the western border of the Project (**Appendix A**: *Figure 2*). Potential Wetland 1 is located approximately 120 feet south of the Project Area. An NHD Mapped Stream, No Name Creek, is located approximately 175 feet southwest of the Project Area. Potential Wetland 1 is associated with No Name Creek. Potential Wetland 2 is located approximately 255 feet east of the Project Area. Ditch 1 is located approximately 319 feet west of the Project. Ditch 1 is associated with Potential Wetland 1 and No Name Creek. NWI Emergent Wetland 1 and NWI Pond 1 are located approximately 155 feet southwest of the Project. NHD Pond 1, NWI Emergent Wetland 2, and NWI Pond 2 are not present (**Appendix A**: *Figure 2*). All hydrologic features within ½ mile of the Project are shown on **Appendix A**: *Figure 3*.

4. Phase I Environmental Site Assessment (ESA) and Cultural Desktop Review

A. Phase I ESA

2DOT conducted an updated Phase I Environmental Site Assessment of the Project on 6/16/2021. No recognized environmental conditions, *de minimis* conditions, or business environmental risks were identified. See *(603-129) McGavin Updated Phase I ESA June 2021* for the full Phase I ESA report.

B. Cultural Desktop Review

A search of the Colorado Inventory of Cultural Resources was received from the Office of Archaeology and Historic Preservation on 7/7/2020. No cultural sites or surveys were located in the Project (**Appendix B**: *Cultural Review*).

5. Ecological Site Characteristics

A. Site Description

The Project is located within an agricultural field (**Appendix C**: *Photographs*). During the site visit on 3/11/2021 the field was cultivated with rye (*Secale cereale*). The topography is uniformly flat with very little elevation gain or loss. There was no sign of livestock observed within the Project.

An existing oil and gas wellhead is located in the south-central portion of the Project.

B. Soils

The Project is comprised of Olney fine sandy loam, 1 to 3 percent slopes; Vona loamy sand, 0 to 3 percent slopes; Aquolls and Aquepts, flooded, and Loup-Boel loamy sands, 0 to 3 percent slopes.

C. Vegetative Communities

There are two plant communities associated with the Project; a disturbed agricultural community, and an ephemeral drainage that has not been cultivated (**Appendix C**: *Photographs*). The agricultural community was dominated by a cultivated rye, kochia (*Bassia scoparia*), and cheatgrass (*Bromus arvensis*). Other species observed within the cultivated area include field bindweed (*Convolvulus arvensis*), prairie sunflower (*Helianthus petiolaris*), Russian thistle (*Salsola tragus*), thistle poppy (*Argemone polyanthemos*), and prickly lettuce (*Lactuca seriola*). The ephemeral drainage plant community exhibits both upland and hydrophytic species, and is comprised of Baltic rush (*Juncus balticus*), creeping spike rush (*Eleocharis palustris*), prickly lettuce, salt grass (*Distichlis spicata*), smooth brome (*Bromus inermis*), Russian olive (*Elaeagnus angustifolia*), musk thistle (*Carduus nutans*), showy milkweed (*Asclepias speciosa*), prickly lettuce, and cheatgrass. The wetland delineation performed in 2020 confirmed that no wetlands extend into the Project Area.

D. Noxious Weeds

The following Colorado Noxious Weeds were observed dispersed throughout the Project; musk thistle (List B), Russian olive (List B), field bindweed (List C), and cheatgrass (List C).

E. Proposed Mitigation to Address Impacts

The proposed mitigation to address the potential impacts to vegetation is to limit the potential of noxious weeds being introduced to the Project. Where needed, best management practices (BMPs) such as routine equipment inspections and wash down stations will limit the potential of introducing noxious weeds and impacts to vegetation. 2DOT also recommends chemically treating the noxious weeds within the Project. Herbicide application in compliance with the Colorado Department of Agriculture has been proven to effectively treat noxious weeds.

Upon KMOG's completion of the proposed disturbance, restoration and revegetation should occur as soon as practicable, in accordance with COGCC 1003, Interim Reclamation rules and regulations.

If the disturbance occurs on crop lands, then the following is recommended to be implemented: COGCC 1003.e(1): "All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour, and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established".

To obtain the final reclamation threshold for release of financial assurance, the following shall be met: COGCC 1004.c(1): “reclamation has been performed as per Rules 1003 and 1004, and observation by the Director over two growing seasons has indicated no significant unrestored subsidence.”

Please let me know if you have any questions.

Sincerely,



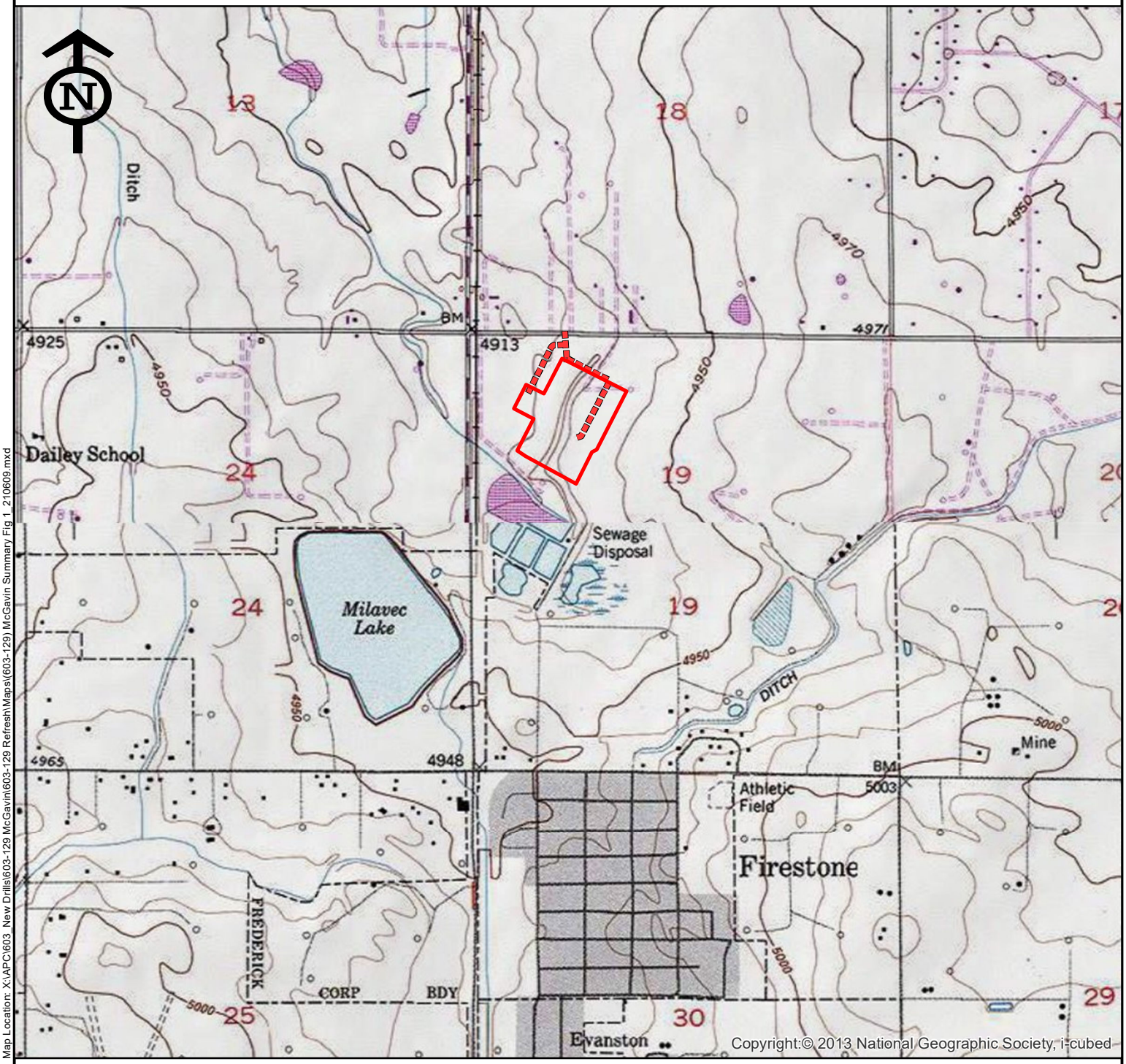
SAM JOSEPH
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ARVADA, CO | LARAMIE, WY | SARATOGA, WY
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Appendix A: *Figures*

McGavin

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 Refresh\Maps\(603-129) McGavin Summary Fig 1_210609.mxd

Project Area

Access Road

PREPARED BY:

2. two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 2,400 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

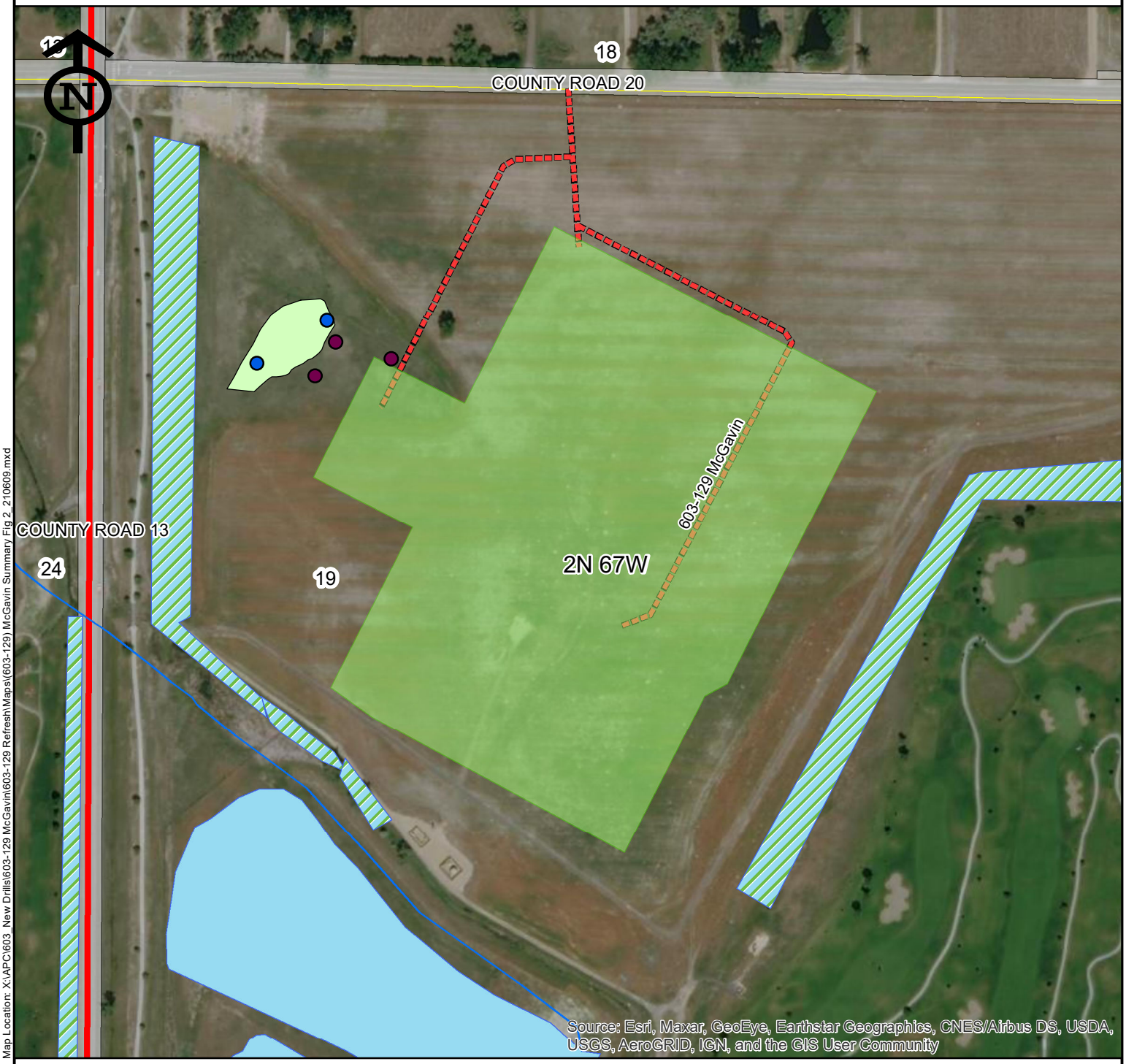
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Vicinity Map
Figure 1

(603-129) McGavin

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 RefreshMaps\(603-129) McGavin Summary Fig 2_210609.mxd

- Upland Soil Pit
- Wetland Soil Pit
- Delineated Wetland
- Potential Wetland
- Multi Well Pad and Prodcution Facility
- Access Road
- NHD Mapped Stream
- NHD Mapped Lake/Pond
- Township
- Section
- Weld County Road ROW

PREPARED BY:

two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 200 400 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated 2/2021

PREPARED FOR:

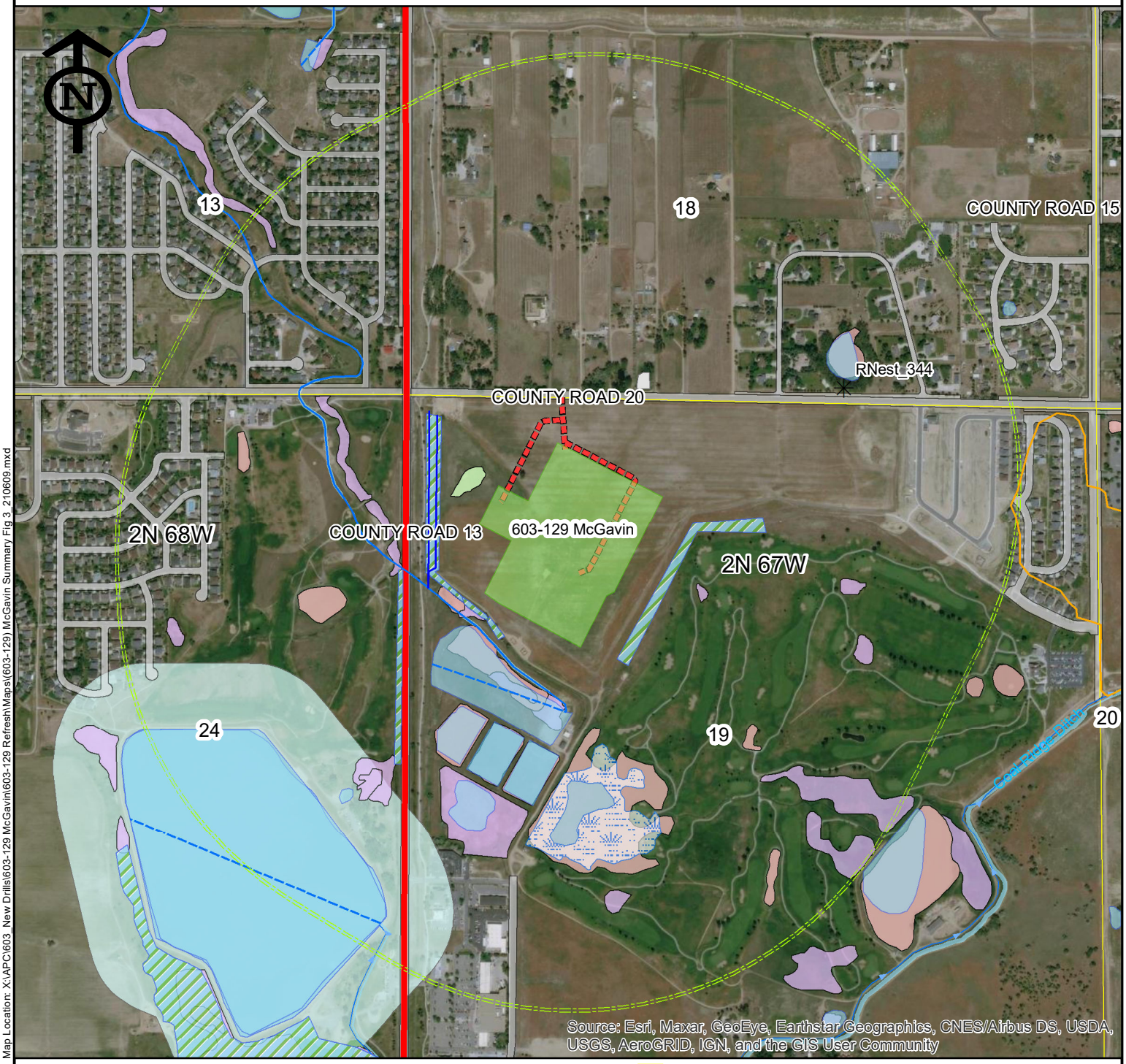
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Wetland Delineation
Figure 2

(603-129) McGavin

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 RefreshMaps\(603-129) McGavin Summary Fig 3_210609.mxd

- Ditch
- Ponds
- Delineated Wetland
- Potential Wetland
- Raptor Nest Removed
- Potential Burrowing Owl Habitat
- Multi Well Pad and Production Facility
- Kerr-McGee Facilities Half Mile Buffer
- Access Road
- NHD Mapped Ditch
- NHD Mapped Stream
- NHD Mapped Artificial Path
- NHD Mapped Lake/Pond
- NHD Mapped Reservoir
- NHD Mapped Swampmarsh
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Forested/Shrub Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Lake
- NWI Mapped Riverine
- Aquatic Sportfish Management Water

PREPARED BY:

two dot
7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 750 1,500 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

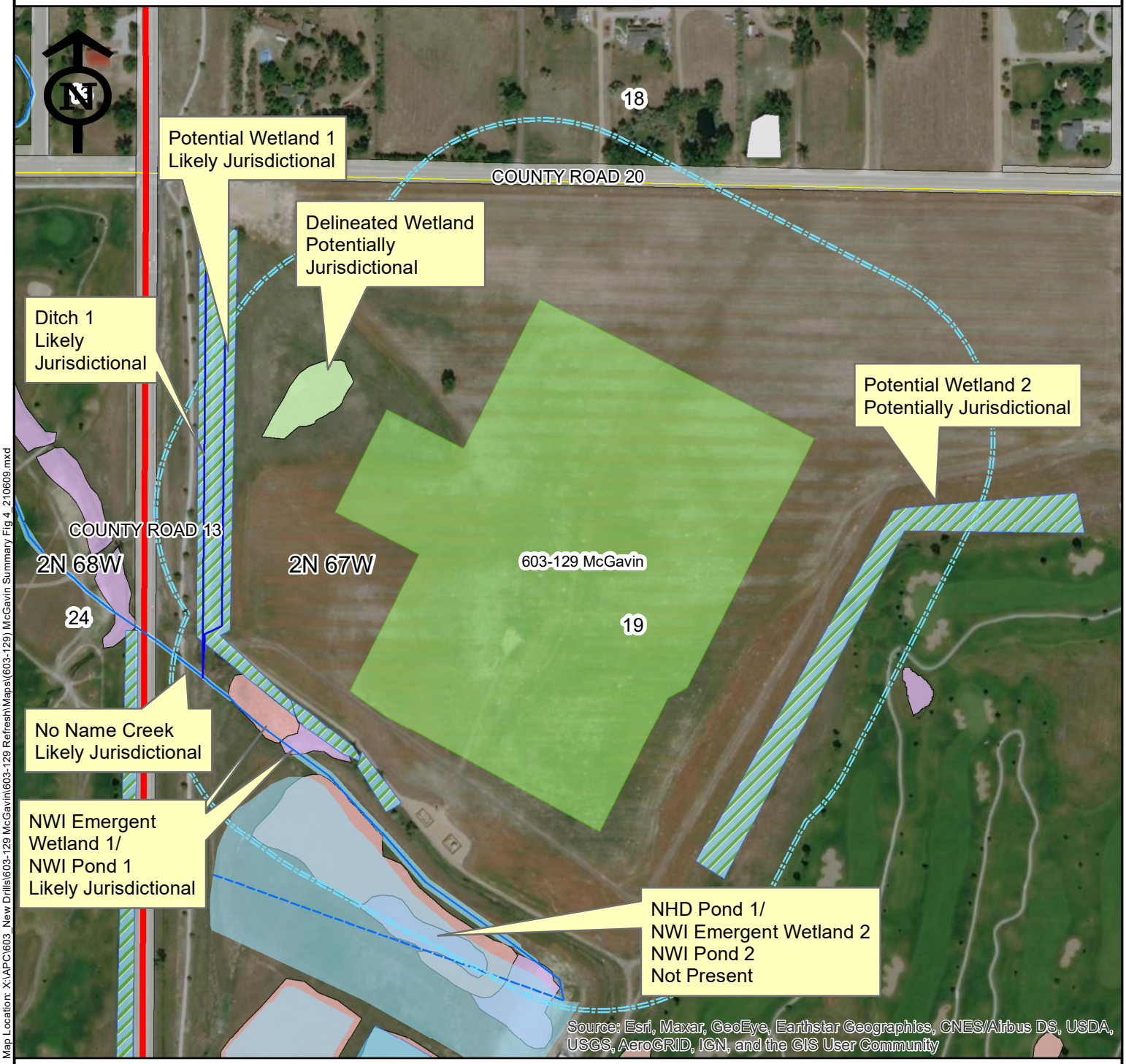
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 3

(603-129) McGavin Refresh

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 Refresh\Maps\(603-129) McGavin Summary Fig 4_210609.mxd

- Ditch
- Ponds
- Delineated Wetland
- Potential Wetland
- Multi Well Pad and Production Facility
- Kerr-McGee Facilities 500ft Buffer
- NHD Mapped Stream
- NHD Mapped Artificial Path
- NHD Mapped Lake/Pond
- NHD Mapped Reservoir
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Riverine

PREPARED BY:

two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 300 600 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/10/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 4



Appendix B: *Cultural Review*

HISTORY COLORADO
Office of Archaeology and Historic Preservation
1200 Broadway, Denver, Colorado 80203

Morgan Colacone
Two Dot Consulting
7674 Grandview Ave, Ste. 210
Arvada, CO 80002

July 7, 2020

Re: McGavin
File Search No. 22884

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources within the area shown in the provided map, located in the following areas:

PM	T	R	S
6th	2N	67W	19

0 sites and 0 surveys were located in the designated area(s).

If information on any district, site, building, structure, or object in the project area was found, detailed information follows the summary. If no properties were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Our letter should not be interpreted as formal consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) or the Colorado Register of Historic Places (CRS 24-80.1). In the event that there is federal or state agency involvement, please note that it is the responsibility of the agencies to meet the requirements of these regulations.

We look forward to consulting with you regarding the effect of the proposed project on significant cultural resources in accordance with the Advisory Council on Historic Preservation regulations titled "Protection of Historic Properties" or the Colorado Register of Historic Places, as applicable (http://www.historycolorado.org/oahp/consultation-guidance).

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3392. Thank you for your interest in Colorado's cultural heritage.

Steve Turner, AIA
State Historic Preservation Officer

*Information regarding significant archaeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.



Appendix C: *Photographs*



Photograph 1. Center of Project Area.



Photograph 2. Center of Project Area.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Ephemeral drainage intersecting the Project Area. No wetlands are present within the Project Area.

Section 9

Phase I Environmental Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Phase I Environmental Site Assessment Update

McGavin Oil and Gas Multi-Well Pad and Production Facility
Town of Firestone, Colorado

June 2021

Prepared for:

Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Prepared by:

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Acronyms and Abbreviations

2DOT	Two Dot Consulting, LLC
AAI	All Appropriate Inquiry
AIRSAFS	Aerometric Information Retrieval System / Air Facility Subsystem
AMSL	Above Mean Sea Level
APCDP	Air Pollution Control Division Permitted Facilities
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity Use Limitation
BER	Business Environmental Risk
BLVD	Boulevard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CREC	Controlled Recognized Environmental Condition
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FRSCO	Facility Registry System (Colorado)
HREC	Historical Recognized Environmental Condition
IPaC	Information for Planning and Consultation
KMOG	Kerr-McGee Oil & Gas Onshore LP
MRDS	Mineral Resource Data System
MSD	Minimum Search Distance
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
Site	McGavin Oil and Gas Facility, Town of Firestone, Colorado
T&E	Threatened and Endangered
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
WOTUS	Waters of the U.S.

Executive Summary

Two Dot Consulting, LLC (2DOT) has conducted an updated Phase I Environmental Site Assessment (Phase I ESA) of the McGavin Oil and Gas Facility located in the Town of Firestone, Colorado. This updated Phase I ESA has been prepared for Kerr-McGee Oil & Gas Onshore LP (KMOG) to determine the property's suitability for oil and gas operations.

The property, referenced herein as the "Site", encompasses approximately 25.6 acres and approximately 0.4 miles of access road. The Site is located in the Town of Firestone, Colorado; southeast of the intersection of County Road 13 and County Road 20 in section 19, township 2 north, range 67 west (**Appendix A: Figure 1**).

The Site is comprised of predominately agricultural land with an oil and gas wellhead located in the south-central portion of the Site. Land use adjacent to the Site consists of rangeland, golf courses, and residential properties.

A review of historical sources, including aerial photographs and historical topographic maps, indicates the Site has been primarily vacant and agricultural land since 1937.

The Phase I ESA was conducted in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM). Elements of the Phase I ESA include: (i) interviews with owners, operators, and occupants; (ii) searches for recorded environmental records; (iii) reviews of federal, tribal, state, and local government records; (iv) visual inspections of the property and of adjoining properties; and (v) the declaration by the environmental professional responsible for the assessment.

The objective of this Phase I ESA was to identify the presence or likely presence, use, or release on the Site of hazardous substances or petroleum products as defined in ASTM Practice E 1527-13 as a Recognized Environmental Condition (REC). This report includes a summary of the site reconnaissance conducted on July 8, 2020 and June 16, 2021, a review of environmental databases, and a review of historical data sources. Any exceptions to or deletions from these ASTM practices are described later in this report.

RECs

Recognized Environmental Condition (REC):

A REC is defined as - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

Based on conditions noted within the Site, 2DOT did not identify any RECs in connection with the Site.

Findings and Conclusions

2DOT has developed the following findings and conclusions:

- The Site is comprised of predominately agricultural land that contains oil and gas equipment. Adjacent properties support agriculture, recreation, and residential properties.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

1. Introduction

Two Dot Consulting, LLC (2DOT) conducted an updated Phase I Environmental Site Assessment (ESA) of the property proposed for the McGavin Oil and Gas Multi-Well Pad and Production Facility (Site) located in the Town of Firestone, Colorado (Site) on behalf of Kerr-McGee Oil & Gas Onshore LP (KMOG), in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM, 2013). This report documents our findings, opinions, and conclusions of the updated Phase I ESA.

1.1 Property Location and Description

The Site is a proposed oil and gas multi-well pad, production facility, and access road.

The Site is located in the town of Firestone, Colorado; southeast of the intersection of County Road 13 and County Road 20 in section 19, township 2 north, range 67 west The Site consists of approximately 25.6 acres for the proposed oil and gas multi-well pad and production facility, in addition to approximately 0.4 miles of proposed access roads. See **Appendix A: Figures.**

The Site currently operates as agricultural land that supports oil and gas production.

1.2 Purpose

2DOT understands that the purpose for conducting this updated Phase I ESA is to assess and document the current environmental conditions at the Site. The goal of the Phase I ESA is to identify recognized environmental conditions (RECs) in connection with the Site. ASTM Practice E 1527-13 defines the following categories of RECs:

Recognized Environmental Condition (REC):

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not RECs (see definition below).

ASTM E 1527-13 defines release as a release of any hazardous substance or petroleum product and shall have the same meaning as the definition of "release" in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 United States Code (U.S.C.) § 9601(22)).

Historical REC (HREC):

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Controlled REC (CREC):

A REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of

required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Additional conditions that are not included under the definitions of a REC, but are defined by ASTM Practice 1527-13 include:

De minimis:

A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Business Environmental Risk (BER):

A risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations.

1.3 Report Users

ASTM E1527-13, Section 3, Terminology, defines "user" as "the party seeking to use Practice E1527 to complete an ESA of the property. A user may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager. ASTM E1527-13, Section 10.7.1, defines "user" as "the person on whose behalf the Phase I Environmental Site Assessment is being conducted."

2DOT received authorization from KMOG to conduct a Phase I ESA of the Site on June 29, 2020. A request to perform an updated Phase I ESA was received on June 7, 2021. The Site is defined as approximately 25.6 acres of agricultural land that contains an oil and gas wellhead, and 0.4 miles of proposed access roads. This updated Phase I ESA has been prepared for KMOG, and only KMOG has the right to rely on the contents of this Phase I ESA without written authorization.

1.4 Scope of Services

ASTM Practice E 1527-13 states that there are four components of a Phase I ESA: 1) Records Review; 2) Site Reconnaissance; 3) Interviews; and 4) Report.

The scope of services provided for this Phase I ESA include:

- On-site assessment of the Site to identify environmental conditions.
- Observation of adjacent properties and the local area to evaluate the potential for adverse environmental impact to the Site.
- Review of available environmental documents for the Site.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the Site.
- Review historical data sources for the Site, including aerial photographs, topographic maps, ownership records, and other readily available development data.
- Interviews with persons represented to be familiar with the operation and history of the Site.

- Determine data gaps in the information obtained and comment on their significance in identifying RECs for the Site.
- Prepare a written report of methods, findings, opinions and conclusions.

The goal of this scope of services is to assist the user in identifying conditions at the Site that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three "defenses" identified in the 2002 Brownfields Amendments to the CERCLA Section 9607 (All Appropriate Inquiry [AAI] subsections). These three defenses include:

- The "innocent landowner" defense to potential liabilities under 42 U.S.C. § 9601
- The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
- The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. §9607r

Federal regulations at (42 U.S.C §9601(35)(A) & (B), §9607(b)(3), §9607(q); and §9607(r)), promulgated by the United States (U.S.) Environmental Protection Agency (EPA), require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-13: 3.2.6) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-13 as the party seeking to use Practice E 1527 to complete an ESA of the site and may include, without limitation, a potential purchaser of land at the site, a potential tenant of the site, an owner of land at the site, a lender, or a site manager.

Investigative areas not included in the standard ASTM ESA scope include: asbestos-containing building materials, radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, endangered species, indoor air quality, mold, biological agents, cultural and historic resources, ecological resources, health and safety, and industrial hygiene.

1.5 Significant Assumptions

2DOT has made certain assumptions in preparing the scope of this assessment:

- Boundaries of the Site were provided by KMOG. 2DOT assumed this information was accurate.
- Data gathered from public information sources (i.e. libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases and no intentional concealment of environmental conditions or releases has occurred.
- Interview information is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.
- Regulatory information is limited to sites identified after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

1.6 Limitations

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-13, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this updated Phase I ESA, and 2DOT's interpretation of the information obtained as part of this updated Phase I ESA. The findings and conclusions are limited to the Site and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs associated with a site within reasonable limits of time and cost. In conducting its services, 2DOT used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. This updated Phase I ESA conforms to the level of documentation required in ASTM Practice E 1527-13. However, 2DOT may omit discussion of certain records, i.e., sources deemed, in 2DOT's professional opinion, to be inapplicable, or of limited value, to the specific needs of KMOG. In accordance with ASTM, if the lack of available documentation results in a data gap, this data gap is identified herein, and its significance is discussed.

2. User-Provided Information

The user of the report provided a location drawing of the Site boundaries via pdf. Full access to the Site was granted to 2DOT.

3. Records Review

3.1 Environmental Records Review

GeoSearch was contracted by 2DOT to complete a database search of federal, state, and tribal environmental records for the Site and facilities in the ASTM-designated search radius. A computerized environmental information database search was performed by GeoSearch on July 2, 2020 and June 8, 2021. The databases searched included federal, state, local, and tribal databases as defined by ASTM E 1527-13. A summary of the sources and results of the database search where the number of records found were greater than zero is listed below in Table 1. A complete copy of the GeoSearch environmental database report (GeoSearch Radius Report) is included in **Appendix B: Environmental Records Review** (Geosearch, 2021f). The approximate minimum search distance (MSD) for this review is noted for each database listed below.

Table 1 - Summary of Environmental Database Search

Database	Description	Search Radius (MSD)	Records Found
Federal			
Resource Conservation & Recovery Act – Corrective Action Facilities	The Resource Conservation and Recovery Act (RCRA) gives the U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground	1 mi	1

Database	Description	Search Radius (MSD)	Records Found
	tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.		
Aerometric Information Retrieval System / Air Facility Subsystem (AIRSAFS)	The U.S. EPA modified the Aerometric Information Retrieval System to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem. Since this change in 2001, the management of the AIRSAFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.	Target Property	1
Facility Registry System (FRSCO)	The United States Environmental Protection Agency's Office of Environmental Information developed the Facility Registry System as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.	Target Property	1
Mineral Resource Data System (MRDS)	MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System originated in the U.S. Bureau of Mines, which is now part of USGS.	0.25 mi	1
State			
Air Pollution Control Division Permitted Facilities (APCDP)	This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.	0.5 mi	8
Total			12

The following table (Table 2) summarizes the site-specific information provided by the database and/or gathered by this office for identified facilities of potential concern to the Site. The remaining facilities listed in the database report do not appear to represent RECs to the Site based upon regulatory status, apparent topographic gradient, and/or distance from the Site.

Table 2 – Summary of facilities of potential concern to the Site

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
NOBLE ENERGY INC. **BATTERY #10086600**	Target Property	APCDP, AIRSAFS, FRSCO	No, based on site visit and aerial imagery. This location is likely mapped incorrectly, and likely does not affect the Site. Additionally, its operation status is listed as temporarily closed and in compliance with procedural requirements.
ST VRAIN (SAND AND GRAVEL CONSTRUCTION)	0.238 mi east / Upgradient	MRDS	No, based on regulatory status and distance from Site.

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
ARC COLORADO INC	0.652 mi east / Upgradient	USRCRAC	No, based on regulatory status and distance from the Site.

Well Search Report

A Water Well Report (Geosearch, 2021c) received from GeoSearch on June 9, 2021 listed 40 water wells within ½ mile of the Site boundary. No wells were listed within the Site. No water wells were observed within the Site during the ESA.

An Oil & Gas Report (**Appendix C: Oil & Gas Report**) (GeoSearch, 2021b) was received from GeoSearch that searched environmental databases for oil and gas well and pit locations. One oil & gas well is located within the Site, however, the 19-4N Rocky Mountain Fuel well, owned by KMOG is listed as shut in. There are two plugged and abandoned wells and one abandoned location located immediately adjacent to the Site.

3.2 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses at and in the vicinity of the Site and to assess these uses for potential hazardous materials impacts that may affect the Site. 2DOT reviewed those historical sources that were reasonably ascertainable and likely to provide useful information, as defined by the ASTM standard.

Historical Aerial Photographs

2DOT reviewed historical aerial photographs provided by GeoSearch (**Appendix D: Historical Aerial Photographs**) (GeoSearch, 2021d) for the following years: 1937, 1948, 1953, 1963, 1966, 1967, 1970, 1975, 1978, 1984, 1993, 1999, 2004, 2005, 2006, 2009, 2011, 2013, 2015, 2017, and 2019. Google Earth imagery from 9/29/2020 was also reviewed (Google Earth, 2021). The Site appears to have changed from undeveloped land and agriculture fields to agricultural fields with oil and gas operations present from 1937 to 2020.

1937-1963: The Site appears to be mostly vacant land surrounded by vacant land. There is what appears to be a ditch entering the Site from the southeastern corner. It splits into two ditches that exit the Site along the northern border. Some development likely associated with farming is located along the eastern edge by 1953.

1966-1967: The Site remains as vacant land bisected by agricultural ditches. There are three, rectangular, man-made ponds located a little over 1/8 mile south of the Site.

1970-1978: An additional, larger man-made pond is located adjacent to the southern border of the Site. There are residential roads and some structures located north of the Site across County Road 20.

1984-1993: There is additional development located north of County Road 20 and west of County Road 13. The ditches that bisect the Site appear to be gone. There is an oil and gas access road that enters the Site from the west and leads to the wellhead located within the south-central portion of the Site.

1999-2006: There is a golf course located east of the Site. The access road that entered the Site from the west appears to have been reclaimed and the road leading the wellhead now enters the Site from the south.

2009: The imagery shows some disturbance likely associated with pipeline construction located along the southwestern corner of the Site. There are some linear, trail-like features located within the Site.

2011-2020: The pipeline disturbance and trail-like features are not shown in the 2011 imagery. The ponds located to the south of the Site appear to have been filled in and planted as evidenced by mowing/harvesting lines. The adjacent properties appear to support agriculture, oil and gas operations, golf courses, and residential properties.

Historical Topographic Maps

2DOT reviewed historical topographic maps of the Site provided by GeoSearch (**Appendix E: Historical Topographic Maps**) (GeoSearch, 2021e). The following United States Geological Survey (USGS) 7.5 minute series topographic maps were reviewed: 1950, 1969, 1979, 1994, and 2013 Frederick, CO; and 1949, 1969, 1979, and 2013 Gowanda, CO. The 1902 30-minute Greeley, CO topographic map was also reviewed.

1902: The Site appears as vacant land with a stream feature that vertically bisects the Site. There are two two-track roads; one located along the southern border of the Site and the other is along on the northeast corner of the Site. A mine is depicted southeast of the Site.

1949/1950: The stream feature is depicted. The two-track road along the southern border is no longer depicted. There is a railroad running parallel along the eastern side of County Road 13, west of the Site.

1969: The Site appears as vacant land with a stream bisecting it. Adjacent properties also appear as vacant land with six ponds located south of the Site.

1979/1994: There is a two-track road, likely an oil and gas access road, located in the northern portion of the Site. The stream is no longer depicted. A well and sewage disposal are both depicted cross-gradient and south of the Site.

2013: The Site appears as vacant land. There are no roads or structures depicted within the Site. The railroad located along County Road 13 (Colorado Boulevard) is not mapped. The well that was depicted cross-gradient and south of the Site in 1979 is no longer depicted. Sewage disposal is not called out, however the ponds associated with it in 1994 are depicted cross-gradient and south of the Site.

Fire Insurance Maps

GeoSearch reviewed fire insurance maps (GeoSearch, 2021a) and determined there is no coverage available for this area.

City Directory Information

A City Directory Report (**Appendix F: City Directory**) was received from GeoSearch for the on County Road 13 [also known as Colorado Boulevard (Blvd)] for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, 2016, 2019, and 2021. A City Directory Report was received from GeoSearch on County Road 20 for the years 1989-1990, 1996, 2001, 2006, 2011, 2016, and 2021 (Geosearch, 2021g).

All addresses listed on County Road 13 (Colorado Blvd) were residential, with exception of the following:

10141 County Rd 13	Pat C Greyhound Kennel Inc (2016-2021)
8080 County Rd 13	Heritage Bank (2006); Re/Max Horizons (2006)
8100 County Rd 13	Tip Toe Nails (2006); Carbon Valley Eye Care (2006); Jazzy Bean Coffee (2006); Wright H Lindsay O D (2006); Zadel And Associates Realty Inc (2006)
8134 County Rd 13	Safeway (2006)
8180 County Rd 13	Saddleback Grepes And Grians (2006)
8196 County Rd 13	Caribbean Tan Inc (2006); Curves For Women (2006); Mj Morrell Inc (2006); Subway Firestone (2006); Video Plus (2006)

9031 County Rd 13	Clever Technology Inc (2006-2021)
9350 County Rd 13	Transcribe Pro (2006)
9501 County Rd 13	Recycled Audio Inc (2006-2016); Samuel Joshua (2016)
9943 County Rd 13	Kens Pnt&Body Shp (2001-2011); Ken's Paint & Body Shop (2021)
10925 Colorado Blvd	Autozone (2011)
11040 Colorado Blvd	Chase (2011)
7133 Colorado Blvd	Discount Tire & Svc (2014-2021)
8080 Colorado Blvd	Premier Members Federal Credit Union (2011)
8110 Colorado Blvd	Carbon Valley Eye Care (2011); Great Clips (2011); Tip Toe Nails (2011); Wah Wok Chinese Food (2011)
8132 Colorado Blvd	0001 All Kings Locksmith (2011)
8134 Colorado Blvd	Safeway (2011)
8196 Colorado Blvd	Aaa Colorado Locksmith (2011); Chochos (2011); Liquor Carbon Valley Liquor (2011); Longs Peak Dental (2011); Neat Repeats Thrift And Gift (2011); Subway Sandwiches (2011)
8252 Colorado Blvd	Ace Hardware (2011)
8308 Colorado Blvd	Adams Bank & Trust (2011); Cardinal Health (2011); Flannagan Clint R Md (2011); North Vista Medical Center (2011); Smith Daniel Attorney (2011); Tusek David Md (2011)
8350 Colorado Blvd	Black Jack Pizza (2011); Dairy Queen (2011); Edward Jones Financial Advisor Br (2011); Emergency Locksmith 24 Hour (2011); Snap Fitness (2011)

The addresses listed on County Road 20 were residential, except for the following:

6171 County Rd 20	Coal Ridge Kennels (2006-2011); Coal Ridge Animal Hospital (2016-2021)
6271 County Rd 20	Woodsmith Construction (2006)

3.3 Environmental Liens and Activity and Use Limitations

GeoSearch performed an environmental lien and activity use limitations (AULs) search for the Site identified as Tax Parcel Number 131119200045 in July 2020. None were found. Based on GeoSearch's recommendation and with agreement from KMOG, environmental lien and AULs were not reordered for this June 2021 update since ownership has not changed.

4. Site Reconnaissance

On July 8, 2020, Shannon Regan and Morgan Colacone conducted a Phase I ESA site reconnaissance at the Site. The site reconnaissance included approximately 25 acres. On June 16, 2021, Sam Joseph conducted an updated Phase I ESA site reconnaissance consisting of approximately 25.6 acres of farmlands and oil and gas operations. The purpose of the site reconnaissance was to observe Site conditions and identify exposed features that could represent or indicate ASTM RECs. Features of interest included, but were not limited to, underground storage tanks (USTs), aboveground storage tanks (ASTs), chemical storage areas, transformers, stressed vegetation, and staining. Adjoining properties were observed from the property boundaries and public rights-of-way. During the walkover, photographs were taken of the Site and adjoining properties. Selected photographs are included in **Appendix G: Site Photographs**.

The Site was accessed from vehicle via lease roads located on the southern and western border of the Site as well as on foot for areas that could not be verified from the vehicle. Public roads were utilized to observe the surrounding and adjacent properties.

4.1 Methodology and Limiting Conditions

The Phase I ESA site reconnaissance consisted of visual observations of the Site and adjoining properties. The methodology for the site reconnaissance included walking and driving the Site to observe current conditions.

4.2 General Site Setting

The Site encompasses approximately 25.6 acres, in addition to 0.4 miles of proposed access roads. The Site is located in the Town of Firestone, Colorado; southeast of the intersection County Road 13 and County Road 20 in section 19, township 2 north, range 67 west. (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with an uncultivated ephemeral drainage located along the western edge (**Appendix A: Figure 2**). There is an oil and gas wellhead located in the south-central portion of the Site.

Adjacent land use surrounding the Site is agricultural, residential, recreational/commercial, and oil and gas operations.

Current Uses of the Site

The Site is comprised of vacant land and an oil and gas wellhead.

Past Uses of the Site

The Site has historically been used as cropland.

Adjoining Properties and Surrounding Area

South of the Site is an oil and gas pad and agricultural fields that appeared to historically support man-made mining or water treatment ponds. East of the project area is a golf course. West of the Site is potential wetland area, a recreational walking trail, and County Road 13. North of the Site is agricultural land, County Road 20, and residential properties.

Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

According to the United States Geologic Survey (Tweto, 1979) Special Geographic Map, the Site is located within the Eolian deposits map unit which dune sand and silt and Peoria Loess.

According to the Natural Resources Conservation Service's Soil Survey Geographic database, the Site is comprised of Olney fine sandy loam, 1 to 3 percent slopes; Vona loamy sand, 0 to 3 percent slopes; Aquolls and Aquepts, flooded, and Loup-Boel loamy sands, 0 to 3 percent slopes.

Topographic maps and aerial imagery indicate that the highest point is located along the eastern border at approximately 4,943 feet above mean sea level (AMSL). The lowest point is located along the western border at 4,919 feet AMSL. The Site consists of relatively flat fields with a slight depressional area located along the central western border. Elevation generally decreases to the northwestward.

Groundwater flow is assumed to follow topography and flows northwest.

General Description of Structures and Roads

There are no roads within the Site. There is an oil and gas access road located approximately 85 feet south of the Site. The only structure within the Site is an oil and gas wellhead.

Potable Water Supply

There is no potable water supply for the Site.

Sewage Disposal System

There is no sewage disposal system for the Site.

4.3 Exterior and Interior Observations

Hazardous Substances and Petroleum Products in Connection with Identified Users

There is an oil and gas wellhead located within the Site, owned by KMOG. No leaks or staining were observed during the field survey on June 16, 2021.

Storage Tanks – ASTs and USTs

There were no storage tanks observed within the Site.

Odors

No odors were observed.

Pools of Liquid

No abnormal puddles or pools of liquid were observed within the Site.

Drums

There were no drums observed within the Site.

Hazardous Substances and Petroleum Product Containers (Not Necessarily in Connection with Identified Uses)

No hazardous substances or petroleum product containers were located within the Site, that are not in connection with identified uses.

Unidentified Substance Containers

No unidentified substance containers were observed within the Site.

Utilities and PCBs

Although no longer commercially produced in the United States, Polychlorinated Biphenyl (PCB) may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include:

- Transformers and capacitors;
- Electrical equipment including voltage regulators, switches, re-closers, bushings, and electromagnets; and
- Oil used in motors and hydraulic systems.

No equipment likely to contain PCBs was observed within the Site.

Pits, Ponds, or Lagoons

During the field surveys on July 8, 2020 and June 16, 2021, a surface depression associated with a potential wetland was identified along the west-central border.

Stained Soil or Pavement

No surface staining was observed during the Site visit on June 16, 2021.

Stressed Vegetation

No areas of stressed vegetation were observed on June 16, 2021 within the Site.

Solid Waste

No solid waste was observed during the Site visit on June 16, 2021.

Wastewater

During the June 16, 2021 field visit, no wastewater or stormwater was observed within the Site.

Wells

One oil and gas well, 19-4N ROCKY MOUNTAIN FUEL, was located within the Site. This well is owned by KMOG and is currently listed as shut in.

5. Non-Scope Considerations

The following sections briefly discuss investigative areas that are not included in the standard ASTM Practice E 1527-13 scope. These items are presented as anecdotal information.

Radon

Radon testing was not conducted as part of this Phase I ESA.

Lead-in-Drinking Water

Drinking water at the Site was not tested for lead as part of the Phase I ESA.

Wetlands

A wetland delineation was performed on July 7, 2020 and determined that no wetlands are present within the Site. An uncultivated ephemeral drainage intersects the western edge of the Site (**Appendix G: Site Photo-graphs**). This drainage appears to convey surface water to an unnamed ditch west of the Site. The nearest wetland is 124 feet west of the Site.

Endangered Species Act

An Information for Planning and Consultation (IPaC) test for threatened and endangered (T&E) species from the United States Fish and Wildlife Service (USFWS) was run for the Site on June 10, 2021. Based on the results, the following T&E birds, fishes, and flowering plants were identified as potentially occurring in or near the Site:

- Preble's Meadow Jumping Mouse, *Zapus hudsonius preblei* (Threatened)
- Eastern Black Rail, *Laterallus jamaicensis ssp. Jamaicensis* (Threatened)
- Piping plover, *Charadrius melodus* (Threatened)
- Whooping Crane, *Grus americana* (Endangered)
- Pallid Sturgeon, *Scaphirhynchus albus* (Endangered)
- Ute Ladies'-tresses, *Spiranthes diluvialis* (Threatened)

- Western Prairie Fringed Orchid, *Platanthera* praeclara (Threatened)

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures. An IPaC test for migratory bird species from USFWS Birds of Conservation Concern list was review for the Site on June 10, 2021. Based on the results, the following migratory birds were identified as potentially occurring in or near the Site:

- Bald Eagle, *Haliaeetus leucocephalus*
- Burrowing Owl, *Athene cunicularia*
- Cassin's Sparrow, *Aimophila cassinii*
- Golden Eagle, *Aquila chrysaetos*
- Lark Bunting, *Calamospiza melanocorys*
- Lesser Yellowlegs, *Tringa avipes*
- Long-billed Curlew, *Numenius americanus*
- Mccown's Longspur, *Calcarius mccownii*
- Semipalmated Sandpiper, *Calidris pusilla*
- Willet, *Tringa semipalmata*

6. Interviews

Tom Crouch, Senior Landman for KMOG, completed a questionnaire regarding the history and current conditions of the Site in July 2020 and June 2021. The questions are below with Tom's answers from June 14, 2021 in **bold**.

To the best of your knowledge…

1. Have any current or past environmental permits been obtained? (solid waste, disposal permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits)…
    a. **Not to my knowledge.**
2. Are there any underground or above ground storage tanks on the property? If yes, what are their contents?
    a. **There is an oil and gas facility located on the property.**
3. Are you aware of any environmental investigations or problems on the property or on adjacent properties?
    a. **I am unaware of any environmental investigations or problems related to the property or adjacent properties.**
4. Have any past or current environmental violations relating to environmental laws occurred?
    a. **Not to my knowledge.**
5. Are there any underground injection systems on the property?

a. **I am unaware of any underground injection systems on the property**.

6. Were there any unreported spills?
    a. **I am unaware of any unreported spills. Might need to check with operations if there are any spills associated with the Oil & Gas wells and facilities.**
7. Are there any environmental liens on the property?
    a. **Not to my knowledge**
8. Is there any environmental waste on the property?
    a. **Not to my knowledge**
9. What has the property previously been used for? (back to what year are you aware of the property use)
    a. **Not sure**
10. What is the property presently used for?
    a. **The parcel is currently being used for agriculture. The parcel is being farmed by a tenant farmer.**
11. Are there any aboveground or underground storage tanks on the site such as gasoline tanks, diesel tanks?
    a. **Not that I am aware of.**
12. Are there any hazardous materials stored on the property such as drums, fuel, chemicals, pesticides, etc?
    a. **Not That I am aware of.**
13. Are there any oil or gas lines, wells, or pumps on the property?
    a. **The parcel does have active wells and facility located on the property.**
14. What are the adjacent properties used for?
    a. **Golf Course, Residential and Commercial.**
15. Has there ever been a fuel spill, fire, or emergency response at the property?
    a. **Not to my knowledge.**
16. Are there active water wells on the property? Have any of the wells ever been contaminated?
    a. **Not sure and not to my knowledge.**

7. Data Gap Analysis

The ASTM E 1527-13 standards require a listing of "data gaps," including data failure encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-13, Section 12.7, Data Gaps, requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this Site, the following items may constitute a data gap as defined by ASTM E 1527-13:

- Absence of aerial photography prior to 1937
- Absence of Sanborn Fire Insurance Maps
- Absence of Tax Map coverage
- Absence of previous landowner(s) interviews

These data gaps do not appear to be significant because the presence of other supporting historical information along with the lack of development in the area, both past and present, provided enough information to determine the historical usage of the Site.

8. Findings, Opinions, and Conclusions

2DOT has conducted a Phase I ESA of the McGavin proposed oil and gas multi-well pad and production facility and access road located in the Town of Firestone, CO. The updated Phase I ESA was performed in accordance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described previously in this report. Included in this updated Phase I ESA are summaries of site reconnaissance conducted on July 8, 2020 and June 16, 2021, the review of the environmental database search report (**Appendix B: Environmental Records Review**), historical data sources (**Appendix D, E, & F**) and other records.

8.1 Findings and Opinions

2DOT has developed the following findings and opinions:

- The Site is comprised of predominately agricultural land that contains oil and gas production equipment. Adjacent properties support agriculture, recreation, oil and gas operations, and residential properties.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

8.2 Conclusions

Based upon the Findings and Opinions, 2DOT concludes that no RECs have been identified in connection with the Site.

The following statement is required by ASTM E 1527-13 as a declaration of whether RECs were found:

> *2DOT has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of the Site (McGavin, Firestone, Colorado). Any exceptions to, or deletions from, this practice are described in previous sections of this report. This assessment has revealed zero RECs, zero HRECs, zero CRECs, zero de minimis conditions, and zero BERs in connection with the Site based on the site reconnaissance on June 16, 2021.*

2DOT recommends that KMOG consider the "shelf life" of Phase I documents in determining risk. ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the CERCLA defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

9. Qualifications of Environmental Professionals

2DOT has performed an updated Phase I ESA for the McGavin Oil and Gas Facility located in the Town of Firestone, Colorado. We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in § 312.10 of 40 CFR § 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the "all appropriate inquiries" in conformance with standards and practices set forth in 40 CFR Part 312.

The scope of the ESA was consistent with practices and procedures set forth in ASTM Practice E 1527-13.

This Phase I ESA was performed by the following 2DOT personnel:



Qualified Environmental Professional, Sam Joseph

Site Reconnaissance, Project Manager

Bachelor of Science Degree in Wildlife & Fisheries Biology & Management Conservation Biology, a Bachelor of Science Degree Environment and Natural Resources, and a minor in Zoology. Mr. Joseph has worked in the environmental field over 5 years. Mr. Joseph has the following registrations and certifications relevant to the environmental field: OSHA 10-Hour Construction Program, OSHA 40-Hour HAZWOPER, OSHA H2S Safety, Wetland Training Institute Wetland Delineation Training, Boulder County Open Spaces T&E Species Identification, SafeLand USA Training.



Qualified Environmental Professional, Kathleen Madigan

Quality Assurance/ Quality Control

Ms. Kathleen Madigan, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Bioresource and Agricultural Engineering with a minor in Spatial Information Management Systems. Ms. Madigan has worked in the environmental field for more than 18 years as a project manager and field technician working on a variety of projects. Ms. Madigan has the following registrations and certifications relevant to the environmental field: SafeLand USA Training, Erosion Control Supervisor Certificate CDOT, and 40-Hour OSHA Hazwoper Training. Additionally, Ms. Madigan has taken online courses for ASTM E1527 Standard Practice for Environmental Site Assessments.

10. References

American Society for Testing and Materials (ASTM) Practice E 1527-13, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

GeoSearch, 2021a. Fire Insurance Map Abstract. McGavin, Longmont, Weld County, CO 80504. June 10, 2021.

GeoSearch, 2021b. GeoPlus Oil & Gas Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021c. GeoPlus Water Well Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021d. Historical Aerial Photographs. McGavin, Longmont, Weld County, CO 80504. June 11, 2021.

GeoSearch, 2021e. Historical Topographic Maps. McGavin, Longmont, Weld County, CO 80504. June 10, 2021.

GeoSearch, 2021f. Radius Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021g. City Directory. Longmont, Weld County, CO 80504. June 10, 2021.

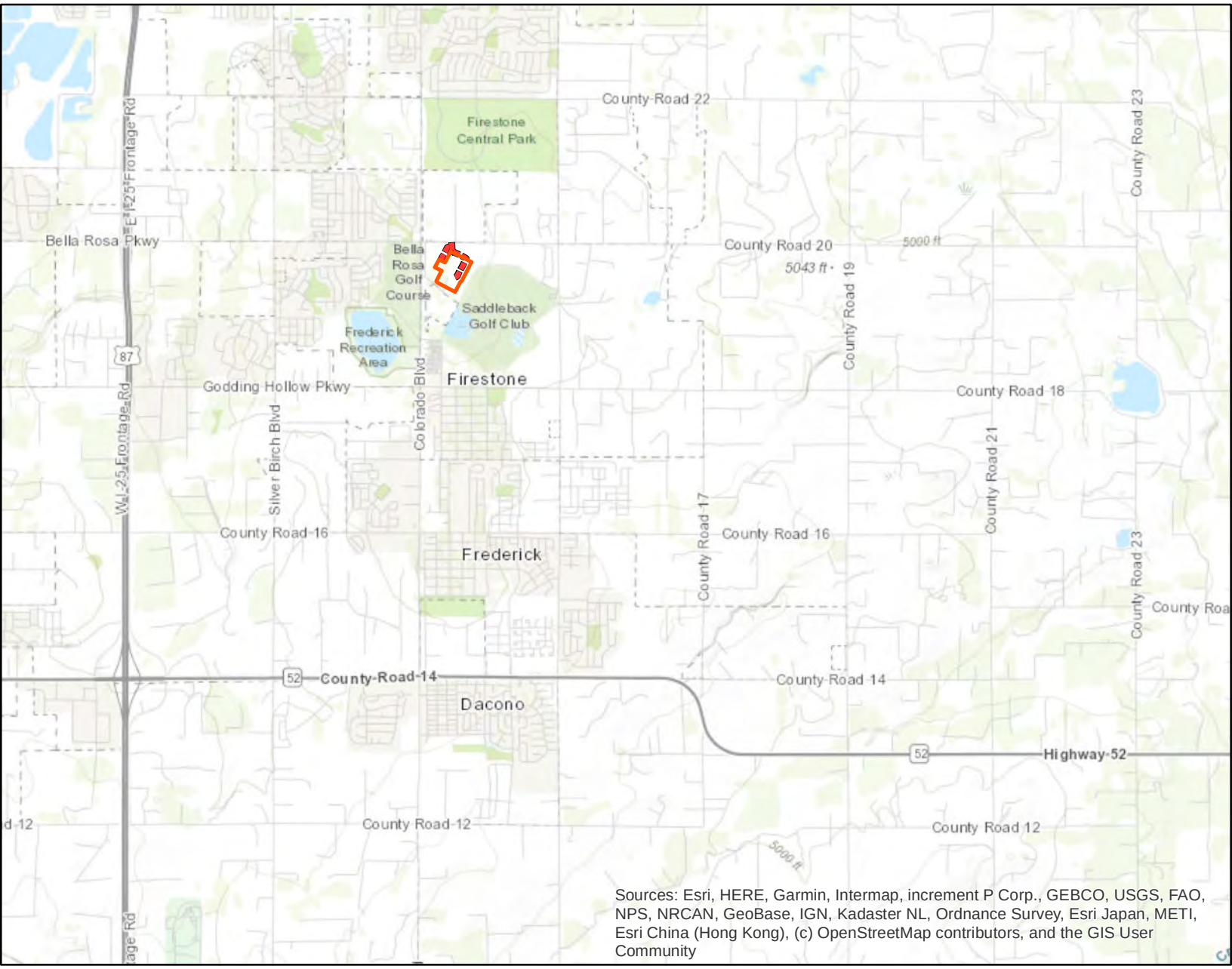
Google Earth, 2021. Aerial Imagery. 40.128504, -104.937976. Imagery date 9/29/2020.

Tweto, Ogden, 1979. Geologic Map of Colorado: U.S. Geological Survey Special Geologic Map, scale 1:500,000.

Appendix A: Figures

McGavin Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

2 two dot

PREPARED FOR:

KerrMcGee

Figure 1: Vicinity Map

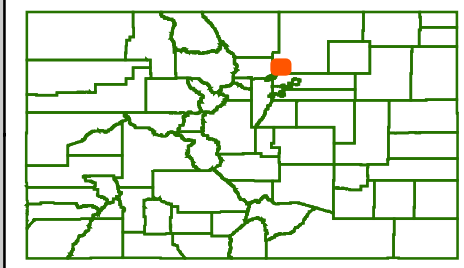
0 0.5 1 Miles

Project

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

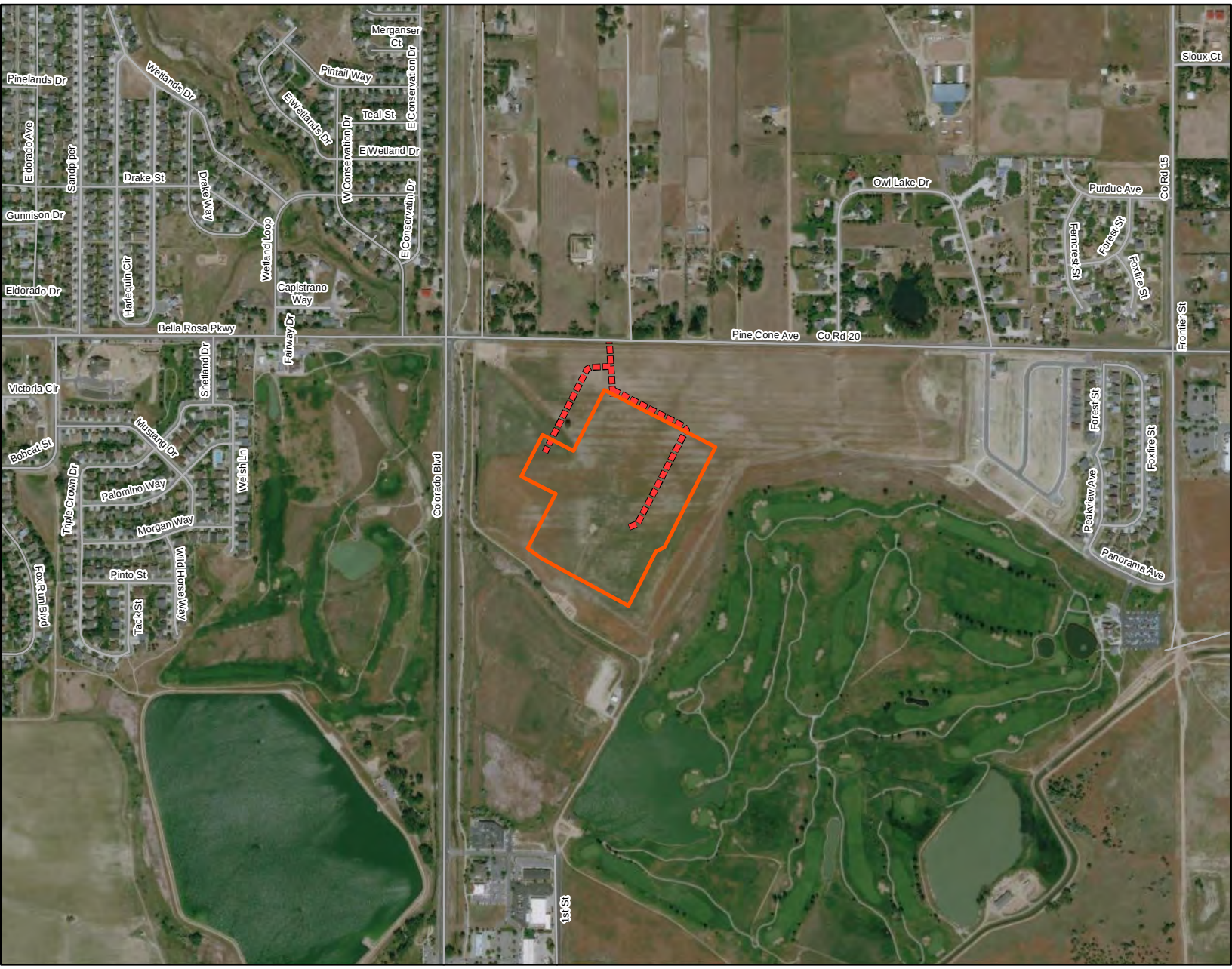
N



Weld County, Colorado

McGavin Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

2 two dot

PREPARED FOR:

KerrMcGee

Figure 2: Site Location

0 500 1,000 Feet

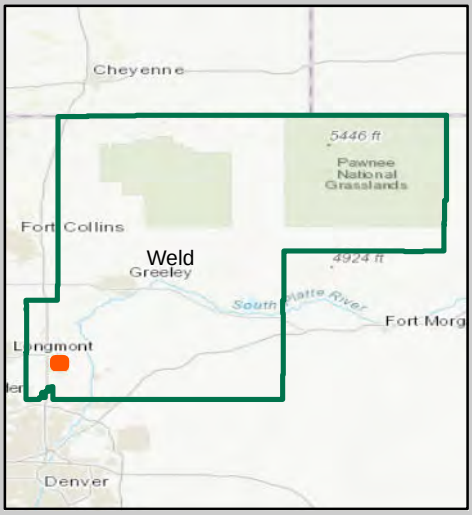
Weld County

Project

Access Road

Date: 6/15/2021 Drafted By: MC
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Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Appendix B: Environmental Records Review

GeoSearch
On time. On target. In touch.™

Radius Report

GeoLens by GeoSearch

Target Property:

McGavin

Longmont, Weld County, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401

Job #: 412768

Project #: 603-129

Date: 06/08/2021

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Unlocatable Report . . . . . See Attachment

Zip Report . . . . . See Attachment

Disclaimer

This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquiries Rule (40 CFR ï¿½312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal,state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR ï¿½312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.

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Target Property Summary

Target Property Information

McGavin
Longmont, Colorado 80504

Coordinates
Area centroid (-104.93778, 40.1284142)
4,927 feet above sea level

USGS Quadrangle
Gowanda, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530

Database Summary

FEDERAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSCO	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	TP/AP
RCRA SITES WITH CONTROLS	RCRASC	0	0	TP/AP
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR	RCRAGR08	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR	RCRANGR08	0	0	0.1250
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - NON-CORRACTS TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM	SEMS	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM ARCHIVED SITE INVENTORY	SEMSARCH	0	0	0.5000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	1	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - SUBJECT TO CORRECTIVE ACTION FACILITIES	RCRASUBC	0	0	1.0000

SUB-TOTAL		1	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	1	0	TP/AP
BIENNIAL REPORTING SYSTEM	BRS	0	0	TP/AP
CERCLIS LIENS	SFLIENS	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	TP/AP
EPA DOCKET DATA	DOCKETS	0	0	TP/AP
ENFORCEMENT AND COMPLIANCE HISTORY INFORMATION	ECHOR08	0	0	TP/AP
FACILITY REGISTRY SYSTEM	FRSCO	1	0	TP/AP

Database Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR08	0	0	TP/AP
HAZARDOUS WASTE COMPLIANCE DOCKET FACILITIES	HWCD	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	0	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR08	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	PCSR08	0	0	TP/AP
SEMS LIEN ON PROPERTY	SEMSLIENS	0	0	TP/AP
SSEHRI PFAS CONTAMINATION SITES	SSEHRIPFAS	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	TP/AP
TOXICS RELEASE INVENTORY	TRI	0	0	TP/AP
ALTERNATIVE FUELING STATIONS	ALTFUELS	0	0	0.2500
FEMA OWNED STORAGE TANKS	FEMAUST	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
INTEGRATED COMPLIANCE INFORMATION SYSTEM DRYCLEANERS	ICISCLEANERS	0	0	0.2500
MINE SAFETY AND HEALTH ADMINISTRATION MASTER INDEX FILE	MSHA	0	0	0.2500
MINERAL RESOURCE DATA SYSTEM	MRDS	1	0	0.2500
OPEN DUMP INVENTORY	ODI	0	0	0.5000
SURFACE MINING CONTROL AND RECLAMATION ACT SITES	SMCRA	0	0	0.5000
URANIUM MILL TAILINGS RADIATION CONTROL ACT SITES	USUMTRCA	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMER MILITARY NIKE MISSILE SITES	NMS	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	FUSRAP	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000

SUB-TOTAL		3	0	

Database Summary

STATE (CO) LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ENVIRONMENTAL REAL COVENANTS LIST	COVENANTS	0	0	TP/AP
HAZARDOUS WASTE SITES- GENERATOR	HWSG	0	0	0.1250
ABOVEGROUND STORAGE TANK FACILITIES	AST	0	0	0.2500
UNDERGROUND STORAGE TANK FACILITIES	UST	0	0	0.2500
COLORADO BROWNFIELD SITES	BF	0	0	0.5000
HISTORICAL SOLID WASTE LANDFILLS	HISTSWLF	0	0	0.5000
LEAKING STORAGE TANK FACILITIES	LST	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS TRUST FUND SITES	LUSTTRUST	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	0	0.5000
VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM SITES	VCRA	0	0	0.5000
HAZARDOUS WASTE SITES- CORRECTIVE ACTION	HWSCA	0	0	1.0000
SUPERFUND SITES	SF	0	0	1.0000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ASBESTOS ABATEMENT AND DEMOLITION PROJECTS	ASBESTOS	0	0	TP/AP
COLORADO DISCHARGE PERMIT SYSTEM FACILITIES	CDPS	0	0	TP/AP
SPILLS LISTING	SPILLS	0	0	TP/AP
DRY CLEANING FACILITIES	CLEANERS	0	0	0.2500
AIR POLLUTION CONTROL DIVISION PERMITTED FACILITIES	APCDP	8	0	0.5000
HAZARDOUS WASTE SITES- TREATMENT, STORAGE & DISPOSAL	HWSTSD	0	0	0.5000
METHANE GAS STUDY SITES	METHANESITES	0	0	0.5000
REGISTERED RECYCLING FACILITIES	RECYCLERS	0	0	0.5000
URANIUM MILL TAILINGS SITES	UMTS	0	0	0.5000
SUB-TOTAL		8	0	

Database Summary

LOCAL LISTING

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
WELD COUNTY SOLID WASTE FACILITIES	WCSWF	0	0	0.5000
SUB-TOTAL		0	0	

TRIBAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR08	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR08	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		12	0	

Database Radius Summary

FEDERAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200	1	NS	NS	NS	NS	NS	1
BRS	0.0200	0	NS	NS	NS	NS	NS	0
CDL	0.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	0.0200	0	NS	NS	NS	NS	NS	0
EC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
ECHOR08	0.0200	0	NS	NS	NS	NS	NS	0
ERNSCO	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
FRSCO	0.0200	1	NS	NS	NS	NS	NS	1
HMIRSR08	0.0200	0	NS	NS	NS	NS	NS	0
HWCD	0.0200	0	NS	NS	NS	NS	NS	0
ICIS	0.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	0.0200	0	NS	NS	NS	NS	NS	0
LUCIS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
MLTS	0.0200	0	NS	NS	NS	NS	NS	0
NPDESR08	0.0200	0	NS	NS	NS	NS	NS	0
PADS	0.0200	0	NS	NS	NS	NS	NS	0
PCSR08	0.0200	0	NS	NS	NS	NS	NS	0
RCRASC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SEMSLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SSEHRIPFAS	0.0200	0	NS	NS	NS	NS	NS	0
SSTS	0.0200	0	NS	NS	NS	NS	NS	0
TRI	0.0200	0	NS	NS	NS	NS	NS	0
TSCA	0.0200	0	NS	NS	NS	NS	NS	0
RCRAGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
RCRANGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
ALTFUELS	0.2500	0	0	0	NS	NS	NS	0
FEMAUST	0.2500	0	0	0	NS	NS	NS	0
HISTPST	0.2500	0	0	0	NS	NS	NS	0
ICISCLEANERS	0.2500	0	0	0	NS	NS	NS	0
MRDS	0.2500	0	0	1	NS	NS	NS	1
MSHA	0.2500	0	0	0	NS	NS	NS	0
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
DNPL	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
NLRRCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**

Database Radius Summary

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ODI	0.5000	0	0	0	0	NS	NS	0
RCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMS	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMSARCH	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SMCRA	0.5000	0	0	0	0	NS	NS	0
USUMTRCA	0.5000	0	0	0	0	NS	NS	0
DOD	1.0000	0	0	0	0	0	NS	0
FUDS	1.0000	0	0	0	0	0	NS	0
FUSRAP	1.0000	0	0	0	0	0	NS	0
NLRRCRAC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
NMS	1.0000	0	0	0	0	0	NS	0
NPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
PNPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RCRAC	**1.0000**	**0**	**0**	**0**	**0**	**1**	**NS**	**1**
RCRASUBC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RODS	1.0000	0	0	0	0	0	NS	0

SUB-TOTAL		2	0	1	0	1	0	4

Database Radius Summary

STATE (CO) LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ASBESTOS	0.0200	0	NS	NS	NS	NS	NS	0
CDPS	0.0200	0	NS	NS	NS	NS	NS	0
COVENANTS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SPILLS	0.0200	0	NS	NS	NS	NS	NS	0
HWSG	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
AST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
CLEANERS	0.2500	0	0	0	NS	NS	NS	0
UST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
APCDP	0.5000	1	0	2	5	NS	NS	8
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HISTSWLF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSTSD	0.5000	0	0	0	0	NS	NS	0
LST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
LUSTTRUST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
METHANESITES	0.5000	0	0	0	0	NS	NS	0
RECYCLERS	0.5000	0	0	0	0	NS	NS	0
SWF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
UMTS	0.5000	0	0	0	0	NS	NS	0
VCRA	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSCA	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
SF	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**

SUB-TOTAL		1	0	2	5	0	0	8

Database Radius Summary

LOCAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
WCSWF	0.5000	0	0	0	0	NS	NS	0
SUB-TOTAL		0	0	0	0	0	0	0

Database Radius Summary

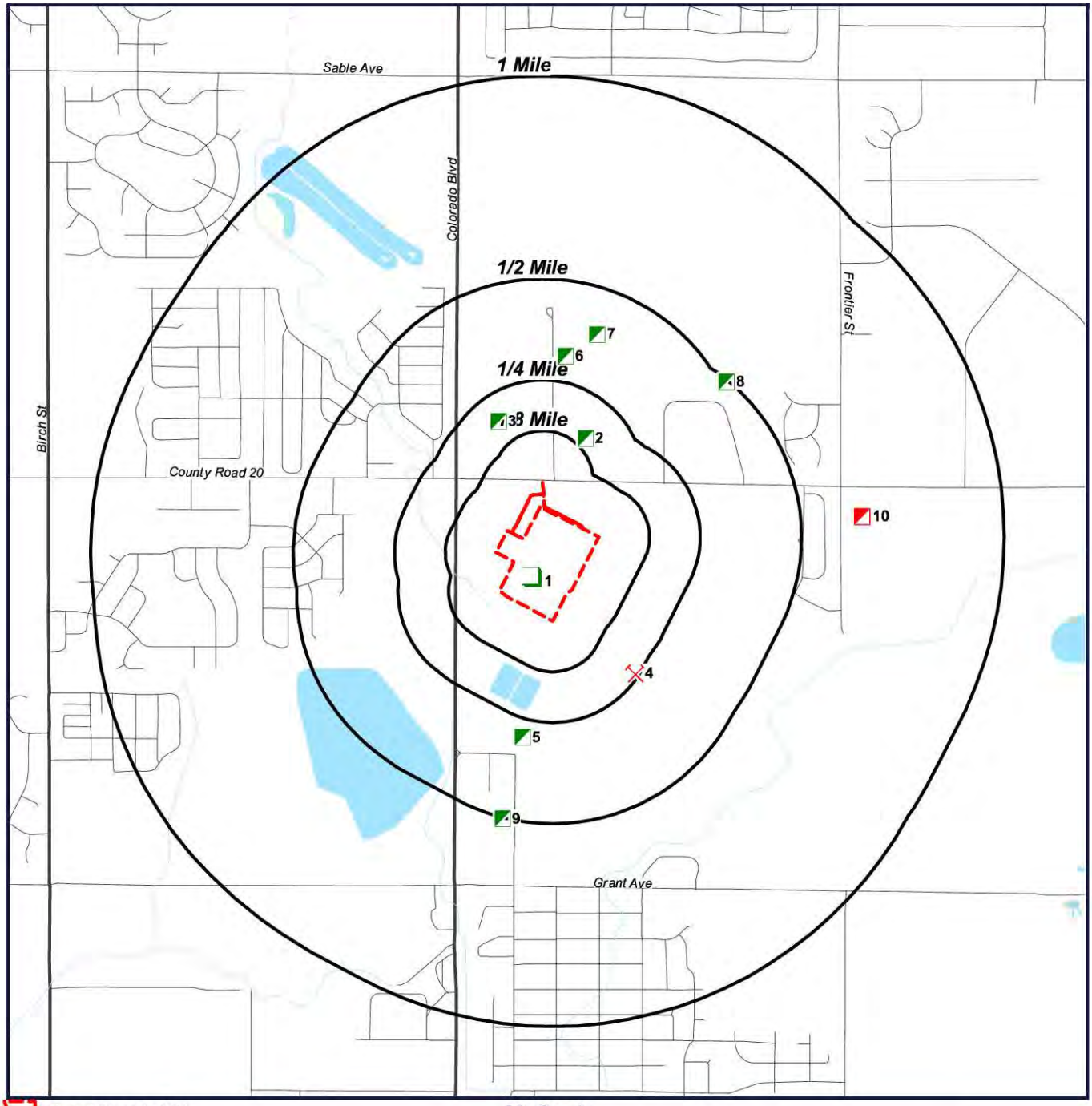
TRIBAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR08	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
LUSTR08	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
ODINDIAN	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
INDIANRES	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	0	0	0	0	0	0
TOTAL		3	0	3	5	1	0	12

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

Radius Map 1



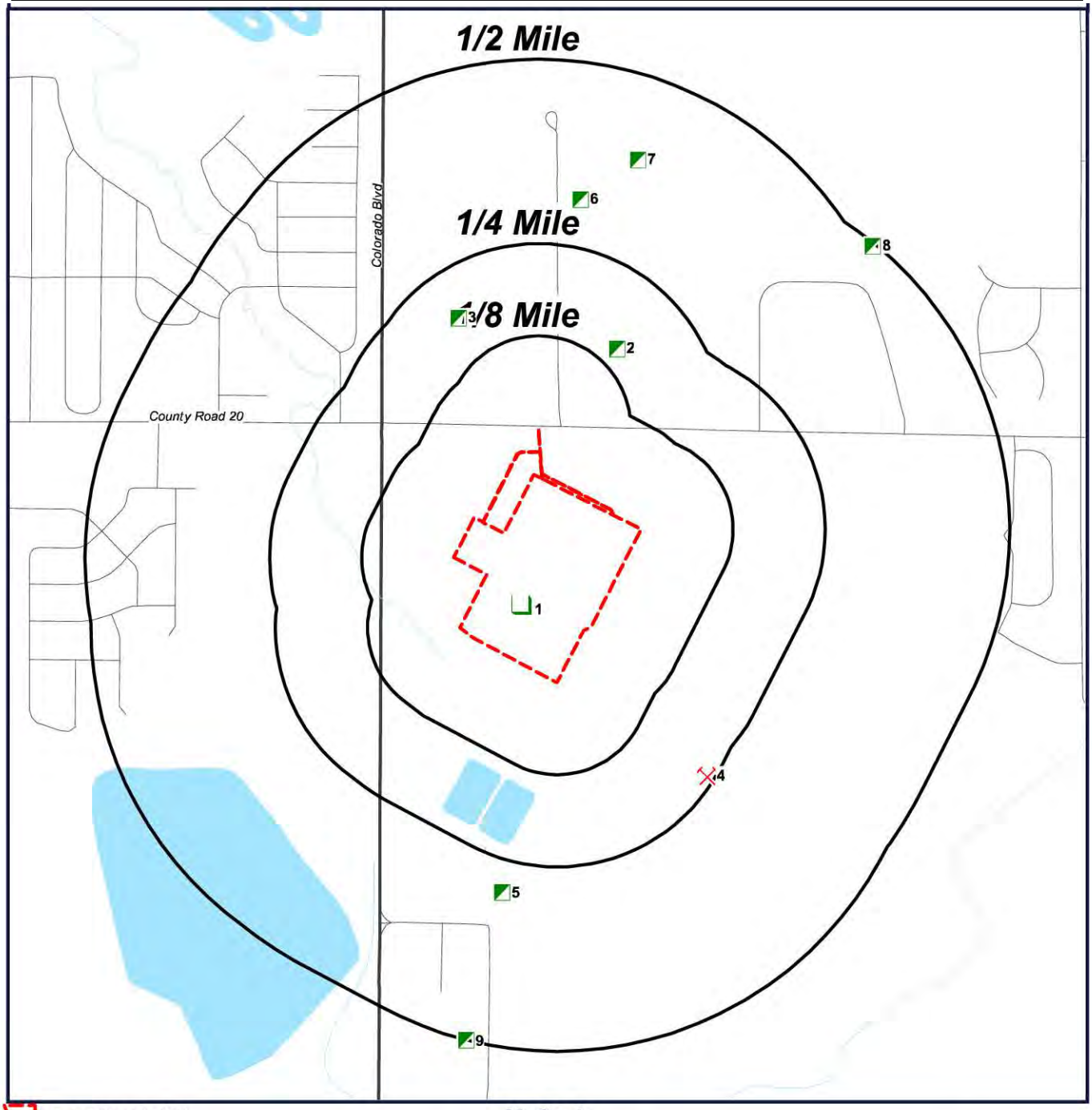
Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

McGavin
Longmont, Colorado
80504

N
W
E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Radius Map 2



Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

McGavin
Longmont, Colorado
80504

N
W E
S

0' 550' 1100' 1650'
SCALE: 1" = 1100'

Ortho Map



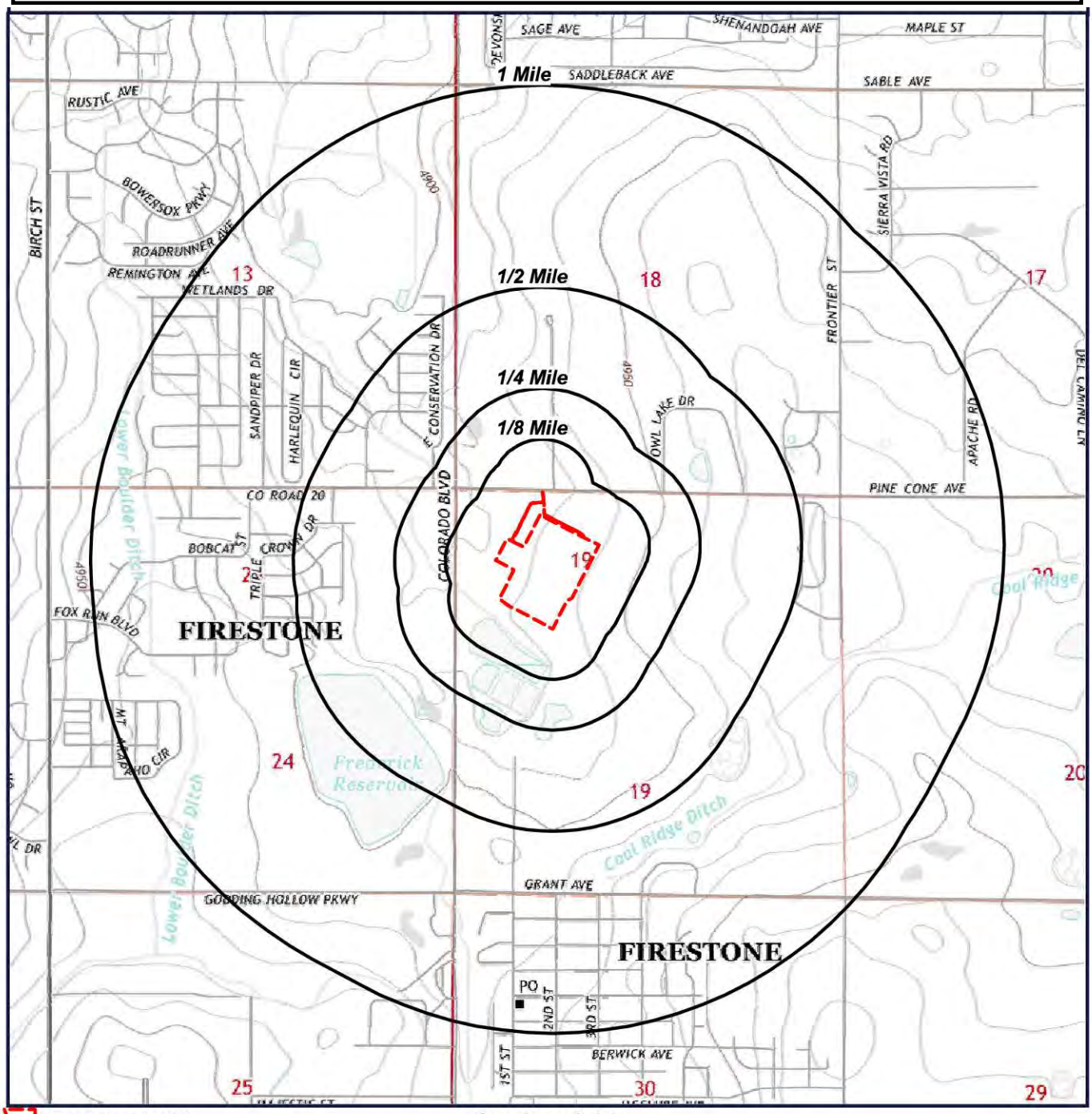
Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

Quadrangle(s):
Gowanda
McGavin
Longmont, Colorado
80504

N
W E
S

0' 550' 1100' 1650'
SCALE: 1" = 1100'

Topographic Map



Target Property (TP)

Quadrangle(s):
Gowanda
Source: USGS,
07/17/2013
McGavin
Longmont, Colorado
80504

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Located Sites Summary

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address	PAGE #
1	AIRSAFS	1022268	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	19
1	APCDP	123-1729	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504	23
1	FRSCO	110040916220	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	30
2	APCDP	123-2463	Higher (4,942 ft.)	0.153 mi. NE (808 ft.)	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504	31
3	APCDP	123-7754	Lower (4,920 ft.)	0.186 mi. NW (982 ft.)	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504	38
4	MRDS	10143018	Higher (4,942 ft.)	0.238 mi. ESE (1257 ft.)	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504	49
5	APCDP	123-5604	Higher (4,931 ft.)	0.292 mi. SSW (1542 ft.)	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520	50
6	APCDP	123-9421	Higher (4,937 ft.)	0.317 mi. NNE (1674 ft.)	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	61
7	APCDP	123-4030	Higher (4,937 ft.)	0.389 mi. NNE (2054 ft.)	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	69
8	APCDP	123-2363	Higher (4,967 ft.)	0.497 mi. NE (2624 ft.)	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504	74
9	APCDP	123-0594	Higher (4,949 ft.)	0.498 mi. SSW (2629 ft.)	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504	91
10	***RCRAC***	***COR000005207***	***Higher (4,977 ft.)***	***0.652 mi. E (3443 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***98***

Site Summary By Database

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address
1	AIRSAFS	1022268	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504
1	APCDP	123-1729	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504
2	APCDP	123-2463	Higher (4,942 ft.)	0.153 mi. NE (808 ft.)	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504
3	APCDP	123-7754	Lower (4,920 ft.)	0.186 mi. NW (982 ft.)	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504
5	APCDP	123-5604	Higher (4,931 ft.)	0.292 mi. SSW (1542 ft.)	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520
6	APCDP	123-9421	Higher (4,937 ft.)	0.317 mi. NNE (1674 ft.)	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504
7	APCDP	123-4030	Higher (4,937 ft.)	0.389 mi. NNE (2054 ft.)	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504
8	APCDP	123-2363	Higher (4,967 ft.)	0.497 mi. NE (2624 ft.)	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504
9	APCDP	123-0594	Higher (4,949 ft.)	0.498 mi. SSW (2629 ft.)	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504
1	FRSCO	110040916220	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504
4	MRDS	10143018	Higher (4,942 ft.)	0.238 mi. ESE (1257 ft.)	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504
10	***RCRAC***	***COR000005207***	***Higher (4,977 ft.)***	***0.652 mi. E (3443 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***

Elevation Summary

Elevations are collected from the USGS 3D Elevation Program 1/3 arc-second (approximately 10 meters) layer hosted at the NGTOC. .

Target Property Elevation: 4927 ft.

*NOTE: Standard environmental records are displayed in **bold**.*

EQUAL/HIGHER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
1	AIRSAFS	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	19
1	APCDP	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504	23
1	FRSCO	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	30
2	APCDP	4,942 ft.	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504	31
4	MRDS	4,942 ft.	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504	49
5	APCDP	4,931 ft.	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520	50
6	APCDP	4,937 ft.	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	61
7	APCDP	4,937 ft.	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	69
8	APCDP	4,967 ft.	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504	74
9	APCDP	4,949 ft.	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504	91
10	***RCRAC***	***4,977 ft.***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***98***

LOWER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
3	APCDP	4,920 ft.	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504	38

Aerometric Information Retrieval System / Air Facility Subsystem (AIRSAFS)

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

SITE INFORMATION

UNIQUE ID: **1022268**
PLANT ID: **1022268**
NAME: **NOBLE ENERGY INC. BATTERY #10086600**
ADDRESS: **NWNW4 SEC19 T2N R67W**
FIRESTONE, CO 80504
CLASSIFICATION: **POTENTIAL UNCONTROLLED EMISSIONS <100 TONS/YEAR**
OPERATION STATUS: **TEMPORARILY CLOSED**
STATE COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
FACILITY TYPE: **PRIVATELY OWNED/OPERATED**
CURRENT HIGH PRIORITY VIOLATOR: **NOT REPORTED**
SIC DESCRIPTION: **ESTABLISHMENTS PRIMARILY ENGAGED IN PRODUCING LIQUID HYDROCARBONS FROM OIL AND GAS FIELD GASES.**

ENFORCEMENT ACTIONS

NO ENFORCEMENT ACTIONS REPORTED

AIR PROGRAM

AIR PROGRAM STATUS: **TEMPORARILY CLOSED**
EPA COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
POLLUTANT COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
POLLUTANT: **VOLATILE ORGANIC COMPOUNDS**

HISTORICAL COMPLIANCE AIR PROGRAM LEVEL

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1403**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1302**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0801**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1004**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1003**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**

COMPLIANCE DATE (YYYQ): **1203**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0704**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1401**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1002**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1201**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1304**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0902**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1001**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1204**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0903**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0904**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0702**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1104**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1101**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1402**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1102**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1301**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1103**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1202**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0804**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0901**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0701**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0703**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1303**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0803**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0802**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0604**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

Back to Report Summary

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

SITE INFORMATION

SITE ID: **123-1729**

FACILITY NAME: **NOBLE ENERGY INC. BATTERY #10086600**

ADDRESS: **NW NW SEC 19 T2N R67W**
FIRESTONE, CO 80504

PERMIT NAME: **NOBLE ENERGY INC. BATTERY #10086600**

FACILITY CLASSIFICATION: **P**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**

ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**

CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**

NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**

STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**

SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**

PLANT AIR PROGRAM: **OZONE, AREA N2081**

PROPERTY AREA: **NOT REPORTED**

COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**

STANDARD INDUSTRIAL DESCRIPTION:

OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **ROB GARREN**

CONTACT PHONE: **(303)228-4299**

SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANKS**

COMMENTS:

NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #:

OWNER NAME:

ADDRESS:

,

OWNER MAIL NAME:

OWNER MAIL PHONE:

SITE OWNER DESCRIPTION:

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2010**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00689**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.02839**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.10647**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.10647**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.48503**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.48503**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **3.93609**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **16.20710**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00185	**0.03710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.05867	**21.17336**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2010**
EMISSION DATA SUBMITTED YEAR: **2008**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2007**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2007**
EMISSION RELEASE POINT (STACK): **VRU EXHAUST**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
1578.00000	**26.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
10.00000	**1.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
3.93609	**16.20710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.48503	**0.48503**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10647	**0.10647**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00689	**0.02839**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.05867	**21.17336**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00185	**0.03710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Facility Registry System (FRSCO)

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

FACILITY INFORMATION

REGISTRY ID: **110040916220**

NAME: **NOBLE ENERGY INC. BATTERY #10086600**

LOCATION ADDRESS: **NWNW4 SEC19 T2N R67W**
FIRESTONE, CO 80504

COUNTY: **WELD**

EPA REGION: **08**

FEDERAL FACILITY:

TRIBAL LAND:

ALTERNATIVE NAME/S:

NOBLE ENERGY INC. BATTERY #10086600

PROGRAM/S LISTED FOR THIS FACILITY

EIS - EIS

STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

211112 - NATURAL GAS LIQUID EXTRACTION.

211112 - NATURAL GAS LIQUID EXTRACTION.

Back to Report Summary

MAP ID# 2

Distance from Property: 0.153 mi. (808 ft.) NE
Elevation: 4,942 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-2463**
FACILITY NAME: **KERR-MCGEE O&G ONSHORE - KUGEL**
ADDRESS: **SE SW SEC 18 T2N R67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE O&G ONSHORE - KUGEL**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00989**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.19782**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.64527**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **12.90540**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00989**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.19782**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.64527**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **12.90540**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00113	**0.02260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.54799	**10.95998**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2019**
EMISSION DATA SUBMITTED YEAR: **2011**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS NO CONTROL DEVICE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**30.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2009**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
0.00113	**0.02260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.54799	**10.95998**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Air Pollution Control Division Permitted Facilities (APCDP)

MAP ID# 3

Distance from Property: 0.186 mi. (982 ft.) NW
Elevation: 4,920 ft. (Lower than TP)

SITE INFORMATION

SITE ID: **123-7754**
FACILITY NAME: **KERR-MCGEE 60172**
ADDRESS: **SWSW-18-2N-67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE 60172**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.06542**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.06542**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00426 **0.03474** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.01937 **0.21000** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

2.43620 **19.83076** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2019**
EMISSION DATA SUBMITTED YEAR: **2016**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):
(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2019**

EMISSION DATA SUBMITTED YEAR: **2016**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.22060	**4.41206**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.65451	**13.09036**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00114	**0.02294**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.01003 **0.20066** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.55250	**1.55250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.43620	**19.83076**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00426	**0.03474**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00934	**0.00934**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

UNIT COMMENT

TANK NAME: 34003007

Back to Report Summary

Mineral Resource Data System (MRDS)

MAP ID# 4

Distance from Property: 0.238 mi. (1,257 ft.) ESE
Elevation: 4,942 ft. (Higher than TP)

FACILITY INFORMATION

GEOSEARCH ID: **10143018**
DEP ID: **10143018**
MINE NAME: **ST VRAIN**
ADDRESS: **WELD COUNTY**
LONGMONT, CO 80504
DEVELOPMENT STATUS: **PRODUCER**
MINERAL RESOURCE DATA SYSTEM (MRDS): **CLICK HERE**

COMMODITY DETAILS

COMMODITY: **SAND AND GRAVEL, CONS**
COMMODITY TYPE: **NON-METALLIC**
COMMODITY GROUP: **SAND AND GRAVEL**
IMPORTANCE: **PRIMARY**

MATERIAL DETAILS

NO MATERIAL DETAILS REPORTED

NAME DETAILS

SITE NAME: **ST VRAIN**
STATUS: **CURRENT**

Back to Report Summary

MAP ID# 5

Distance from Property: 0.292 mi. (1,542 ft.) SSW
Elevation: 4,931 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-5604**
FACILITY NAME: **KERR-MCGEE 62406**
ADDRESS: **NESW-19-2N-67W**
FIRESTONE, CO 80520
PERMIT NAME: **KERR-MCGEE 62406**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **04/11/06**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00540 **0.10800** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.04725 **0.94500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

3.08250 **61.65000** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.03174 **0.03174** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
18.11825	**18.11825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2018**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2011**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2008**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07224	**0.07224**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38428	**7.68570**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
3.08250	**61.65000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00540	**0.10800**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04725	**0.94500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.87680	**0.87680**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
18.11825	**18.11825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03174	**0.03174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 6

Distance from Property: 0.317 mi. (1,674 ft.) NNE
Elevation: 4,937 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-9421**

FACILITY NAME: **KERR-MCGEE OIL & GAS ONSHORE LP - 62137**

ADDRESS: **NESW-18-2N-67W**
FIRESTONE AREA, CO 80504

PERMIT NAME: **KERR-MCGEE OIL & GAS ONSHORE LP - 62137**

FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**

ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**

CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**

NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**

STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**

SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**

PLANT AIR PROGRAM: **OZONE, AREA N2081**

PROPERTY AREA: **NOT REPORTED**

COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

DATE COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

STANDARD INDUSTRIAL DESCRIPTION:

OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**

CONTACT PHONE: **(720)929-6916**

SITE DESCRIPTION:**OIL & GAS PRODUCTION FACILITY**

COMMENTS:

NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**

OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**

ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*

OWNER MAIL NAME: **CARISSA KREY**

OWNER MAIL PHONE: **(720)929-6916**

SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00205**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03598**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.17032	**20.54316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.17032	**20.54316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2011**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2011**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00178	**0.03572**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
1.01962	**20.39246**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.24073	**4.81474**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00026	**0.00026**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.15070	**0.15070**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 7

Distance from Property: 0.389 mi. (2,054 ft.) NNE
Elevation: 4,937 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-4030**
FACILITY NAME: **KERR-MCGEE 60174**
ADDRESS: **NESW-18-2N-67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE 60174**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
1.67825	**1.67825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2005**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
5.80880	**5.80880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE:	STACK GAS FLOW RATE (NEI COMPATIBLE):
(CUBIC FEET PER MINUTE):	*(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2012**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2005**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS NO CONTROL DEVICE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **30.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.67825**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.67825**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2005**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.80880	**5.80880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 8

Distance from Property: 0.497 mi. (2,624 ft.) NE
Elevation: 4,967 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-2363**
FACILITY NAME: **KERR-MCGEE OIL & GAS - 34003763**
ADDRESS: **NWSE-18-2N-67W**
FIRESTONE, CO 80504
PERMIT NAME: **KERR-MCGEE OIL & GAS - 34003763**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**
CONTACT PHONE: **(720)929-6916**
SITE DESCRIPTION:**E&P SITE (FARNSWORTH 9-18A/O...)**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00672**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13440**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.08241**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.08241**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.38432**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **7.68640**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03244**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03244**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00672 **0.13440** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.03244 **0.03244** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.38432 **7.68640** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.10605 **0.10605** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.00455 **0.04800** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24539	**0.24539**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03985	**0.42000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.09659	**0.09659**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.59992	**27.40001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2017**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK/FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.56409	**11.28196**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.04174 **0.04174** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.30527	**26.10536**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.09659	**0.09659**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24539	**0.24539**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00228	**0.04574**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02000	**0.40016**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.21920	**0.21920**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.29465	**1.29465**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00226	**0.00226**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01984	**0.01984**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 9

Distance from Property: 0.498 mi. (2,629 ft.) SSW
Elevation: 4,949 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-0594**
FACILITY NAME: **SAFEWAY INC. # 4614**
ADDRESS: **8134 COUNTY ROAD 13**
FIRESTONE, CO 80504
PERMIT NAME: **SAFEWAY INC. # 4614**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **BLANK** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM:
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
AUTOMOTIVE DEALERS AND GASOLINE SERVICE STATIONS - GASOLINE SERVICE STATION

SITE CONTACT INFORMATION

CONTACT NAME: **PAUL GOFF**
CONTACT PHONE: **(303)843-7740**
SITE DESCRIPTION:**UNDERGROUND GASOLINE STORAGE TANKS**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920105401**
OWNER NAME: **SAFEWAY INC.**
ADDRESS: **PO BOX 29096**
PHOENIX, 04 85038
OWNER MAIL NAME: **JACQUI RUSH**
OWNER MAIL PHONE: **(623)869-3765**
SITE OWNER DESCRIPTION: **FOOD STORE AND FUEL DISPENSING**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S.: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
17.23656	**17.23656**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

17.23656 **17.23656** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **3 UNDERGROUND GASOLINE TANKS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):

(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

0.00000 **0.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

0.00000 **0.00000** **30.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2009**

EMISSION RELEASE POINT (STACK): **3 UNDERGROUND GASOLINE TANKS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):

(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

0.00000 **0.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

0.00000 **0.00000** **30.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.13970 **0.13970** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
17.23656	**17.23656**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Resource Conservation & Recovery Act - Corrective Action Facilities (RCRAC)

MAP ID# 10

Distance from Property: 0.652 mi. (3,443 ft.) E
Elevation: 4,977 ft. (Higher than TP)

FACILITY INFORMATION

EPA ID#: **COR000005207**
NAME: **ARC COLORADO INC**
ADDRESS: **7040 WCR 20**
LONGMONT, CO 80504
CONTACT NAME: **REES JONES**
CONTACT ADDRESS: **7040 WCR 20**
LONGMONT CO 80504
CONTACT PHONE: **303-833-6130**
NON-NOTIFIER:
DATE RECEIVED BY AGENCY: **03/02/2020**

OWNER TYPE: **PRIVATE**
OWNER NAME: **ARC COLORADO INC**
OPERATOR TYPE: **PRIVATE**
OPERATOR NAME: **ARC COLORADO INC**

CERTIFICATION

CERTIFICATION NAME:	CERTIFICATION TITLE:	CERTIFICATION SIGNED DATE:
KEVIN SCHWINDT	**CONTROLLER**	**02/15/2010**
KEVIN SCHWINDT	**GENERAL MANAGER**	**02/06/2012**
DEREK H SHELTON	**EH&S MANAGER**	**02/17/2014**
DEREK SHELTON	**EH&S DIRECTOR**	**02/29/2016**
SHAWN COWLING	**SHAWN COWLING**	**03/01/2018**
REES JONES	**METALLURGIST**	**02/28/2020**
DEREK SHELTON	**MGR**	**09/20/2011**
DEREK SHELTON	**EH&S MGR**	**08/15/2012**
REES JONES	**METALLURGIST**	**03/02/2020**
NICOLLE DESANTIS	**ENV MGR**	**09/16/2003**
NICOLLE E DESANTIS	**EHS COORDINATOR**	**10/31/2003**
DOUGLAS BALL	**ENV MGR**	**08/03/2004**
DOUGLAS G BALL	**EH & S COORDINATOR**	**10/18/2004**
MARK ROSE	**PRESIDENT**	**02/27/2006**
MIM DUFFY	**HR/SAFETY MGR**	**02/07/2007**
MIM DUFFY	**HR/SAFETY MGR**	**02/28/2008**

INDUSTRY CLASSIFICATION (NAICS)

332117 - POWDER METALLURGY PART MANUFACTURING
332999 - ALL OTHER MISCELLANEOUS FABRICATED METAL PRODUCT MANUFACTURING
33911 - MEDICAL EQUIPMENT AND SUPPLIES MANUFACTURING
339999 - ALL OTHER MISCELLANEOUS MANUFACTURING

CURRENT ACTIVITY INFORMATION

GENERATOR STATUS: **LARGE QUANTITY GENERATOR** LAST UPDATED DATE: **03/02/2020**
SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**
TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: **NO**
TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**
NON TSDFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **YES**
CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**
IMPORTER: **NO**
UNDERGROUND INJECTION: **NO**
MIXED WASTE GENERATOR: **NOT REPORTED**
UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**
TRANSFER FACILITY: **NO**
TRANSPORTER: **NO**
USED OIL FUEL BURNER: **NO**
ONSITE BURNER EXEMPTION: **NO**
USED OIL PROCESSOR: **NO**
FURNACE EXEMPTION: **NO**
USED OIL FUEL MARKETER TO BURNER: **NO**
USED OIL REFINER: **NO**
SPECIFICATION USED OIL MARKETER: **NO**
USED OIL TRANSFER FACILITY: **NO**
USED OIL TRANSPORTER: **NO**

COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION

EVALUATIONS

01/10/2006	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
01/29/2018	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
02/01/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/03/2004	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/11/2014	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
03/05/2012	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/05/2012	**SNN**	**NOT A SIGNIFICANT NON-COMPLIER**
03/06/2014	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/09/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
08/17/2017	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
10/28/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
11/30/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
12/02/1999	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**SNY**	**SIGNIFICANT NON-COMPLIER**

VIOLATIONS

02/01/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
02/11/2014	**262.C**	**GENERATORS - PRE-TRANSPORT**
10/28/2010	**262.A**	**GENERATORS - GENERAL**
10/28/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
12/15/2011	**262.C**	**GENERATORS - PRE-TRANSPORT**

ENFORCEMENTS

02/01/2010	**175**	**COMPLIANCE ADVISORY**
02/11/2014	**175**	**COMPLIANCE ADVISORY**
03/08/2012	**310**	**FINAL 3008(A) COMPLIANCE ORDER**
10/28/2010	**175**	**COMPLIANCE ADVISORY**
12/15/2011	**175**	**COMPLIANCE ADVISORY**

HAZARDOUS WASTE

D001	**IGNITABLE WASTE**
D002	**CORROSIVE WASTE**
D003	**REACTIVE WASTE**
D006	**CADMIUM**
D007	**CHROMIUM**
D008	**LEAD**
D010	**SELENIUM**

D039	**TETRACHLOROETHYLENE**
D040	**TRICHLORETHYLENE**
F001	**THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE,TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE ANDCHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
F002	**THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE,TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE,CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001,F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
U228	**ETHENE, TRICHLORO-**
U228	**TRICHLOROETHYLENE**

UNIVERSAL WASTE

WASTE TYPE:	ACCUMULATED WASTE ON-SITE:	GENERATED WASTE ON-SITE:	SOURCE TYPE:
BATTERIES	**YES**		**NOTIFICATION**
OTHER	**YES**	**YES**	**NOTIFICATION**
LAMPS	**YES**		**NOTIFICATION**
PESTICIDES	**YES**		**NOTIFICATION**
MERCURY CONTAINING EQUIPMENT	**YES**		**NOTIFICATION**
A	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**
LAMPS	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**

CORRECTIVE ACTION AREA (RELEASE)

AREA NAME:	AIR:	GROUNDWATER:	SOIL:	SURFACE WASTE:
ENTIRE FACILITY		**Y**	**Y**	

CORRECTIVE ACTION EVENT

CA EVENT CODE: **CA375**
EVENT DESCRIPTION: **INTERIM DECISION FOR NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA400**
EVENT DESCRIPTION: **REMEDY DECISION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA550NR**
EVENT DESCRIPTION: **REMEDY CONSTRUCTION-NO REMEDY CONSTRUCTED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA900NC**
EVENT DESCRIPTION: **CA PERFORMANCE STANDARDS ATTAINED - NO CONTROLS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA999NF**
EVENT DESCRIPTION: **CA PROCESS IS TERMINATED-NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA190**
EVENT DESCRIPTION: **INVESTIGATION REPORT RECEIVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA370**
EVENT DESCRIPTION: **PETITION FOR NO FUR. ACTION RECEIPT DATE**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA070YE**

EVENT DESCRIPTION: **DETERMINATION OF NEED FOR AN INVESTIGATION-INVESTIGATION IS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA075LO**
EVENT DESCRIPTION: **CA PRIORITIZATION-LOW CA PRIORITY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA100**
EVENT DESCRIPTION: **INVESTIGATION IMPOSITION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA150**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN APPROVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA060**
EVENT DESCRIPTION: **NOTICE OF CONTAMINATION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA110**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN RECEIVED**
EVENT SEQUENCE NUMBER: **1**

EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

Back to Report Summary

Unlocated Sites Summary

This list contains sites that could not be mapped due to limited or incomplete address information.

No Records Found

Environmental Records Definitions - FEDERAL

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance. Enforcement and Compliance History Online (ECHO) Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014, the EPA retired this system for Clean Air Act stationary sources.

ALTFUELS Alternative Fueling Stations

VERSION DATE: 10/28/20

Nationwide list of alternative fueling stations made available by the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Bio-diesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE).

BF Brownfields Management System

VERSION DATE: 01/11/21

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment. This database includes tribal brownfield sites.

BRS Biennial Reporting System

VERSION DATE: 12/31/17

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 06/17/20

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

DNPL Delisted National Priorities List

VERSION DATE: 04/26/21

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

DOCKETS EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

DOD Department of Defense Sites

VERSION DATE: 12/01/14

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 04/27/21

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. The data displays remedy component information for Superfund decision documents issued in fiscal years 1982-2017, and it includes final and deleted NPL sites as well as sites with a Superfund Alternative Approach (SAA) agreement in place. The only sites included that are not on the NPL, proposed for NPL, or removed from proposed NPL, are those with an SAA Agreement in place. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the

potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ECHOR08 Enforcement and Compliance History Information

VERSION DATE: 11/28/20

The U.S. Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database, provides compliance and enforcement information for facilities nationwide. This database includes facilities regulated as Clean Air Act stationary sources, Clean Water Act direct dischargers, Resource Conservation and Recovery Act hazardous waste handlers, Safe Drinking Water Act public water systems along with other data, such as Toxics Release Inventory releases.

ERNSCO Emergency Response Notification System

VERSION DATE: 03/28/21

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FEMAUST FEMA Owned Storage Tanks

VERSION DATE: 12/01/16

This is a listing of FEMA owned underground and aboveground storage tank sites. For security reasons, address information is not released to the public according to the U.S. Department of Homeland Security.

FRSCO Facility Registry System

VERSION DATE: 03/02/21

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

FUDS Formerly Used Defense Sites

VERSION DATE: 12/31/18

The Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not

all properties currently have polygon data available. DISCLAIMER: This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

FUSRAP Formerly Utilized Sites Remedial Action Program

VERSION DATE: 03/04/17

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

HISTPST Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR08 Hazardous Materials Incident Reporting System

VERSION DATE: 03/24/21

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

HWCD Hazardous Waste Compliance Docket Facilities

VERSION DATE: 10/29/20

This list of the Federal Agency Hazardous Waste Compliance Docket Facilities is maintained by the United States Environmental Protection Agency (EPA). According to the EPA, Section 120(c) of CERCLA requires EPA to establish a listing, known as the Federal Facility Hazardous Waste Compliance Docket (Docket), of Federal facilities which are managing or have managed hazardous waste; or have had a release of hazardous waste. Thus, the Docket identifies all Federal facilities that must be evaluated to determine whether they pose a risk to human health and the environment and it makes this information available to the public. In order for the Docket to remain current and accurate it requires periodic updating.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 09/19/20

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISCLEANERS Integrated Compliance Information System Drycleaners

VERSION DATE: 09/19/20

This is a listing of drycleaner facilities from the Integrated Compliance Information System (ICIS). The U.S. Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments. The following Primary SIC Codes are included in this data: 7211, 7212, 7213, 7215, 7216, 7217, 7218, and/or 7219; the following Primary NAICS Codes are included in this data: 812320, 812331, and/or 812332.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 04/26/20

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. This database is provided by the U.S. Environmental Protection Agency.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 06/29/17

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements. Disclaimer: Due to agency regulations and policies, this database contains applicant/licensee location information which may or may not be related to the physical location per MLTS site.

MRDS Mineral Resource Data System

VERSION DATE: 03/15/16

MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps. A few updates last occurred 2015 and early 2016 for select mine site area/s.

MSHA Mine Safety and Health Administration Master Index File

VERSION DATE: 08/07/20

The Mine dataset lists all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970. It includes such information as the current status of each mine (Active, Abandoned, NonProducing, etc.), the current owner and operating company, commodity codes and physical attributes of the mine. Mine ID is the unique key for this data. This information is provided by the United States Department of Labor - Mine Safety and Health Administration (MSHA).

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 03/22/21

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 03/22/21

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

NMS Former Military Nike Missile Sites

VERSION DATE: 12/01/84

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline,

heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

NPDESR08 National Pollutant Discharge Elimination System

VERSION DATE: 04/01/07

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES database was collected from the U.S. Environmental Protection Agency (EPA) from December 2002 through April 2007. Refer to the ICIS and/or ICIS-NPDES database as source of current data. This database includes permitted facilities located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

NPL National Priorities List

VERSION DATE: 04/26/21

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

ODI Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

PADS PCB Activity Database System

VERSION DATE: 11/19/20

PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of Polychlorinated Biphenyls (PCB) who are required to notify the U.S. Environmental Protection Agency of such activities.

PCSR08 Permit Compliance System

VERSION DATE: 08/01/12

The historic Permit Compliance System tracked enforcement status and permit compliance of facilities controlled

by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. This database includes permitted facilities located in EPA Region 8 states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. This system has since been modernized by United States Environmental Protection Agency and is now integrated into the Integrated Compliance Information System (ICIS). Please refer to the ICIS database as the current source for this data.

PNPL Proposed National Priorities List

VERSION DATE: 04/26/21

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.

RCRAGR08 Resource Conservation & Recovery Act - Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities currently generating hazardous waste. EPA Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRANGR08 Resource Conservation & Recovery Act - Non-Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities classified as non-generators. Non-Generators do not presently generate hazardous waste. EPA

Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRASC RCRA Sites with Controls

VERSION DATE: 05/16/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with institutional controls in place.

RCRASUBC Resource Conservation & Recovery Act - Subject to Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities subject to corrective actions.

RCRAT Resource Conservation & Recovery Act - Non-CORRACTS Treatment, Storage & Disposal Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities recognized as hazardous waste treatment, storage, and disposal sites (TSD).

RODS Record of Decision System

VERSION DATE: 09/21/20

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

SEMS Superfund Enterprise Management System

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.

SEMSARCH Superfund Enterprise Management System Archived Site Inventory

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System Archived Site Inventory (List 8R Archived) replaced the CERCLIS NFRAP reporting system in 2015. This listing reflects sites at which the EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program.

SEMSLIENS SEMS Lien on Property

VERSION DATE: 06/22/20

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs. This is a listing of SEMS sites with a lien on the property.

SFLIENS CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete. Please refer to the SEMSLIENS database as source of current data.

SMCRA Surface Mining Control and Reclamation Act Sites

VERSION DATE: 12/18/20

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as information on the cost associated with the reclamation of those problems.

The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

SSEHRIPFAS SSEHRI PFAS Contamination Sites

VERSION DATE: 12/12/19

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Please access the following source link for the most current information: https://pfasproject.com/pfas-contamination-site-tracker/

SSTS Section Seven Tracking System

VERSION DATE: 08/04/20

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. "Production" includes formulation, packaging, repackaging, and relabeling. For this database, the Product Information is only available for establishments up through 2014 or prior years, product details are no longer released by the EPA within the current SSTS non-Confidential Business Information data.

TRI Toxics Release Inventory

VERSION DATE: 12/31/18

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/31/16

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured,

imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency (EPA) authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site. The EPA has collected Chemical Data Reporting (CDR) data since in 1986 (as Inventory Update Reporting). Collections occur approximately every four years and reporting requirements changed from collection to collection.

USUMTRCA Uranium Mill Tailings Radiation Control Act Sites

VERSION DATE: 03/04/17

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Environmental Records Definitions - STATE (CO)

APCDP Air Pollution Control Division Permitted Facilities

VERSION DATE: 06/29/20

This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.

ASBESTOS Asbestos Abatement and Demolition Projects

VERSION DATE: 12/28/17

The Colorado Department of Public Health and Environment’s Air Pollution Control Division assists schools and businesses to comply with air pollution laws regulating asbestos and asbestos containing materials. The regulation that governs asbestos in Colorado is the Colorado Air Quality Control Commission s Regulation No. 8, Part B, "Emission Standards for Asbestos." Notification is required for all demolitions of all facilities and all asbestos abatement projects that exceed the trigger levels, whatever is the lesser quantity. The notification requirements apply to both friable and non-friable asbestos materials. This database contains those related projects since January 2008.

AST Aboveground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of aboveground storage tank (AST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

BF Colorado Brownfield Sites

VERSION DATE: 11/12/20

This list of Colorado brownfields is maintained by the Colorado Department of Public Health & Environment (CDPHE) Hazardous Materials and Waste Management Division Brownfields Program in conjunction with the Voluntary Cleanup Program (VCUP). The brownfields database is an inventory of sites for which CPDHE has provided brownfields assistance in the form of targeted brownfields assessments, a revolving loan or grant through the Colorado Brownfields Revolving Loan Fund, and/or assistance through our state brownfields grants program. Most of these incentives are available only to local governments or nonprofits. In some cases, sites that receive state incentives also go through the VCUP program but most of the VCUP applicants are private entities not eligible for other state brownfields incentives.

CDPS Colorado Discharge Permit System Facilities

VERSION DATE: 02/03/19

The Colorado Department of Public Health & Environment's Water Quality Control Division regulates the

Colorado Discharge Permit System. This system controls stormwater discharges from construction activities by requiring a Stormwater Construction Permit to reduce pollutants from entering streams, river, lakes and wetlands as a result of runoff from residential, commercial and industrial areas. This database also includes facilities with Industrial Stormwater Permits.

CLEANERS Dry Cleaning Facilities

VERSION DATE: 04/16/21

This list of dry cleaners, which have obtained an air permit through the Air Pollution Control Division, is maintained by the Colorado Department of Public Health and Environment.

COVENANTS Environmental Real Covenants List

VERSION DATE: 11/23/20

This list of environmental covenants is maintained by the Colorado Division of Public Health and Environment. Senate Bill 01-145 gave authority to the Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental covenant. These covenants, which are recorded with the deed and run with the land, provide a mechanism to ensure that institutional controls that are part of environmental remediation projects are properly implemented and that engineered structures are protected and maintained, so that implemented remedies continue to be protective of human health and the environment for as long as any residual contamination remains a risk.

HISTSWLF Historical Solid Waste Landfills

VERSION DATE: NR

This historical solid waste landfills database contains data from the Hazardous Materials Waste Management Division (HMWMD) of the Colorado Department of Public Health and other various state and local agencies. In the early 1980s, the HMWMD conducted a survey of staff members and local agencies to compile this listing of sites that were known or thought to have waste issues. This Solid Waste Historical Data is not considered complete or verifiable and has not been maintained since the late 1980s. The HMWMD is not responsible and shall not be liable to the used for damages of any kind arising out of the use of this data or information.

HWSCA Hazardous Waste Sites- Corrective Action

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by Congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the Hazardous and Solid Waste Amendments (HSWA) were added to RCRA providing for corrective action at facilities subject to RCRA. That same year, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. Corrective action may be implemented as part of a RCRA Hazardous Waste Permit, an Order, or a Corrective Action Plan pursuant to the Colorado Hazardous Waste Regulations. Corrective action is the process by which regulated facilities investigate and remediate, as necessary, all contamination (soil, ground water, surface water, air) associated with their releases into the environment. Historic Corrective Action Sites are facilities that have

completed the RCRA Subtitle C corrective Action process. This data was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

HWSG Hazardous Waste Sites- Generator

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. This facility listing includes RCRA sites listed as generators of hazardous waste (Small Quantity Generators and Large Quantity Generators) and was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

Small Quantity Generators (SQG) generate, in any calendar month, more than 100 kg (220 lbs.) but less than 1,000 kg (2,200 lbs.) of RCRA hazardous waste; and generate, in any calendar month, or accumulate at any time, no more than 1 kg (2.2 lbs.) of acute hazardous waste and no more than 100 kg (220 lbs.) of material from the cleanup of a spill of acute hazardous waste; and accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time; or, the site is a Small Quantity Generator if the site met all other criteria for a Conditionally Exempt Small Quantity Generator, but accumulated, at any time, more than 1,000 kg (2,200 lbs.) of RCRA hazardous waste.

Large Quantity Generators (LQG) generate, in any calendar month, 1,000 kg (2,200 lbs.) or more of RCRA hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 1 kg (2.2 lbs.) of RCRA acute hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 100 kg (220 lbs.) of spill cleanup material contaminated with RCRA acute hazardous waste.

HWSTSD Hazardous Waste Sites- Treatment, Storage & Disposal

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. TSD facilities treat, store, dispose, or recycle hazardous waste on site in units and therefore are subject to RCRA permitting requirements. Historic TSDs are facilities that have completed closure and/or post-closure of the RCRA Subtitle C Regulated Unit(s) or the Treatment/Storage/Disposal Unit is no longer regulated. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

LST Leaking Storage Tank Facilities

VERSION DATE: 05/03/21

This database of aboveground and underground storage tank facilities with confirmed releases is a compilation of several lists maintained by the Colorado Department of Labor and Employment. Currently In Use, Never Installed/Existed, Never Installed-Permit Revoked, Not Regulated, Other, Pending Installation, Permanently Closed, Temporarily Out of Use tanks are included in this data. The next set of data is obtained from the Active

and Closed OPS Petroleum Release Events in Colorado database. This data includes the OPS Open Event locations, but also shows locations of closed events (releases that have been issued a No Further Action determination). The Events data utilized in this database includes the following status types: Brownfield, Closed, Enforcement, LUST Trust, Open and State Lead. Please note some Events (confirmed releases) may not have a contaminant present.

LUSTTRUST Leaking Underground Storage Tanks Trust Fund Sites

VERSION DATE: 01/01/00

Suspected tank leaks have been discovered at the sites are included in this database, but the facility responsible for the leak has not been identified. The state's investigation and search for responsible parties is paid for out of the state's Leaking Underground Storage Tank (LUST) Trust Fund. This data was originally collected in 2002 from the Colorado Department of Labor & Employment, Division of Oil & Public Safety, State Fund Section by a former environmental database company known as Satisfi. Please refer to State LST database as source of current LUST Trust sites.

METHANESITES Methane Gas Study Sites

VERSION DATE: 01/01/81

This Investigation of Methane Gas Hazards report was prepared by the Denver Office of Emergency Preparedness in 1981. The purpose of this study was to assess the actual and potential generation, migration, explosive and related problems associated with specified landfills, and to identify existing and potential problems, suggested strategies to prevent, abate, and control such problems and recommend investigative and monitoring functions as may be deemed necessary. The Colorado Department of Health selected eight landfills as priorities due to population density and potential hazards to population and property.

RECYCLERS Registered Recycling Facilities

VERSION DATE: 09/01/19

This list of registered recycling facilities in Colorado is maintained by the Colorado Department of Public Health & Environment. This list includes primarily processing facilities for recyclable materials, such as: material recovery facilities, industrial recycling operations, and recyclable material end user sites. Collection centers/drop-off locations are not included unless the site is also processing recyclable materials (separating, sorting, dismantling, grinding, baling, etc.).

SF Superfund Sites

VERSION DATE: 12/10/20

This list of Superfund Sites is maintained by the Colorado Department of Public Health and Environment. This list contains active, deleted and proposed "Superfund" hazardous waste sites, as well as those sites identified through the Natural Resource Damages section of Superfund legislation and one Private Non-Superfund Cleanup site. A site qualifies for the National Priorities List (NPL or Superfund list) when the U.S. Environmental Protection Agency (EPA) determines there is a release or threatened release of hazardous substances that may

endanger public health, welfare or the environment. In Colorado, the lead agency for Superfund remediation may be either the EPA or the Colorado Department of Public Health and Environment.

SPILLS Spills Listing

VERSION DATE: 02/28/21

The Colorado Department of Public Health and Environment's Division of Emergency Preparedness and Response maintains this listing of chemical spills and/or releases.

SWF Solid Waste Facilities

VERSION DATE: 12/18/20

The Colorado Department of Public Health and Environment maintains this database of solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants. As of 11-6-19, the Waste Grease list has been discontinued and no new sites will be added as waste grease.

UMTS Uranium Mill Tailings Sites

VERSION DATE: 08/09/02

There were nine uranium mill tailings sites in Colorado designated for cleanup under the federal Uranium Mill Tailings Radiation Control Act (UMTRA). These nine sites, know commonly as UMTRA sites, were remediated jointly by the State of Colorado and the U.S. Department of Energy during the late 1980's and early 1990's. Mill tailings were removed from 8 of the mill sites and relocated in engineered disposal cells. A disposal cell is designed to encapsulate the material, reduce radon emanation, and prevent the movement of water through the material. At one site, Maybell, CO, the tailings were stabilized in-place at the mill site. After remediation of the tailings was completed, the State and DOE began to investigate the residual impacts to groundwater at the mill sites. The groundwater phase of the UMTRA program is on-going. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

UST Underground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of underground storage tank (UST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

VCRA Voluntary Cleanup and Redevelopment Program Sites

VERSION DATE: 03/31/21

This list of Voluntary Cleanup and Redevelopment Program Sites is maintained by the Colorado Department of Public Health and Environment (CDPHE) and includes both voluntary cleanup and brownfield properties. The

Voluntary Cleanup and Redevelopment program was created in 1994. The objective of the program is to facilitate the redevelopment and transfer of contaminated properties. Properties that sit untouched because of their real or perceived contamination can be rehabilitated using the CDPHE's Brownfields Program in conjunction with the Voluntary Cleanup Program. Cleanup decisions are based on existing standards and the proposed use of the property. The actual cleanup and verification is the owner's responsibility.

Environmental Records Definitions - LOCAL

WCSWF Weld County Solid Waste Facilities

VERSION DATE: 01/25/18

This list of solid waste facilities is maintained by the Weld County Public Health Department. The Weld County Code (WCC), Section 23-4-380 is the only section of the WCC that pertains to solid waste operations. The siting, permitting and regulation of solid waste disposal sites is an area of dual jurisdiction between Colorado Department of Public Health and Environment and Weld County. The primary regulations that govern composting and solid waste facilities are the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). These regulations are implemented by the Colorado Department of Public Health & Environment. The Weld County Department of Public Health & Environment interacts with compost and solid waste facilities through the receipt of complaints, the land use planning process for facilities having a Use by Special Review (USR) Permit, site inspections, and investigations.

Environmental Records Definitions - TRIBAL

INDIANRES Indian Reservations

VERSION DATE: 09/27/17

This database is extracted from select geographic and cartographic information from the U.S. Census Bureau. The Bureau of Indian Affairs (BIA) within the U.S. Department of the Interior (DOI) provides the list of federally recognized tribes. The American Indian/Alaska Native/Native Hawaiian (AIANNH) Areas includes the following legal entities: federally recognized American Indian reservations and off-reservation trust land areas, state-recognized American Indian reservations, and Hawaiian home lands (HHLs). The boundaries for federally recognized American Indian reservations and off-reservation trust lands are as of January 2017. The boundaries for state-recognized American Indian reservations and for state designated tribal statistical areas were delineated by state governor-appointed liaisons for the 2010 Census through the State American Indian Reservation Program and Tribal Statistical Areas Program respectively.

LUSTR08 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

USTR08 Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

Appendix C: Well Search Report

GeoPlus Oil & Gas Report

GeoLens by GeoSearch

Target Property:

McGavin

Longmont, Weld County, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401

Job #: 412773

Project #: 603-129

Date: 06/08/2021

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Target Property Summary

Target Property Information

McGavin
Longmont, Colorado 80504

Coordinates
Area centroid (-104.93778, 40.1284142)

USGS Quadrangle
Gowanda, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504

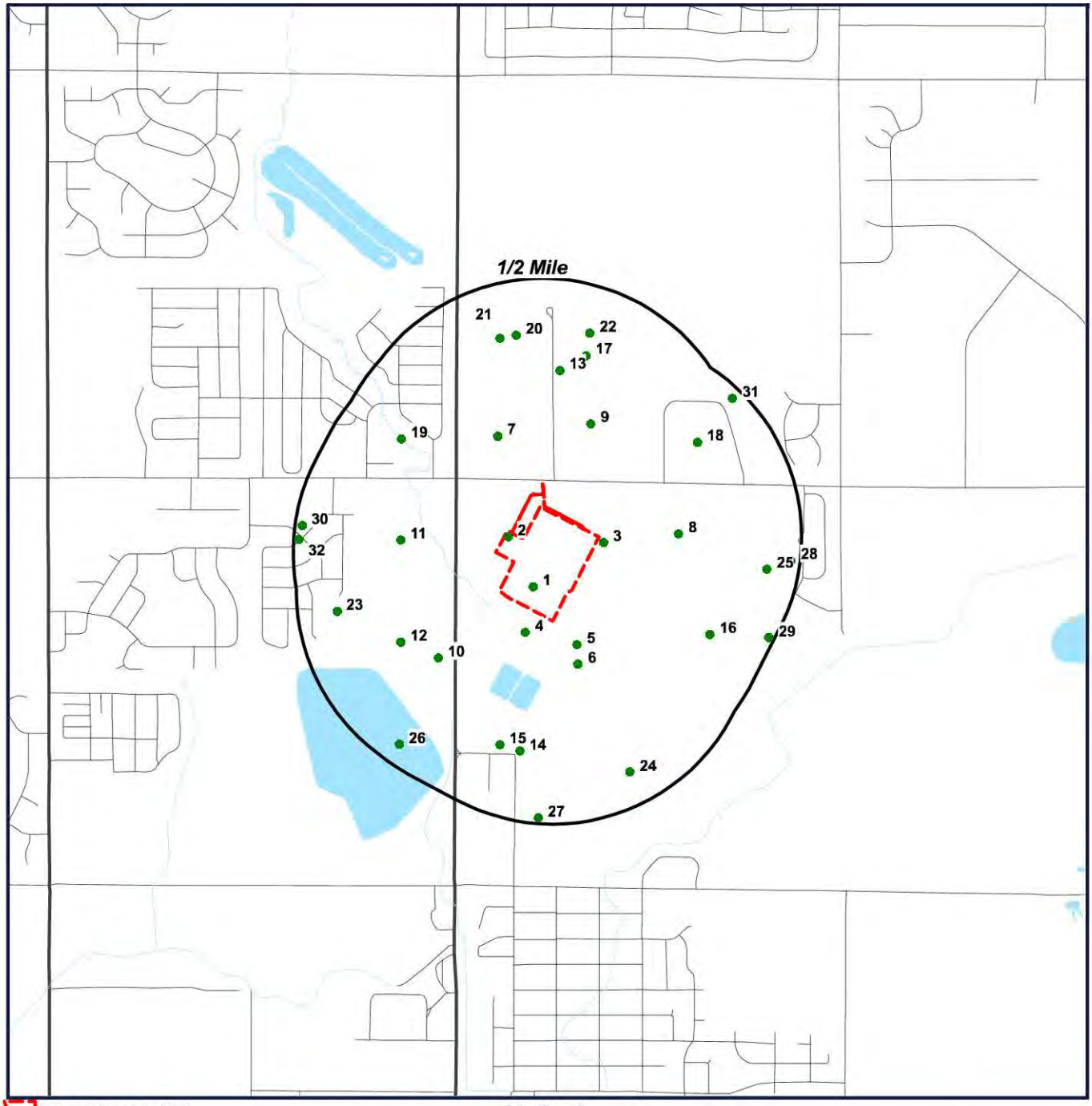
Database Radius Summary

STATE (CO) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
OG	0.5000	3	6	6	20	NS	NS	35
PITS	0.5000	0	0	2	5	NS	NS	7
SUB-TOTAL		3	6	8	25	0	0	42
TOTAL		3	6	8	25	0	0	42

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

OIL & GAS WELL MAP



Target Property (TP)

Well Location

McGavin
Longmont, Colorado
80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
1	OG	05-123-16476	TP	ROCKY MOUNTAIN FUEL	WELD COUNTY, LONGMONT, CO 80504
2	OG	05-123-16157	0.004 mi. NNE (21 ft.)	TRAVELERS	WELD COUNTY, LONGMONT, CO 80504
3	OG	05-123-08666	0.013 mi. ENE (69 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
4	OG	05-123-08667	0.039 mi. SW (206 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-19583	0.082 mi. SE (433 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20217	0.072 mi. ESE (380 ft.)	ROCKY MTN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20218	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20219	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-10317	0.107 mi. SE (565 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
7	OG	05-123-08668	0.170 mi. NW (898 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
7	PITS	103318	0.161 mi. NW (850 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-10318	0.199 mi. E (1051 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-11244	0.200 mi. NE (1056 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-20530	0.209 mi. SW (1104 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-08492	0.239 mi. W (1262 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20667	0.225 mi. WNW (1188 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	PITS	118742	0.239 mi. W (1262 ft.)	BATAA OIL INC	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-17665	0.265 mi. WSW (1399 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
13	OG	05-123-07379	0.295 mi. N (1558 ft.)	DREW	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-10315	0.312 mi. SSW (1647 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-21738	0.337 mi. SSW (1779 ft.)	SADDLEBACK	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
15	PITS	117994	0.313 mi. SSW (1653 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08531	0.344 mi. ESE (1816 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
17	OG	05-123-08679	0.346 mi. NNE (1827 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
18	OG	05-123-08579	0.350 mi. NE (1848 ft.)	BRETT	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-14402	0.355 mi. WNW (1874 ft.)	BUFFALO GARDENS U	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-15821	0.384 mi. NNW (2028 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
21	PITS	103319	0.385 mi. NNW (2033 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-10408	0.401 mi. NNE (2117 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
22	PITS	103321	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	112952	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-17664	0.401 mi. W (2117 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
24	OG	05-123-08527	0.401 mi. SE (2117 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08514	0.419 mi. E (2212 ft.)	ROCKY MOUNTAIN FUEL CO J	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-07516	0.434 mi. SW (2292 ft.)	FREDERICK	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08528	0.467 mi. S (2466 ft.)	ROCKY MTN FUEL D	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-22564	0.467 mi. S (2466 ft.)	SPECTRUM	WELD COUNTY, LONGMONT, CO 80504
28	OG	05-123-08675	0.475 mi. E (2508 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-10316	0.477 mi. ESE (2519 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-12771	0.485 mi. W (2561 ft.)	MOORE	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11551	0.488 mi. NE (2577 ft.)	DREW GAS UNIT TRUE	WELD COUNTY, LONGMONT, CO 80504
32	PITS	118634	0.488 mi. W (2577 ft.)	MACHII-ROSS PETROLEUM CO	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
1	OG	05-123-16476	4,927 ft.	TP	ROCKY MOUNTAIN FUEL	WELD COUNTY, LONGMONT, CO 80504
2	OG	05-123-16157	4,915 ft.	0.004 mi. NNE (21 ft.)	TRAVELERS	WELD COUNTY, LONGMONT, CO 80504
3	OG	05-123-08666	4,934 ft.	0.013 mi. ENE (69 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
4	OG	05-123-08667	4,927 ft.	0.039 mi. SW (206 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-19583	4,935 ft.	0.082 mi. SE (433 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20217	4,935 ft.	0.072 mi. ESE (380 ft.)	ROCKY MTN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20218	4,935 ft.	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20219	4,935 ft.	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-10317	4,935 ft.	0.107 mi. SE (565 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
7	OG	05-123-08668	4,913 ft.	0.170 mi. NW (898 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-10318	4,947 ft.	0.199 mi. E (1051 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-11244	4,942 ft.	0.200 mi. NE (1056 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-20530	4,920 ft.	0.209 mi. SW (1104 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-08492	4,916 ft.	0.239 mi. W (1262 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20667	4,916 ft.	0.225 mi. WNW (1188 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-17665	4,926 ft.	0.265 mi. WSW (1399 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
13	OG	05-123-07379	4,931 ft.	0.295 mi. N (1558 ft.)	DREW	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-10315	4,931 ft.	0.312 mi. SSW (1647 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-21738	4,931 ft.	0.337 mi. SSW (1779 ft.)	SADDLEBACK	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08531	4,966 ft.	0.344 mi. ESE (1816 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
17	OG	05-123-08679	4,937 ft.	0.346 mi. NNE (1827 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
18	OG	05-123-08579	4,953 ft.	0.350 mi. NE (1848 ft.)	BRETT	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-14402	4,910 ft.	0.355 mi. WNW (1874 ft.)	BUFFALO GARDENS U	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-15821	4,916 ft.	0.384 mi. NNW (2028 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-10408	4,937 ft.	0.401 mi. NNE (2117 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-17664	4,933 ft.	0.401 mi. W (2117 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
24	OG	05-123-08527	4,942 ft.	0.401 mi. SE (2117 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08514	4,966 ft.	0.419 mi. E (2212 ft.)	ROCKY MOUNTAIN FUEL CO J	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-07516	4,946 ft.	0.434 mi. SW (2292 ft.)	FREDERICK	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08528	4,947 ft.	0.467 mi. S (2466 ft.)	ROCKY MTN FUEL D	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-22564	4,947 ft.	0.467 mi. S (2466 ft.)	SPECTRUM	WELD COUNTY, LONGMONT, CO 80504
28	OG	05-123-08675	4,969 ft.	0.475 mi. E (2508 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-10316	4,972 ft.	0.477 mi. ESE (2519 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-12771	4,923 ft.	0.485 mi. W (2561 ft.)	MOORE	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11551	4,967 ft.	0.488 mi. NE (2577 ft.)	DREW GAS UNIT TRUE	WELD COUNTY, LONGMONT, CO 80504
7	PITS	103318	4,913 ft.	0.161 mi. NW (850 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
11	PITS	118742	4,916 ft.	0.239 mi. W (1262 ft.)	BATAA OIL INC	WELD COUNTY, LONGMONT, CO 80504
15	PITS	117994	4,931 ft.	0.313 mi. SSW (1653 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
21	PITS	103319	4,916 ft.	0.385 mi. NNW (2033 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	103321	4,937 ft.	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	112952	4,937 ft.	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
32	PITS	118634	4,923 ft.	0.488 mi. W (2577 ft.)	MACHII-ROSS PETROLEUM CO	WELD COUNTY, LONGMONT, CO 80504

Oil & Gas Well Report

MAP ID	API #	WELL # AND NAME	OPERATOR NAME	GRND ELEV.	LOCATION QUALIFIER	STATUS	LATITUDE	LONGITUDE
1	05-123-16476	19-4N ROCKY MOUNTAIN FUEL	KERR MCGEE OIL & GAS ONSHORE LP	4933 FT	ACTUAL LATLONG	SHUT IN	40.127820000	-104.938345000
2	05-123-16157	11-19 TRAVELERS	BASIN EXPLORATION INC	4910 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.129587000	-104.939529000
3	05-123-08666	8 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4935 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129386000	-104.935069000
4	05-123-08667	10 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4930 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.126190000	-104.938722000
5	05-123-19583	19-6JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4893 FT	ACTUAL LATLONG	PRODUCING	40.125387000	-104.936470000
5	05-123-20217	19-5JI ROCKY MTN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4935 FT	ACTUAL LATLONG	SHUT IN	40.125684000	-104.936364000
5	05-123-20218	19-3 JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4935 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.125756000	-104.936305000
5	05-123-20219	19-4 JI ROCKY MOUNTAIN FUEL V	PATINA OIL & GAS CORPORATION	4935 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.125693000	-104.936375000
6	05-123-10317	13 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4935 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.125053000	-104.936259000
7	05-123-08668	1 LINCOLN	KERR MCGEE OIL & GAS ONSHORE LP	4913 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.133191000	-104.939995000
8	05-123-10318	12 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4954 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129709000	-104.931571000
9	05-123-11244	2 LISA	KERR MCGEE OIL & GAS ONSHORE LP	4939 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.133630000	-104.935664000
10	05-123-20530	42-24 FOX	PDC ENERGY INC	4919 FT	ACTUAL LATLONG	SHUT IN	40.125282000	-104.942772000
11	05-123-08492	1 FOX	BATAA OIL INC	4915 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129481000	-104.944518000
11	05-123-20667	41-24 FOX	PDC ENERGY INC	4913 FT	ACTUAL LATLONG	SHUT IN	40.129724000	-104.944165000
12	05-123-17665	U 24-8 FOX	GERRITY OIL & GAS CORP	4916 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.125841000	-104.944532000
13	05-123-07379	1 DREW	KERR MCGEE OIL & GAS ONSHORE LP	4933 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.135532000	-104.937106000
14	05-123-10315	15 ROCKY MOUNTAIN FUEL CO. D	HS RESOURCES INC	4928 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121955000	-104.938973000
14	05-123-21738	12-19A SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	4940 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.121613000	-104.939161000
16	05-123-08531	5 ROCKY MOUNTAIN FUEL CO D	KERR MCGEE OIL & GAS ONSHORE LP	4965 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.126122000	-104.930119000
17	05-123-08679	2 LINCOLN	HS RESOURCES INC	4940 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.136063000	-104.935885000
18	05-123-08579	2 BRETT	HS RESOURCES INC	4949 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.132969000	-104.930699000
19	05-123-14402	13-16 BUFFALO GARDENS U	BATAA OIL INC	4919 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.133094000	-104.944491000
20	05-123-15821	3 LINCOLN	KERR MCGEE OIL & GAS ONSHORE LP	4911 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.136785000	-104.939147000
22	05-123-10408	1 LISA	KERR MCGEE OIL & GAS ONSHORE LP	4939 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.136855000	-104.935708000
23	05-123-17664	U 24-1J FOX	PDC ENERGY INC	4929 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.126942000	-104.947501000
24	05-123-08527	4 ROCKY MOUNTAIN FUEL CO D	KERR MCGEE OIL & GAS ONSHORE LP	4944 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.121205000	-104.933845000
25	05-123-08514	6 ROCKY MOUNTAIN FUEL CO J	KERR MCGEE OIL & GAS ONSHORE LP	4965 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.128436000	-104.927453000
26	05-123-07516	3 FREDERICK	COLORADO ENERGY CORPORATION	4932 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.122201000	-104.944594000
27	05-123-08528	7 ROCKY MTN FUEL D	KERR MCGEE OIL & GAS ONSHORE LP	4940 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119576000	-104.938106000
27	05-123-22564	13-19 SPECTRUM	KERR MCGEE OIL & GAS ONSHORE LP	4950 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119558000	-104.937895000
28	05-123-08675	9 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4970 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.128759000	-104.926326000
29	05-123-10316	14 ROCKY MOUNTAIN FUEL CO. D	HS RESOURCES INC	4975 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.126003000	-104.927361000
30	05-123-12771	31-24C MOORE	PDC ENERGY INC	4920 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.129997000	-104.949130000

31	05-123-11551	1 DREW GAS UNIT TRUE	KERR MCGEE OIL & GAS ONSHORE LP	4968 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.134536000	-104.929066000

Oil & Gas Pits Report

MAP ID	FACILITY #	PIT #	OPERATOR NAME	WELL # AND NAME	FIELD NAME	STATUS	LATITUDE	LONGITUDE
7	103318	PIT# 103318	HS RESOURCES INC	NOT REPORTED	SPINDLE	CLOSED	40.133056000	-104.939913000
11	118742	PIT# 118742	BATAA OIL INC	NOT REPORTED	WATTENBERG	CLOSED	40.129454000	-104.944529000
15	117994	PIT# 117994	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.122190000	-104.939911000
21	103319	PIT# 103319	HS RESOURCES INC	NOT REPORTED	WATTENBERG	CLOSED	40.136669000	-104.939899000
22	103321	PIT# 103321	HS RESOURCES INC	NOT REPORTED	WATTENBERG	NOT REPORTED	40.136639000	-104.935450000
22	112952	PIT# 112952	HS RESOURCES INC	NOT REPORTED	WATTENBERG	CLOSED	40.136639000	-104.935450000
32	118634	PIT# 118634	MACHII-ROSS PETROLEUM CO	NOT REPORTED	WATTENBERG	NOT REPORTED	40.129501000	-104.949283000

Environmental Records Definitions - STATE (CO)

OG Oil and Gas Well Locations

VERSION DATE: 09/18/20

The Colorado Oil and Gas Conservation Commission maintains this database of active and plugged wells, including active and expired well permits. Some permitted locations were never drilled but locations are still included in the data.

PITS Oil and Gas Pit Locations

VERSION DATE: 09/18/20

This Colorado Oil and Gas Conservation Commission (COGCC) database maintains this list of oil and gas pit locations within Colorado. This data contains over 10,000 oil and gas related pit locations. The Colorado Department of Natural Resources (DNR) is not responsible and shall not be liable to the user for damages of any kind arising out of the use of data or information provided by the DNR, including the installation of the data or information, its use, or the results obtained from its use. Any data or information provided by the DNR is provided "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Appendix D: Historical Aerial Photographs

Historical Aerial Photographs

NEW: *GeoLens by Geosearch*

Target Property:

McGavin

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401
Job #: 412771
Project #: 603-129
Date: 6/10/2021

Target Property Summary

McGavin

Longmont, Weld, Colorado 80504

USGS Quadrangle: ***Gowanda***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.937914000, 40.131300000), (-104.937831000, 40.130403000), (-104.936074000, 40.129704000), (-104.936016000, 40.129640000), (-104.936034000, 40.129611000), (-104.935294000, 40.129317000), (-104.936558000, 40.127414000), (-104.936755000, 40.127329000), (-104.937435000, 40.126299000), (-104.939585000, 40.127190000), (-104.939941000, 40.127389000), (-104.939242000, 40.128436000), (-104.940087000, 40.128757000), (-104.939567000, 40.129548000), (-104.939350000, 40.129460000), (-104.939052000, 40.129908000), (-104.938468000, 40.130788000), (-104.938370000, 40.130830000), (-104.937878000, 40.130848000), (-104.937920000, 40.131301000)

Aerial Research Summary

Date	Source	Scale	Frame
2019	USDA	1" = 500'	N/A
2017	USDA	1" = 500'	N/A
2015	USDA	1" = 500'	N/A
2013	USDA	1" = 500'	N/A
2011	USDA	1" = 500'	N/A
2009	USDA	1" = 500'	N/A
2006	USDA	1" = 500'	N/A
2005	USDA	1" = 500'	N/A
2004	USDA	1" = 500'	N/A
10/04/1999	USGS	1" = 500'	N/A
06/27/1993	USGS	1" = 500'	6670-212
10/13/1984	USGS	1" = 500'	17-72
08/16/1978	USGS	1" = 500'	3-42
06/26/1975	USGS	1" = 500'	16-25
03/04/1970	USGS	1" = 500'	2-6
09/20/1967	USGS	1" = 500'	1-68
10/04/1966	USGS	1" = 500'	1-108
09/03/1963	ASCS	1" = 1320'	PI-14
09/10/1953	AMS	1" = 500'	4940
10/08/1948	USGS	1" = 500'	5-28
06/22/1937	ASCS	1" = 500'	2-11

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N
W E
S

McGavin
USDA
2019

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2017

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2015

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2013

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2011

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2009

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2006

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2005

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USDA
2004

GeoSearch

JOB #: 412771 - 06/10/2021



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McGavin
USGS
10/04/1999

GeoSearch

JOB #: 412771 - 06/10/2021



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McGavin
USGS
06/27/1993

GeoSearch

JOB #: 412771 - 06/10/2021

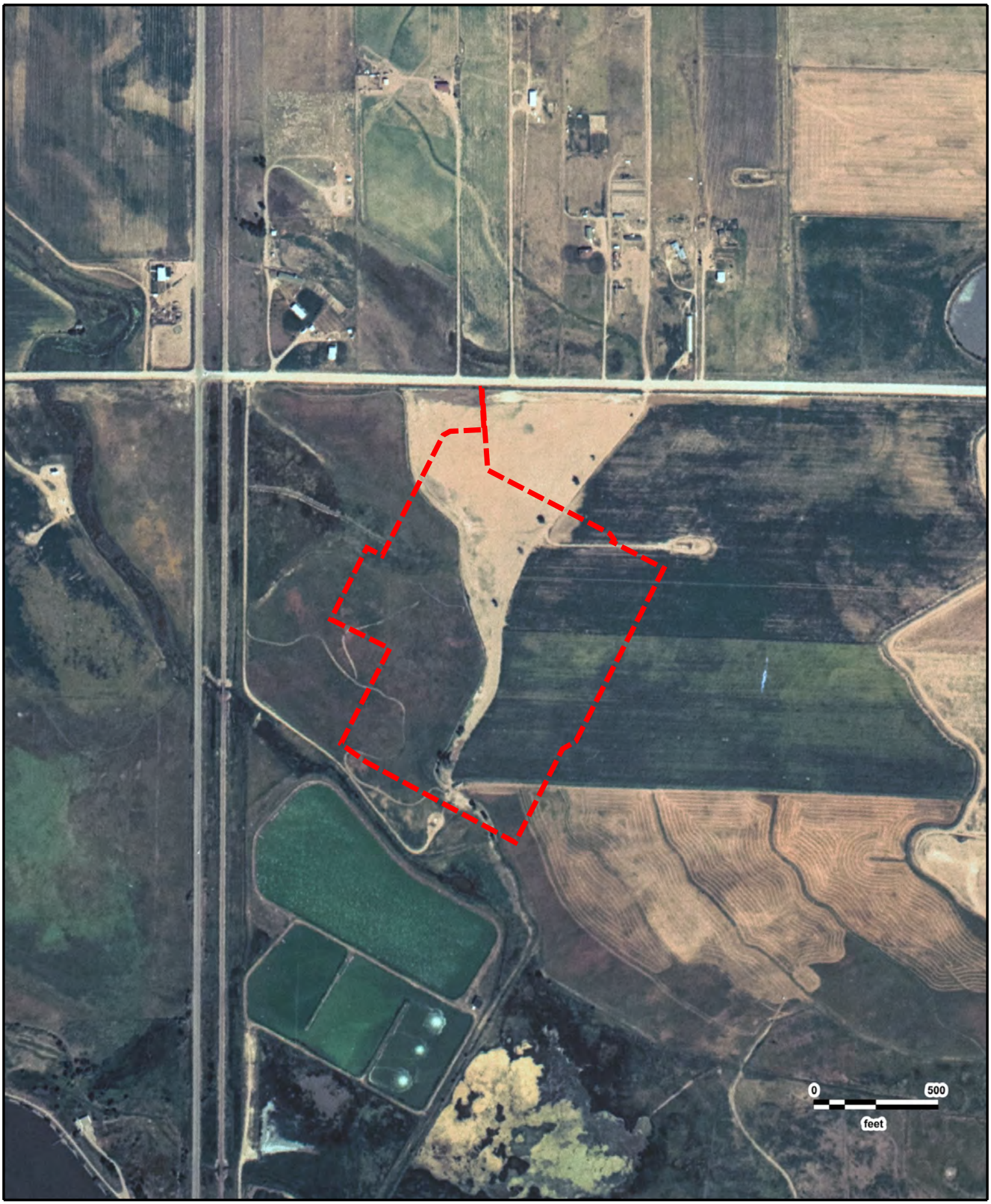


N
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McGavin
USGS
10/13/1984

GeoSearch

JOB #: 412771 - 06/10/2021

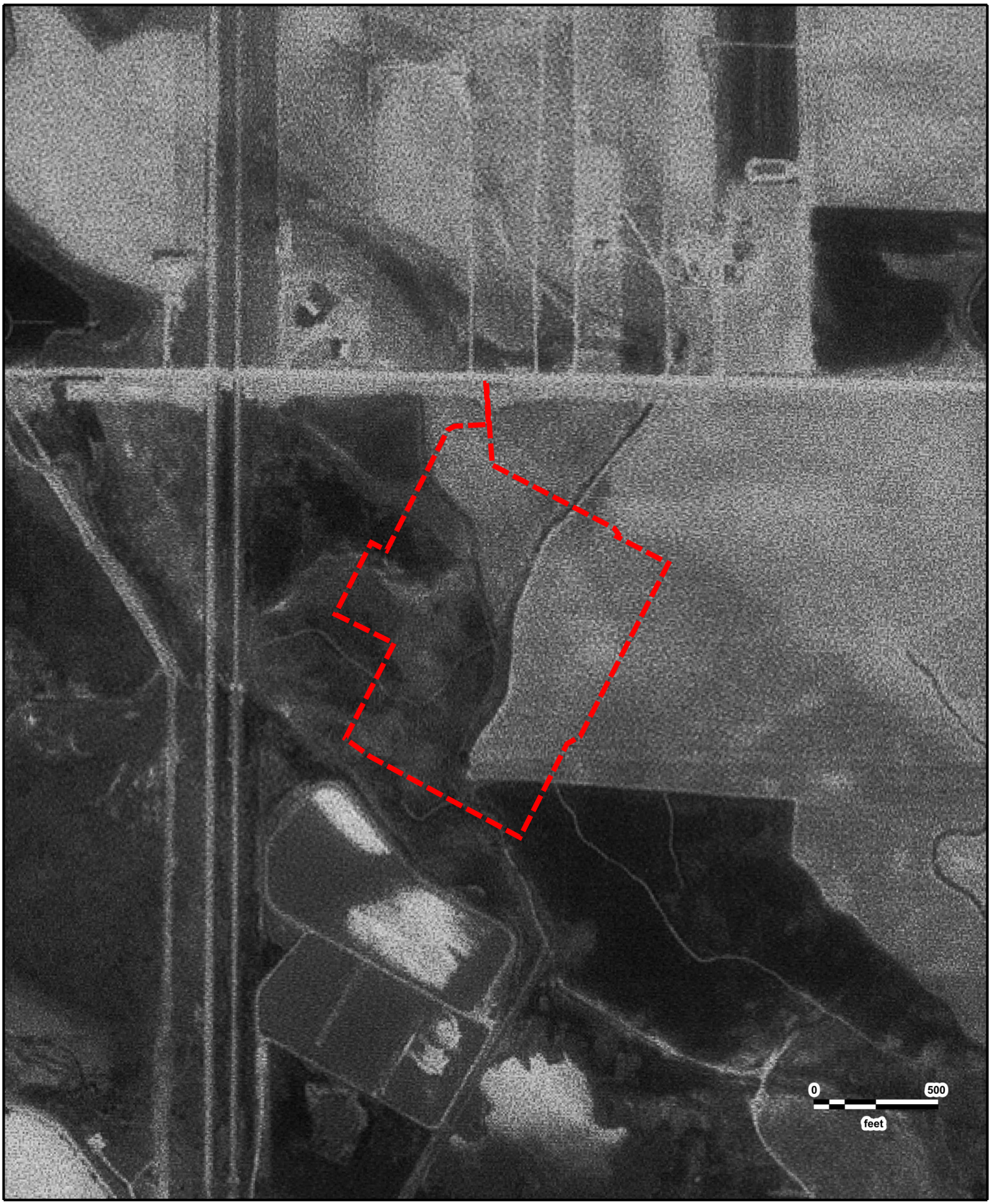


N
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McGavin
USGS
08/16/1978

GeoSearch

JOB #: 412771 - 06/10/2021

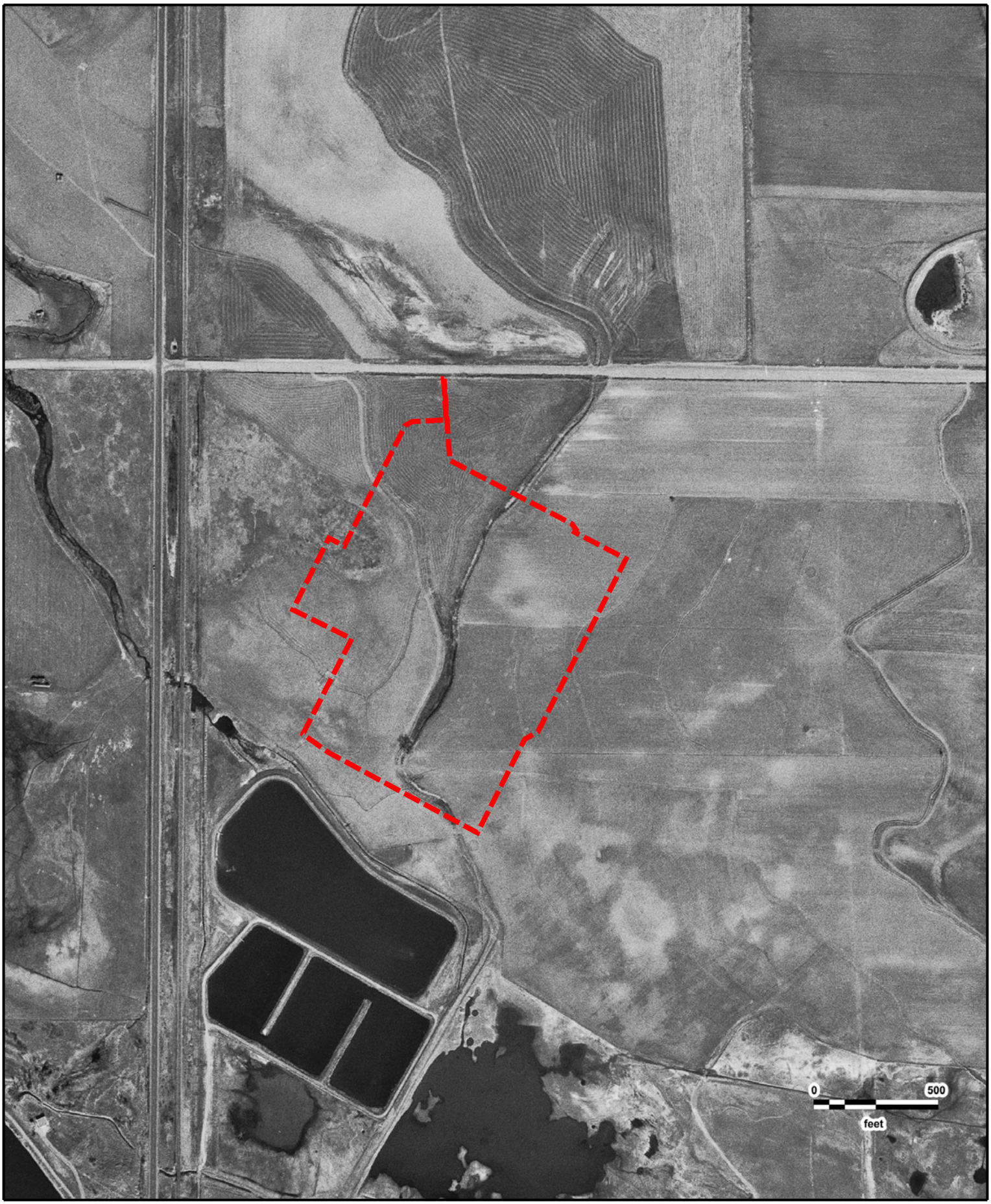


N
W E
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McGavin
USGS
06/26/1975

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USGS
03/04/1970

GeoSearch

JOB #: 412771 - 06/10/2021

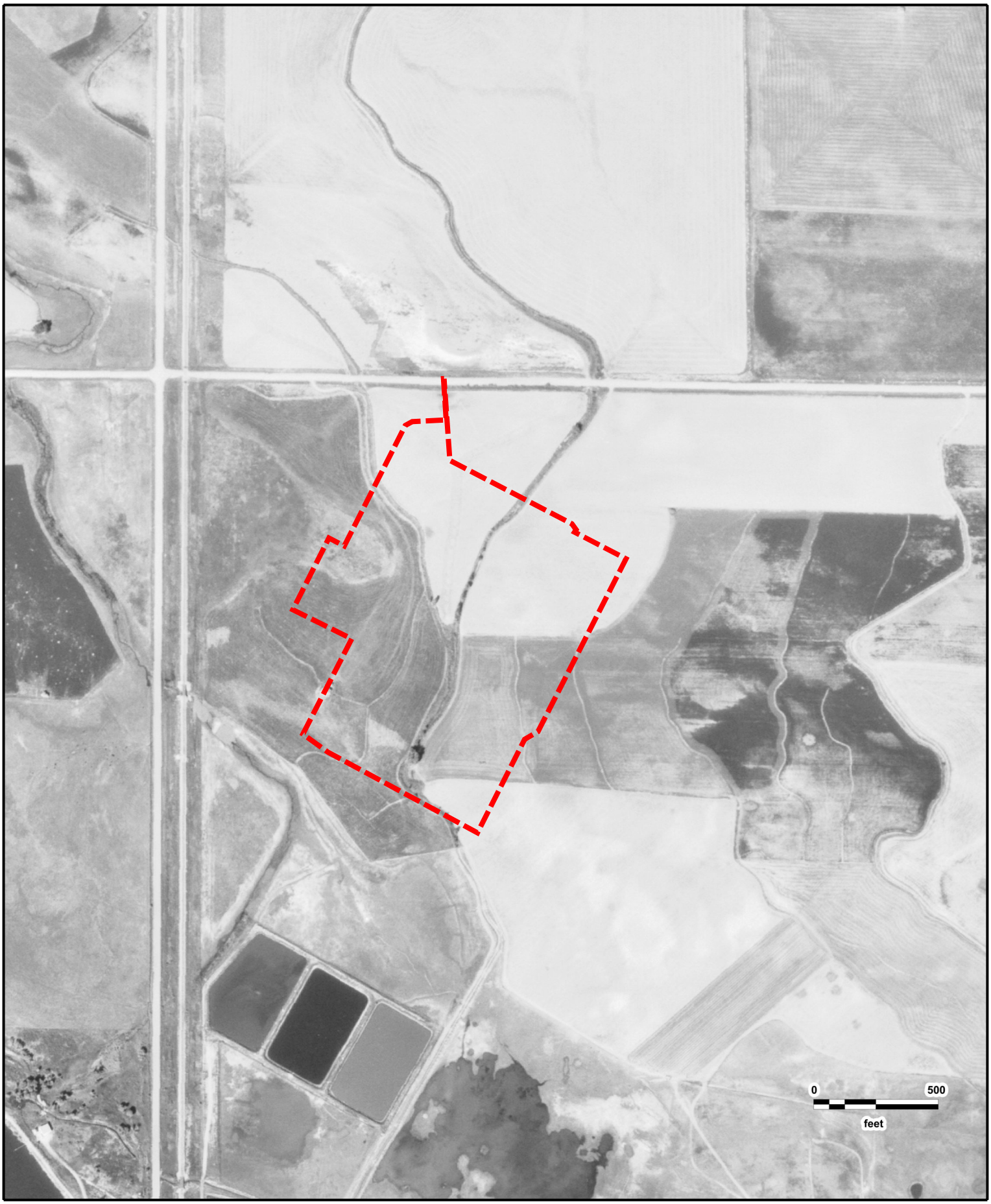


N
W E
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McGavin
USGS
09/20/1967

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
USGS
10/04/1966

GeoSearch

JOB #: 412771 - 06/10/2021

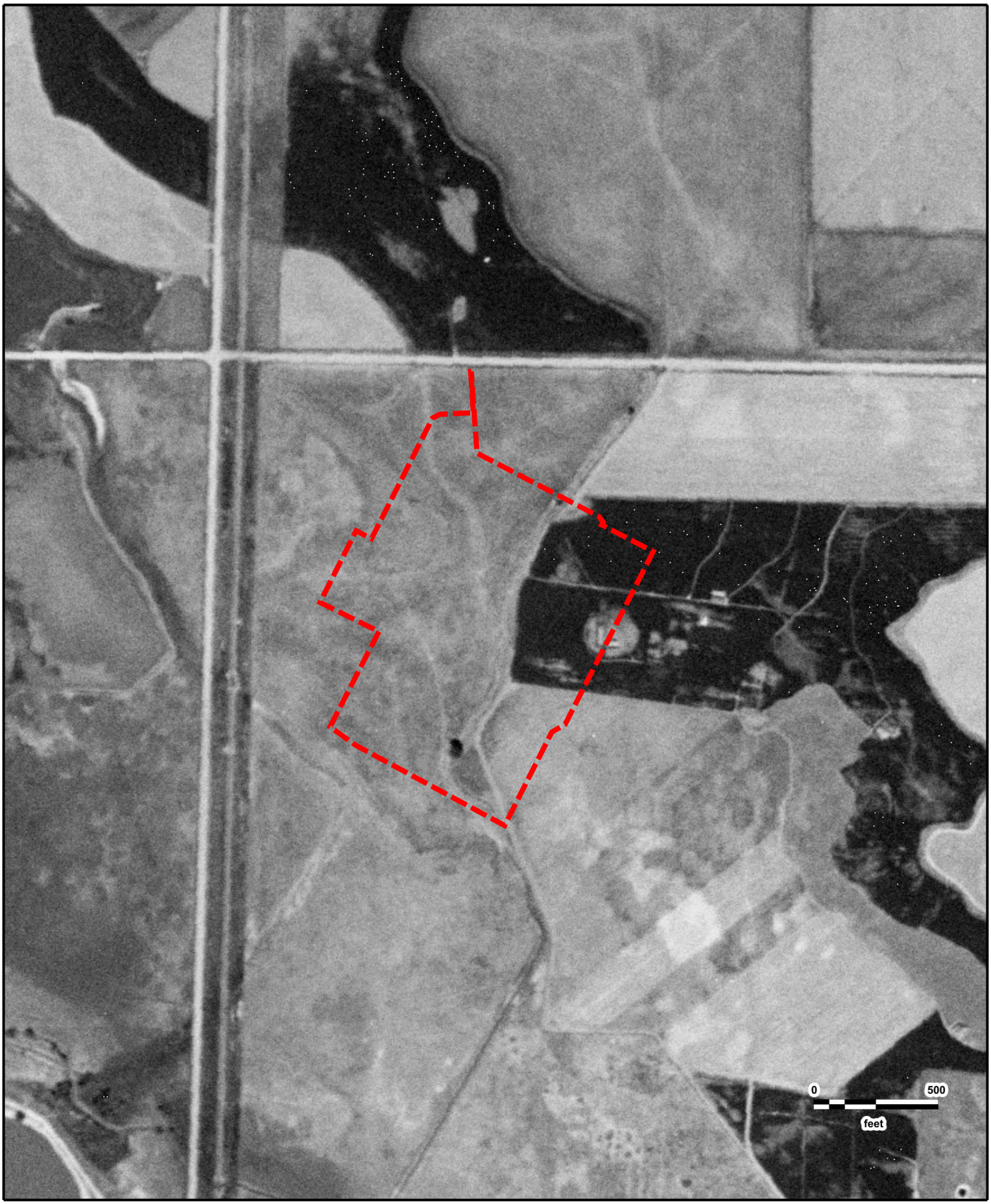


N
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McGavin
ASCS
09/03/1963

GeoSearch

JOB #: 412771 - 06/10/2021



N
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McGavin
AMS
09/10/1953

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USGS
10/08/1948

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
ASCS
06/22/1937

GeoSearch

JOB #: 412771 - 06/10/2021

Appendix E: Historical Topographic Maps

Historical Topographic Maps

NEW: *GeoLens by Geosearch*

Target Property:

McGavin

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401
Job #: 412770
Project #: 603-129
Date: 6/10/2021

Target Property Summary

McGavin

Longmont, Weld, Colorado 80504

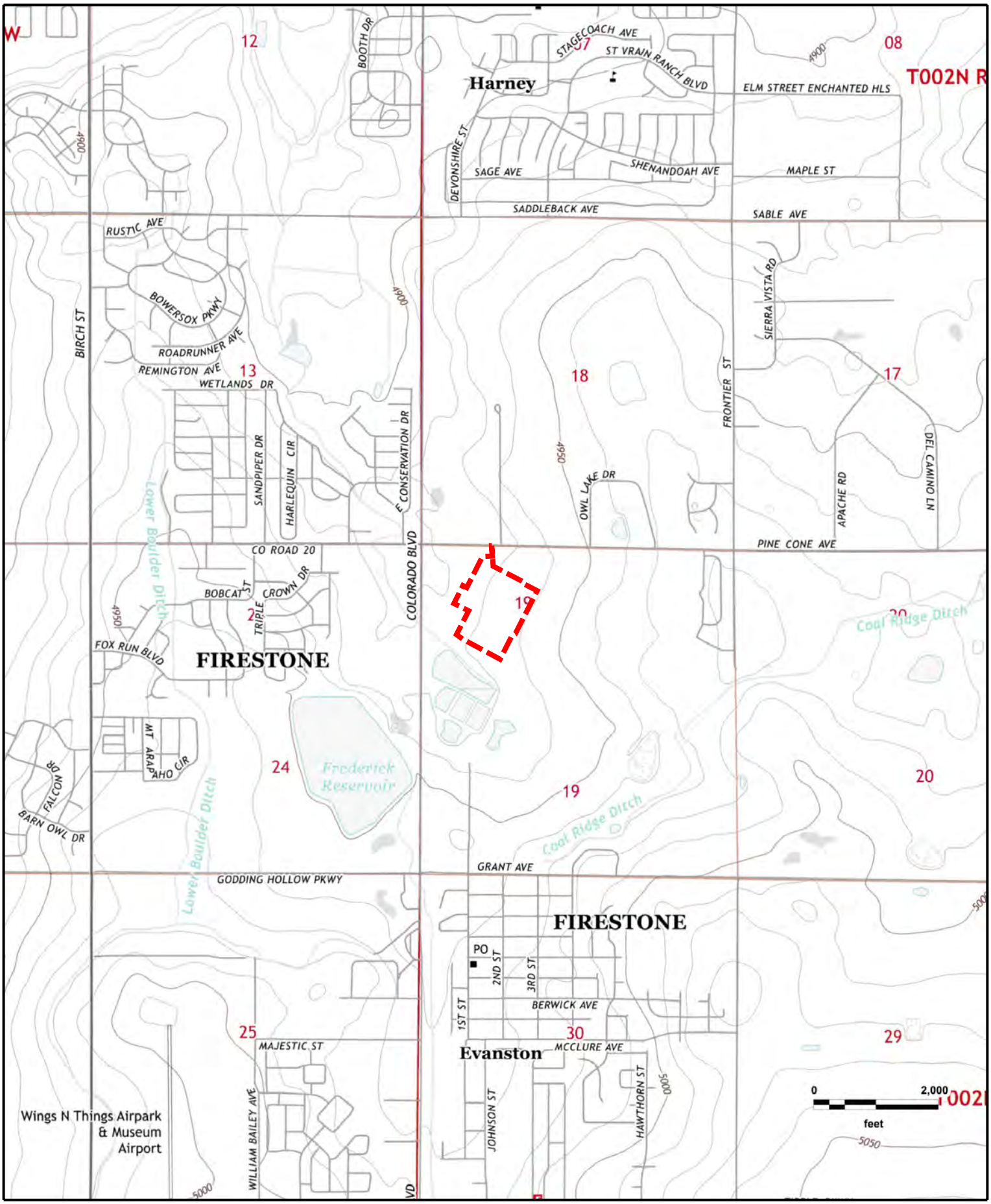
USGS Quadrangle: ***Gowanda***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.937914000, 40.131300000), (-104.937831000, 40.130403000), (-104.936074000, 40.129704000), (-104.936016000, 40.129640000), (-104.936034000, 40.129611000), (-104.935294000, 40.129317000), (-104.936558000, 40.127414000), (-104.936755000, 40.127329000), (-104.937435000, 40.126299000), (-104.939585000, 40.127190000), (-104.939941000, 40.127389000), (-104.939242000, 40.128436000), (-104.940087000, 40.128757000), (-104.939567000, 40.129548000), (-104.939350000, 40.129460000), (-104.939052000, 40.129908000), (-104.938468000, 40.130788000), (-104.938370000, 40.130830000), (-104.937878000, 40.130848000), (-104.937920000, 40.131301000)

Topographic Map Summary

Date	Quadrangle	Scale
2013	GOWANDA, CO (2013)	1" = 2000'
	FREDERICK, CO (2013)	
1950 REVISED 1994	GOWANDA, CO (1979)	1" = 2000'
	FREDERICK, CO (1994)	
1949 PHOTOREVISED 1979	GOWANDA, CO (1979)	1" = 2000'
	FREDERICK, CO (1979)	
1949 PHOTOREVISED 1969	GOWANDA, CO (1969)	1" = 2000'
	FREDERICK, CO (1969)	
1949	GOWANDA, CO (1949)	1" = 2000'
	FREDERICK, CO (1950)	
1902	GREELEY, CO	1" = 10420'

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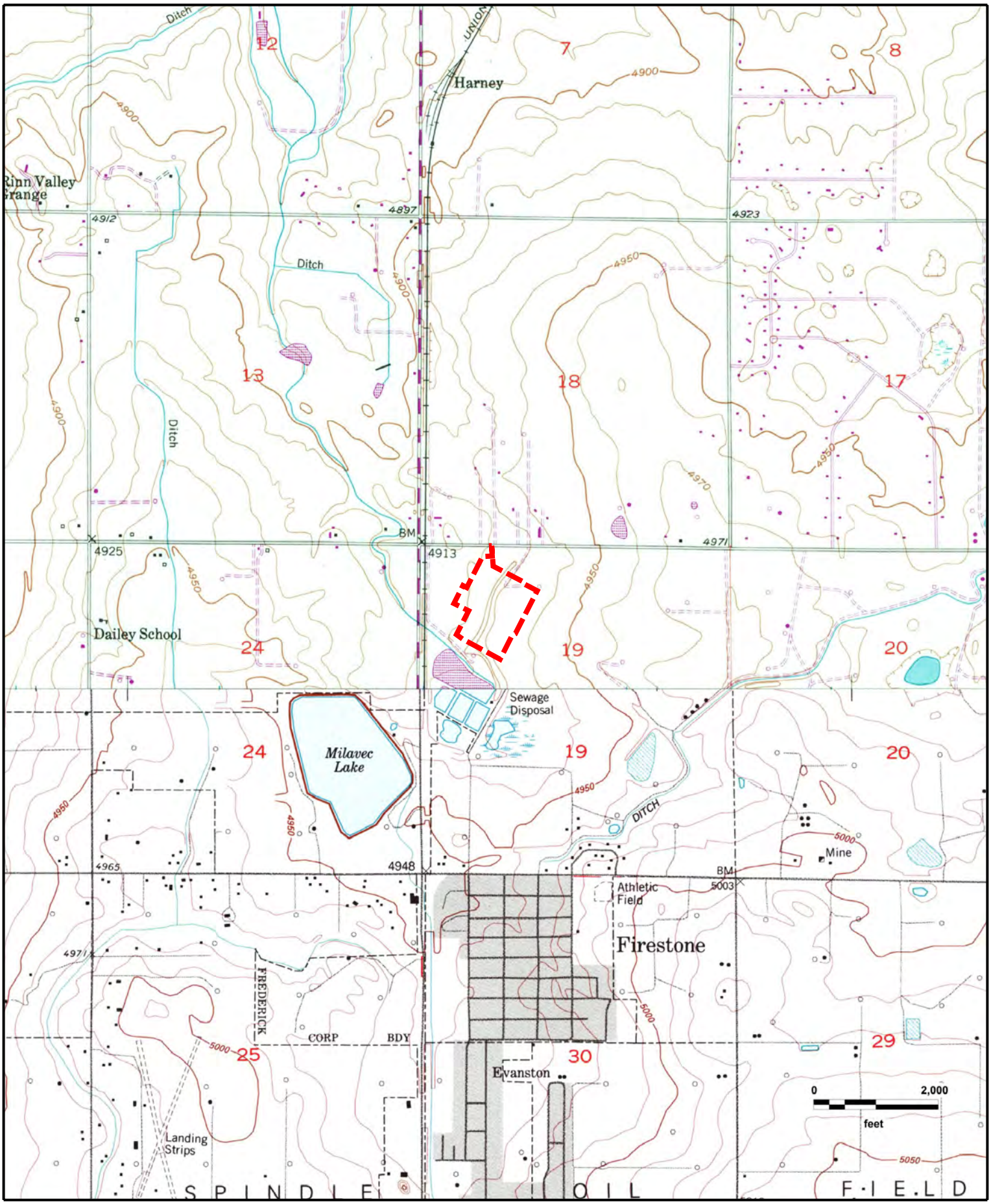


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McGavin
GOWANDA, CO (2013), FREDERICK, CO (2013)

GeoSearch

JOB #: 412770 - 06/10/2021

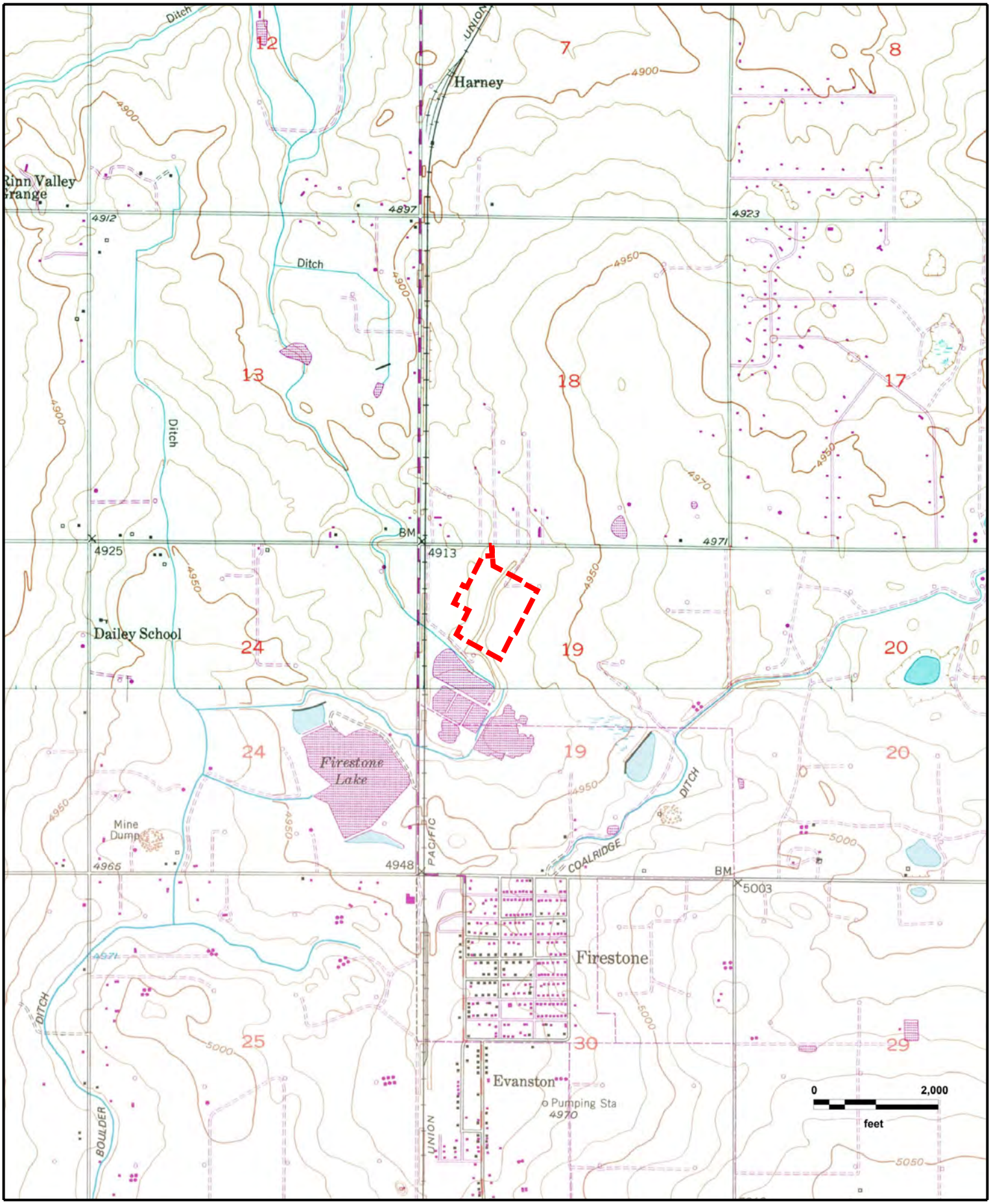


N
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McGavin
GOWANDA, CO (1979), FREDERICK, CO (1994)

GeoSearch

JOB #: 412770 - 06/10/2021

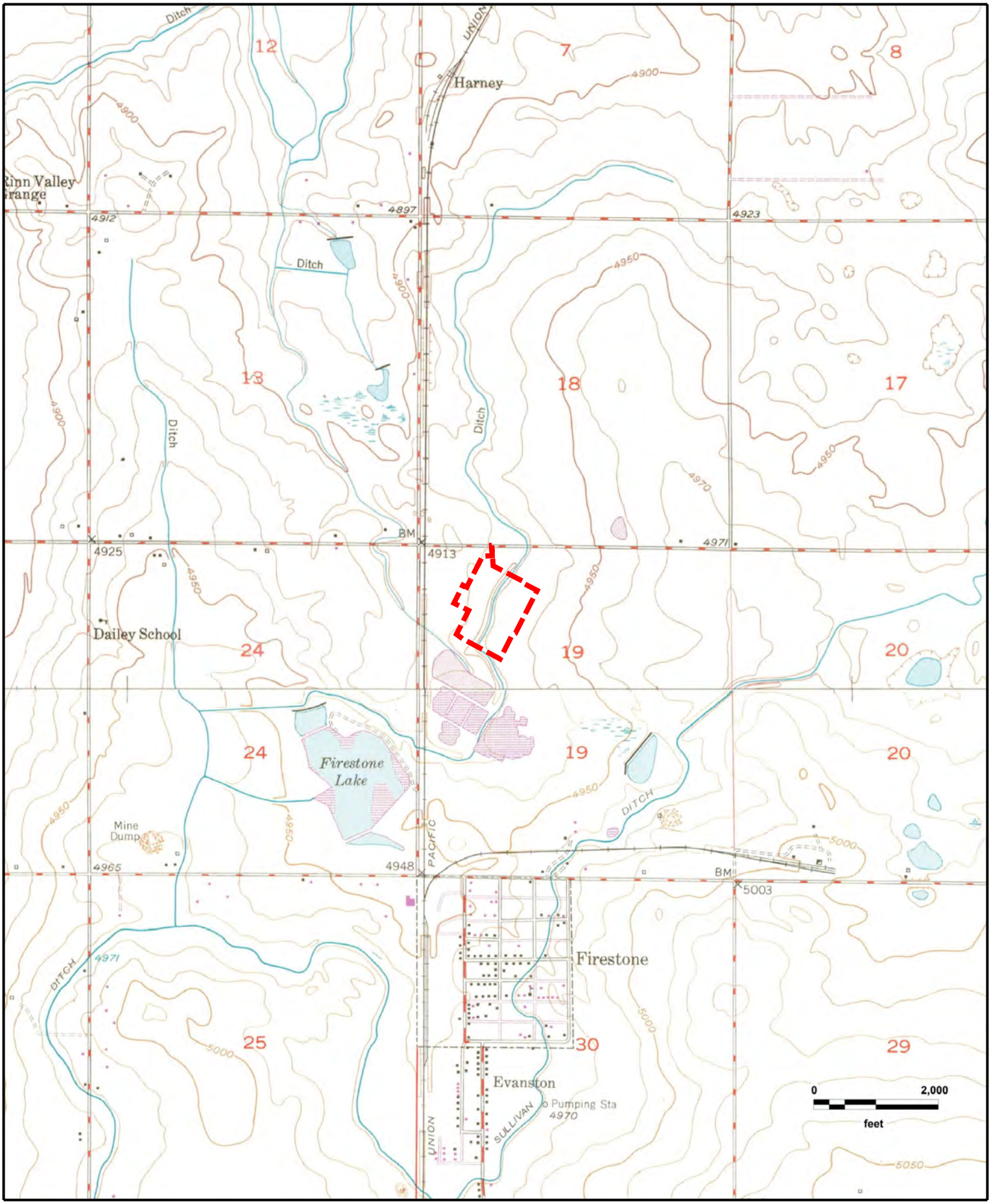


N
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S

McGavin
GOWANDA, CO (1979), FREDERICK, CO (1979)

GeoSearch

JOB #: 412770 - 06/10/2021

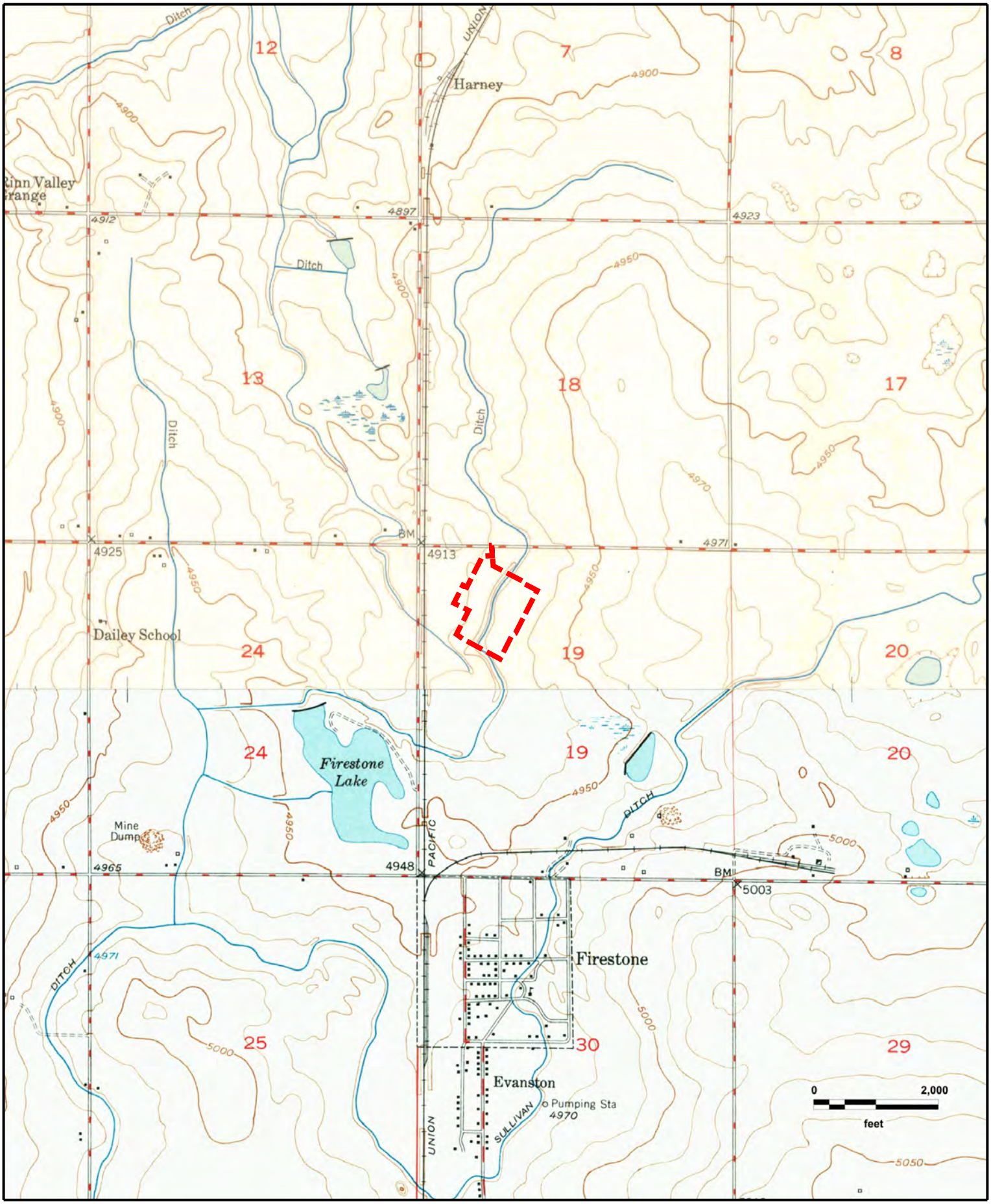


N
W E
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McGavin
GOWANDA, CO (1969), FREDERICK, CO (1969)

GeoSearch

JOB #: 412770 - 06/10/2021

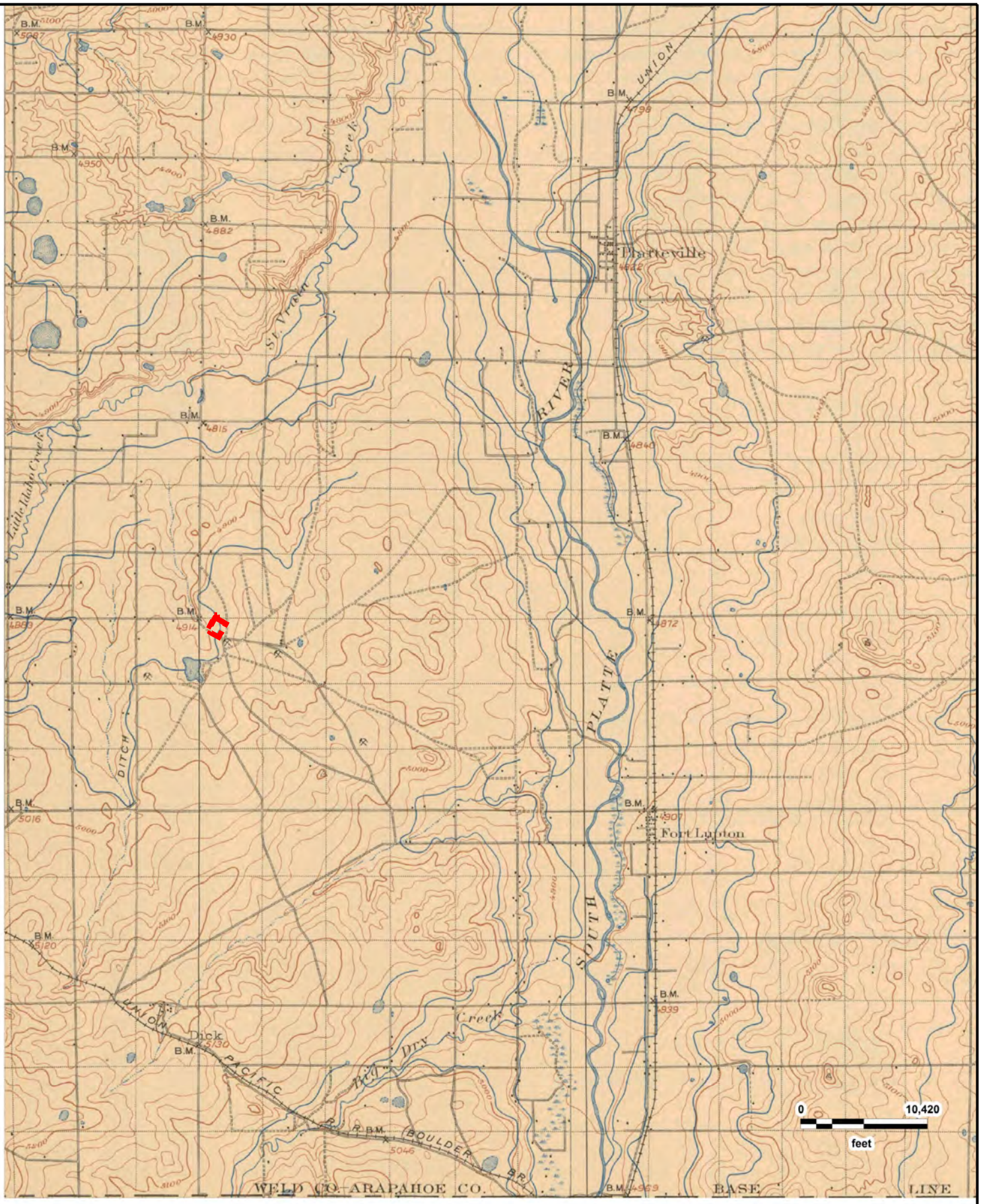


N
W E
S

McGavin
GOWANDA, CO (1949), FREDERICK, CO (1950)

GeoSearch

JOB #: 412770 - 06/10/2021



N
W E
S

McGavin
GREELEY, CO (1902)

GeoSearch

JOB #: 412770 - 06/10/2021

Appendix F: City Directory Report

City Directory Target Property Address

Target Property:

County Rd 13,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

County Rd 13, Longmont, CO 80504

1 COUNTY RD 13

2021	STREET BEGINS		INFOUSA	NORTH WEST
2016	STREET BEGINS		INFOUSA	NORTH WEST
2011	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
1996	STREET NOT LISTED		COLE DIRECTORY	LONGMONT
1989-90	RANGE NOT LISTED- BEGINS WITH 16219		US WEST	BOULDER - LONGMONT

8080 COUNTY RD 13

2006	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2006	HERITAGE BANK		COLE DIRECTORY	LONGMONT-BOULDER
2006	RE/MAX HORIZONS	200	COLE DIRECTORY	LONGMONT-BOULDER

8100 COUNTY RD 13

2006	TIP TOE NIALS		COLE DIRECTORY	LONGMONT-BOULDER
2006	CARBON VALLEY EYE CARE		COLE DIRECTORY	LONGMONT-BOULDER
2006	JAZZY BEAN COFFEE		COLE DIRECTORY	LONGMONT-BOULDER
2006	JAZZY BEAN COFFEEHOUSE LLC		COLE DIRECTORY	LONGMONT-BOULDER
2006	TIP TOE NIALS		COLE DIRECTORY	LONGMONT-BOULDER
2006	WRIGHT H LINDSAY O D		COLE DIRECTORY	LONGMONT-BOULDER
2006	NANCY WYCKOFF		COLE DIRECTORY	LONGMONT-BOULDER
2006	ZADEL AND ASSOCIATES REALTY INC		COLE DIRECTORY	LONGMONT-BOULDER

8134 COUNTY RD 13

2006	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER

8180 COUNTY RD 13

2006	SADDLEBACK GREPES AND GRIANS		COLE DIRECTORY	LONGMONT-BOULDER

8196 COUNTY RD 13

2006	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2006	CARIBBEAN TAN INC	N6	COLE DIRECTORY	LONGMONT-BOULDER
2006	CURVES FOR WOMEN	N5	COLE DIRECTORY	LONGMONT-BOULDER
2006	MJ MORRELL INC	N5	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUBWAY FIRESTONE		COLE DIRECTORY	LONGMONT-BOULDER
2006	VIDEO PLUS		COLE DIRECTORY	LONGMONT-BOULDER

9031 COUNTY RD 13

2021	CLEVER TECHNOLOGY INC		INFOUSA	NORTH WEST
2021	CLEVER LARRY		INFOUSA	NORTH WEST
2016	CLEVER TECHNOLOGY INC		INFOUSA	NORTH WEST
2016	CLEVER LARRY		INFOUSA	NORTH WEST
2011	LARRY CURTIS CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SUSAN W CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	CLEVER TECHNOLOGY INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	LARRY CURTIS CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	SUSAN W CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	CLEVER TECHNOLOGY INC		COLE DIRECTORY	LONGMONT-BOULDER
2001	LARRY CLEVER		COLE DIRECTORY	LONGMONT-BOULDER

9340 COUNTY RD 13

2021	KOSTELECKY DUANE		INFOUSA	NORTH WEST
2016	CLOWES PATRICK		INFOUSA	NORTH WEST
2016	KOSTELECKY DUANE		INFOUSA	NORTH WEST
2011	HEARST JAMES PRESSLY		COLE DIRECTORY	LONGMONT-BOULDER

2011	NANCY ANN PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2006	HEARST J PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2006	NANCY A PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2001	HEARST PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER

9350 COUNTY RD 13

2016	JAQUISH JENNIFER	INFOUSA	NORTH WEST
2011	BERINIKAY K BEITZEL	COLE DIRECTORY	LONGMONT-BOULDER
2011	DONALD J BEITZEL	COLE DIRECTORY	LONGMONT-BOULDER
2006	FOREST E MCCONNELL	COLE DIRECTORY	LONGMONT-BOULDER
2006	JACQUELINE K MCCONNELL	COLE DIRECTORY	LONGMONT-BOULDER
2006	TRANSCRIBE PRO	COLE DIRECTORY	LONGMONT-BOULDER

9480 COUNTY RD 13

2021	FUERST JORDAN	INFOUSA	NORTH WEST
2016	FUERST JORDAN	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	DONNA MARIA PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN J PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER

9501 COUNTY RD 13

2021	PAYTON HARLIN II	INFOUSA	NORTH WEST
2021	ZRIMSEK SANDRA	INFOUSA	NORTH WEST
2016	RECYCLED AUDIO INC	INFOUSA	NORTH WEST
2016	SAMUEL JOSHUA	INFOUSA	NORTH WEST
2011	RECYCLED AUDIO INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	RECYCLED AUDIO INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOSHUA MOSES SAMUEL	COLE DIRECTORY	LONGMONT-BOULDER

2001	ITA CORTALE	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOSHUA SAMUEL	COLE DIRECTORY	LONGMONT-BOULDER

9661 COUNTY RD 13

2021	KINNEY WILLIAM	INFOUSA	NORTH WEST
2016	KINNEY WILLIAM	INFOUSA	NORTH WEST
2011	MARY JANE KINNEY	COLE DIRECTORY	LONGMONT-BOULDER
2011	WILLIAM E KINNEY	COLE DIRECTORY	LONGMONT-BOULDER
2006	WAYNE R POUND	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

9703 COUNTY RD 13

2021	MINNER JOSIAH	INFOUSA	NORTH WEST
2016	DURKIN JOHN JR	INFOUSA	NORTH WEST
2011	MICHELLE A JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2011	STEPHEN THOMAS JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2006	MICHELLE A JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEPHEN THOMAS JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

9783 COUNTY RD 13

2021	MAESTAS MATTHEW	INFOUSA	NORTH WEST
2021	MUMBY MARY	INFOUSA	NORTH WEST
2016	MAESTAS MATTHEW	INFOUSA	NORTH WEST
2011	DESERIE DAWN IARUSSI	COLE DIRECTORY	LONGMONT-BOULDER
2011	KEVIN J IARUSSI	COLE DIRECTORY	LONGMONT-BOULDER
2006	BETTY L VENO	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN T VENO	COLE DIRECTORY	LONGMONT-BOULDER

2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	X [COUNTY ROAD 22 INTS]	COLE DIRECTORY	LONGMONT-BOULDER

9815 COUNTY RD 13

2021	MOORE GERALD	INFOUSA	NORTH WEST
2016	MOORE GERALD	INFOUSA	NORTH WEST
2011	CAROLINE M MOORE	COLE DIRECTORY	LONGMONT-BOULDER
2011	GERALD WAYNE MOORE SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	CAROLINE M MOORE	COLE DIRECTORY	LONGMONT-BOULDER
2006	GERALD WAYNE MOORE SR	COLE DIRECTORY	LONGMONT-BOULDER

9943 COUNTY RD 13

2021	BROOKER KEN	INFOUSA	NORTH WEST
2021	KEN'S PAINT & BODY SHOP	INFOUSA	NORTH WEST
2016	BROOKER KEN	INFOUSA	NORTH WEST
2011	KENNETH T BROOKER	COLE DIRECTORY	LONGMONT-BOULDER
2011	SANDRA KAY BROOKER	COLE DIRECTORY	LONGMONT-BOULDER
2011	KENS PAINT AND BODY SHOP	COLE DIRECTORY	LONGMONT-BOULDER
2006	KENS PAINT AND BODY SHOP	COLE DIRECTORY	LONGMONT-BOULDER
2001	KENS PNT&BODY SHP	COLE DIRECTORY	LONGMONT-BOULDER
2001	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER

10141 COUNTY RD 13

2021	PAT C GREYHOUND KENNEL INC	INFOUSA	NORTH WEST
2021	COLLINS PATRICK	INFOUSA	NORTH WEST
2016	PAT C GREYHOUND KENNEL INC	INFOUSA	NORTH WEST
2016	COLLINS PATRICK	INFOUSA	NORTH WEST
2011	LENORA B COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2011	PATRICK L COLLINS	COLE DIRECTORY	LONGMONT-BOULDER

2011	X [BOOTH DR INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	LENORA B COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	PATRICK L COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

Comment:

City Directory Target Property Address

Target Property:

Colorado Blvd,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

Colorado Blvd, Longmont, CO 80504

1 COLORADO BLVD

2021	STREET BEGINS		INFOUSA	NORTH WEST
2019	STREET BEGINS		INFOUSA	NORTH WEST
2014	STREET BEGINS		INFOUSA	NORTH WEST
2011	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET NOT LISTED		COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET NOT LISTED		COLE DIRECTORY	LONGMONT

7133 COLORADO BLVD

2021	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2021	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2019	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2019	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2014	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]		INFOUSA	NORTH WEST

8080 COLORADO BLVD

2011	PREMIER MEMBERS FEDERAL CREDIT UNION		COLE DIRECTORY	LONGMONT-BOULDER

8110 COLORADO BLVD

2011	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2011	CARBON VALLEY EYE CARE		COLE DIRECTORY	LONGMONT-BOULDER
2011	GREAT CLIPS	S3	COLE DIRECTORY	LONGMONT-BOULDER
2011	TIP TOE NAILS		COLE DIRECTORY	LONGMONT-BOULDER
2011	WAH WOK CHINESE FOOD		COLE DIRECTORY	LONGMONT-BOULDER

8132 COLORADO BLVD

2011	0001 ALL KINGS LOCKSMITH		COLE DIRECTORY	LONGMONT-BOULDER

8134 COLORADO BLVD

2011	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER
2011	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER

City Directory Target Property Address

Colorado Blvd, Longmont, CO 80504

8196 COLORADO BLVD

2011	AAA COLORADO LOCKSMITH		COLE DIRECTORY	LONGMONT-BOULDER
2011	CHOCHOS		COLE DIRECTORY	LONGMONT-BOULDER
2011	LIQUOR CARBON VALLEY LIQUOR		COLE DIRECTORY	LONGMONT-BOULDER
2011	LONGS PEAK DENTAL		COLE DIRECTORY	LONGMONT-BOULDER
2011	NEAT REPEATS THRIFT AND GIFT		COLE DIRECTORY	LONGMONT-BOULDER
2011	SUBWAY SANDWICHES		COLE DIRECTORY	LONGMONT-BOULDER

8252 COLORADO BLVD

2011	ACE HARDWARE		COLE DIRECTORY	LONGMONT-BOULDER

8308 COLORADO BLVD

2011	ADAMS BANK & TRUST		COLE DIRECTORY	LONGMONT-BOULDER
2011	CARDINAL HEALTH		COLE DIRECTORY	LONGMONT-BOULDER
2011	FLANNAGAN CLINT R MD		COLE DIRECTORY	LONGMONT-BOULDER
2011	NORTH VISTA MEDICAL CENTER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SMITH DANIEL ATTORNEY		COLE DIRECTORY	LONGMONT-BOULDER
2011	TUSEK DAVID MD		COLE DIRECTORY	LONGMONT-BOULDER

8350 COLORADO BLVD

2011	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2011	BLACK JACK PIZZA		COLE DIRECTORY	LONGMONT-BOULDER
2011	DAIRY QUEEN	190	COLE DIRECTORY	LONGMONT-BOULDER
2011	EDWARD JONES FINANCIAL ADVISOR BR	130	COLE DIRECTORY	LONGMONT-BOULDER
2011	EMERGENCY LOCKSMITH 24 HOUR		COLE DIRECTORY	LONGMONT-BOULDER
2011	SNAP FITNESS	150	COLE DIRECTORY	LONGMONT-BOULDER

10925 COLORADO BLVD			
2011	AUTOZONE	COLE DIRECTORY	LONGMONT-BOULDER
11040 COLORADO BLVD			
2011	CHASE	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER

Comment: Listed in Longmont and Firestone.

City Directory Target Property Address

Target Property:

County Rd 20,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

County Rd 20, Longmont, CO 80504

1 COUNTY RD 20			
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT
1989-90	STREET NOT LISTED	US WEST	BOULDER - LONGMONT
2832 COUNTY RD 20			
2021	COLCLASURE JACE	INFOUSA	NORTH WEST
2910 COUNTY RD 20			
2011	BETTY R MEYER	COLE DIRECTORY	LONGMONT-BOULDER
2011	WALLACE HARDIN MEYER	COLE DIRECTORY	LONGMONT-BOULDER
5830 COUNTY RD 20			
2006	JOSHUA GOODMAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	FINLEY JCK MSNG	COLE DIRECTORY	LONGMONT-BOULDER
6071 COUNTY RD 20			
2021	DUSO PEGGY	INFOUSA	NORTH WEST
2021	HARRISON TAFFYETTE	INFOUSA	NORTH WEST
2016	DUSO LAWRENCE SR	INFOUSA	NORTH WEST
2016	HARRISON TAFFYETTE	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	REBECCA A LYALL	COLE DIRECTORY	LONGMONT-BOULDER
2001	C CONGER	COLE DIRECTORY	LONGMONT-BOULDER
6073 COUNTY RD 20			
2021	GLEIM MARCY	INFOUSA	NORTH WEST
2021	KNOLLENBERG MARGARET	INFOUSA	NORTH WEST
2021	SELLERS MILLY	INFOUSA	NORTH WEST
2016	GLEIM JASON	INFOUSA	NORTH WEST
2011	WAYNE VANHEUSDEN	COLE DIRECTORY	LONGMONT-BOULDER
6075 COUNTY RD 20			
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

6077 COUNTY RD 20

2006	JOHN PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOHN PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER

6099 COUNTY RD 20

2021	NOFSINGER KAREN	INFOUSA	NORTH WEST
2021	TYMOEZKO DARRELL	INFOUSA	NORTH WEST
2011	LARRY OTIS FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2011	RICHARD L FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2006	LARRY OTIS FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2006	RICHARD L FULTON	COLE DIRECTORY	LONGMONT-BOULDER

6171 COUNTY RD 20

2021	COAL RIDGE ANIMAL HOSPITAL	INFOUSA	NORTH WEST
2016	COAL RIDGE ANIMAL HOSPITAL	INFOUSA	NORTH WEST
2011	COAL RIDGE ANIMALS HOSPITAL	COLE DIRECTORY	LONGMONT-BOULDER
2006	COAL RIDGE KENNELS	COLE DIRECTORY	LONGMONT-BOULDER

6173 COUNTY RD 20

2021	KNUDSON KURT	INFOUSA	NORTH WEST
2016	KNUDSON KURT	INFOUSA	NORTH WEST
2011	ANITA ROSE KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	KUSRT E KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	ANITA ROSE KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	KURT E JNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	KURT KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER

6247 COUNTY RD 20

2021	OCONNOR DANIEL	INFOUSA	NORTH WEST

2016	OCONNOR DANIEL	INFOUSA	NORTH WEST
2011	DANIEL J OCONNOR	COLE DIRECTORY	LONGMONT-BOULDER
2011	KAREN LAVON OCONNOR	COLE DIRECTORY	LONGMONT-BOULDER

6251 COUNTY RD 20

2021	BEILAND KEVIN	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	CARL MSMITH	COLE DIRECTORY	LONGMONT-BOULDER

6261 COUNTY RD 20

2011	JOHN ARTHUR KANE	COLE DIRECTORY	LONGMONT-BOULDER
2011	TRACY LEIGH KANE	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN ARTHUR KANE	COLE DIRECTORY	LONGMONT-BOULDER
2006	TRACY LEIGH KANE	COLE DIRECTORY	LONGMONT-BOULDER

6271 COUNTY RD 20

2021	COOPER WALTER	INFOUSA	NORTH WEST
2016	COOPER WALTER	INFOUSA	NORTH WEST
2011	DEBORAH PETTIBONE COOPER	COLE DIRECTORY	LONGMONT-BOULDER
2011	WALTER LOUIS COOPER	COLE DIRECTORY	LONGMONT-BOULDER
2006	BRAIN J FAZIO JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	KAREN M FAZIO	COLE DIRECTORY	LONGMONT-BOULDER
2006	WOODSMITH CONSTRUCTION	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

6291 COUNTY RD 20

2021	LAM CRAIG	INFOUSA	NORTH WEST
2011	JERALD D KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
2011	HARRIET OPAL KLINETOBE	COLE DIRECTORY	LONGMONT-BOULDER

2006	HARRIET OPAL KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
2006	JERALD D KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
6297 COUNTY RD 20			
2021	CONIFF JEFFREY	INFOUSA	NORTH WEST
6325 COUNTY RD 20			
2021	GRAY JENNIFER	INFOUSA	NORTH WEST
2021	PENNER SAMUEL	INFOUSA	NORTH WEST
2016	FUCHS CHRISTOPHER	INFOUSA	NORTH WEST
2011	BERNA M BRYAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	BERNA M BRYAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
6343 COUNTY RD 20			
2021	RICH KEVIN	INFOUSA	NORTH WEST
6363 COUNTY RD 20			
2021	DVORAK KATHERINE	INFOUSA	NORTH WEST
2016	DVORAK KATHERINE	INFOUSA	NORTH WEST
2011	KATHERINE M DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
2011	ROBERT J DOVRAK	COLE DIRECTORY	LONGMONT-BOULDER
2006	KATHERINE M DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
2006	ROBERT J DOVRAK	COLE DIRECTORY	LONGMONT-BOULDER
2001	ROBERT DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
6395 COUNTY RD 20			
2011	JENNIFER S ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER
2011	LOWELL M ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER
2006	LOWELL M ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER

City Directory Target Property Address

County Rd 20, Longmont, CO 80504

6399 COUNTY RD 20

2021	CLEMMER JAMES	INFOUSA	NORTH WEST
2016	CLEMMER JAMES	INFOUSA	NORTH WEST
2001	MIKE BLUE	COLE DIRECTORY	LONGMONT-BOULDER

Comment:

Appendix G: Site Photographs



Photograph 1. Center of Project Area.



Photograph 2. Center of Project Area.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Ephemeral drainage area intersecting the Project Area. No wetlands are present within the Project Area.

Section 10

Cultural Assessment

The cultural assessment is included in the Phase I Environmental Study in Section 9

Section 11

Lighting Plan

Lighting Mitigation Plan

For



KerrMcGee

Kerr McGee Oil & Gas Onshore LP

McGavin 6-19 HZ

Project Number: 21010

Originators:	D. Nowicki / L. Ohl	Date	6-3-21
Project Engineer Approval:	D. Nowicki	Date	6-3-21
Project Manager Approval:	B. Primeaux	Date	6-3-21
Client Approval:		Date	

Rev. No.	By	Revisions	Approval	Date
0	DN/LO	Issued for Attachment for Permit	BP	6-14-21
1	DN/LO	Issued for Attachment for Permit	BP	6-30-21

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1.0 EXECUTIVE SUMMARY

Kerr McGee Oil & Gas Onshore LP commissioned Samuel Engineering to develop a lighting mitigation plan for the McGavin 6-19 HZ pad site. The purpose of this report is to demonstrate compliance with the various State and Local lighting regulations, predict lighting impacts for the different development phases, and to detail the various lighting mitigation techniques used to limit light pollution.

Specially, the key points of the study are:

- Demonstrate compliance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 424.
- Identify the light level impacts associated with each phase of the facility operations on surrounding buildings.
- Demonstrate compliance with the total lighting used based on site working surfaces.
- Demonstrate the various lighting mitigation techniques that were implemented.

Site specific three-dimensional lighting models were developed for each of the phases to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems.

The following Table 1.0 summarizes the calculated maximum values compared to the regulatory limits:

Calculated Lighting Values and Regulatory Limits Summary			
	Calculated Value	**Regulatory Limit**	**Code Reference**
Max. Light Impact on Surrounding Building	1.6 lux	≤ 4.0 lux	*COGCC 424.f*
Pre-Production – Drilling Phase (Lumens / Hardscape)	5.3 lm/ft²	≤ 12 lm/ft²	
Pre-Production – Completions Phase (Lumens / Hardscape)	9.2 lm/ft²	≤ 12 lm/ft²	
Production (Lumens / Hardscape)	< 0.1 lm/ft²	≤ 2.5 lm/ft²	*COGCCC Rule 424.d.(2) for Agricultural/Commercial*

Table 1.0 - Calculated Lighting Values and Regulatory Limits

All calculated values are within prescribed regulatory limits.

2.0 INTRODUCTION AND DEFINITION OF TECHNICAL TERMS

2.1 INTRODUCTION

Light mitigation plans seek to quantify and prescribe methods to address the negative effects of multiple forms of light pollution. Effective lighting mitigation plans address light pollution by limiting the impacts on the surrounding communities, preserving the overall night-sky aesthetics, and maintaining existing ecosystems, all while maintaining a safe work environment.

There are a number of standards, best practices, and regulations which are used as guidelines when developing lighting plans for reducing the negative effects of artificial lighting. The applicable regulation used for this report is COGCC Rule 424.

2.2 DEFINITION OF TECHNICAL TERMS

A number of technical terms are used throughout this report and, as an aid to the reader, are defined below.

Illuminance (lx)

Illuminance is defined as the amount of light falling on a surface area. It is measured in Lux (lx). One lux is equal to one lumen per square meter. As an example, the photo in Figure 2.2 shows the lux levels decreasing on the sidewalk, as the distance from the light source increases.

Illuminance is often associated with values for lighting levels for safe operation in various standard codes. In addition, photometric plans are used to predict the illuminance on surfaces of an area to provide minimum lighting levels and for mitigation of light trespass into adjoining properties or areas. Most lighting meters units used today are in lux and used to measure these values at a given distance. It should be noted that the measured value is dependent on angle, sensitivity, and optics.

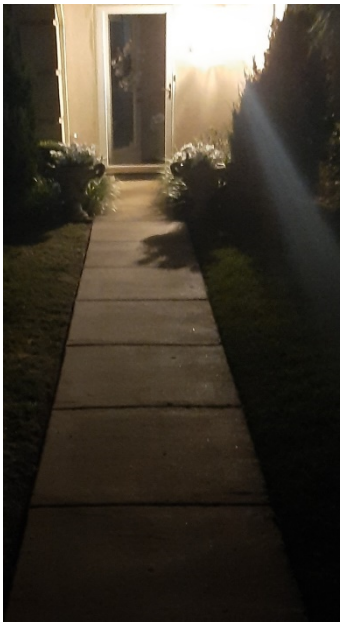


Figure 2.2–Illuminance (lx) level decreasing with distance from light source.

Table 2.2 below provides examples of typical Lux values.

Typical Lux Values	
Clear night, no moon:	0.002 lx
Clear night, full Moon:	0.27 to 1 lx
Family Living Room	50 lx
Sunrise/sunset	300-500 lx
Overcast day:	1000 lx
Daylight:	10,000-25,000 lx
Direct sunlight:	32,000-130,000 lx

Table 2.2 – Typical Lux Values

Luminous Flux(lm)

Luminous Flux is defined as the amount of light energy produced per unit time and is measured in Lumens (lm). It is a physical property of light and, in general terms, is a measurement of the total amount of light emanating from a source. It is important to note that the luminous flux value of a given source is independent of where a measurement is taken.

For example, a 60-watt light bulb produces approximately 800 lumens, regardless of if the measurement is taken at 1 foot, 10 miles, or 10,000 miles away from the source.

3.0 MODEL AND ANALYSIS DEVELOPMENT

Site-specific three-dimensional models were developed for each of the major project development phases. These phases are Pre-Production Drilling, Pre-Production Completions, and final Production. Elements incorporated into the models, among others, were the local site topographical information, major lighting obstructions (sound wall, large equipment, etc), individual luminaire lighting qualities, lighting mounting characteristics and surrounding building units.

The site geographical information was obtained using USGS topographical information to model the surrounding 1-mile landscape.

To determine the lighting impacts on local building units, 25-foot vertical walls were modeled at the units' locations, at the USGS identified elevations.

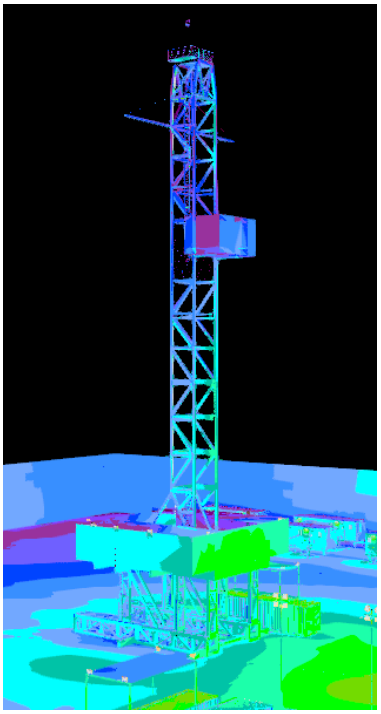


Figure 3.0–Screenshot from a representative 3-D model showing a false color rendering

Modeling of site-specific information (including large equipment, type of luminaire, and sound wall locations) were based on inspections of operational representative sites, provided vendor information, and research into various available lighting systems. The major pieces of equipment modeled included:

- Drilling: Drill rig floor, derrick, substructure, temporary lighting, sound barriers, backyard, and trailers.
- Completions: Temporary lighting, sound barriers, completion fleet equipment, and trailers.
- Production: LACT skids, separators, large tanks, and associated equipment.

Once site-specific topographical information and equipment were modeled, lighting characteristics were placed within the model. These characteristics were obtained from the various manufacturers and were specific to the make/model of the light to be used. The luminaires information included in the model were the type, quantity, mounting height, orientation, and tilt angle.

Models for each of the various project phases were developed in a similar manner and the resulting calculated lighting impacts were tabulated. An Excel spreadsheet was used to total the site lumens for each fixture and compared it to the site working pad surface (hardscape).

In the Pre-Production phases, temporary lighting fixtures were based on currently available rental units and on observations from representative sites. The temporary lighting system that will be used might vary based on rental availability at the time of procurement but is expected to be representative of the lumens values used in this analysis.

4.0 LIGHTING ANALYSIS RESULTS

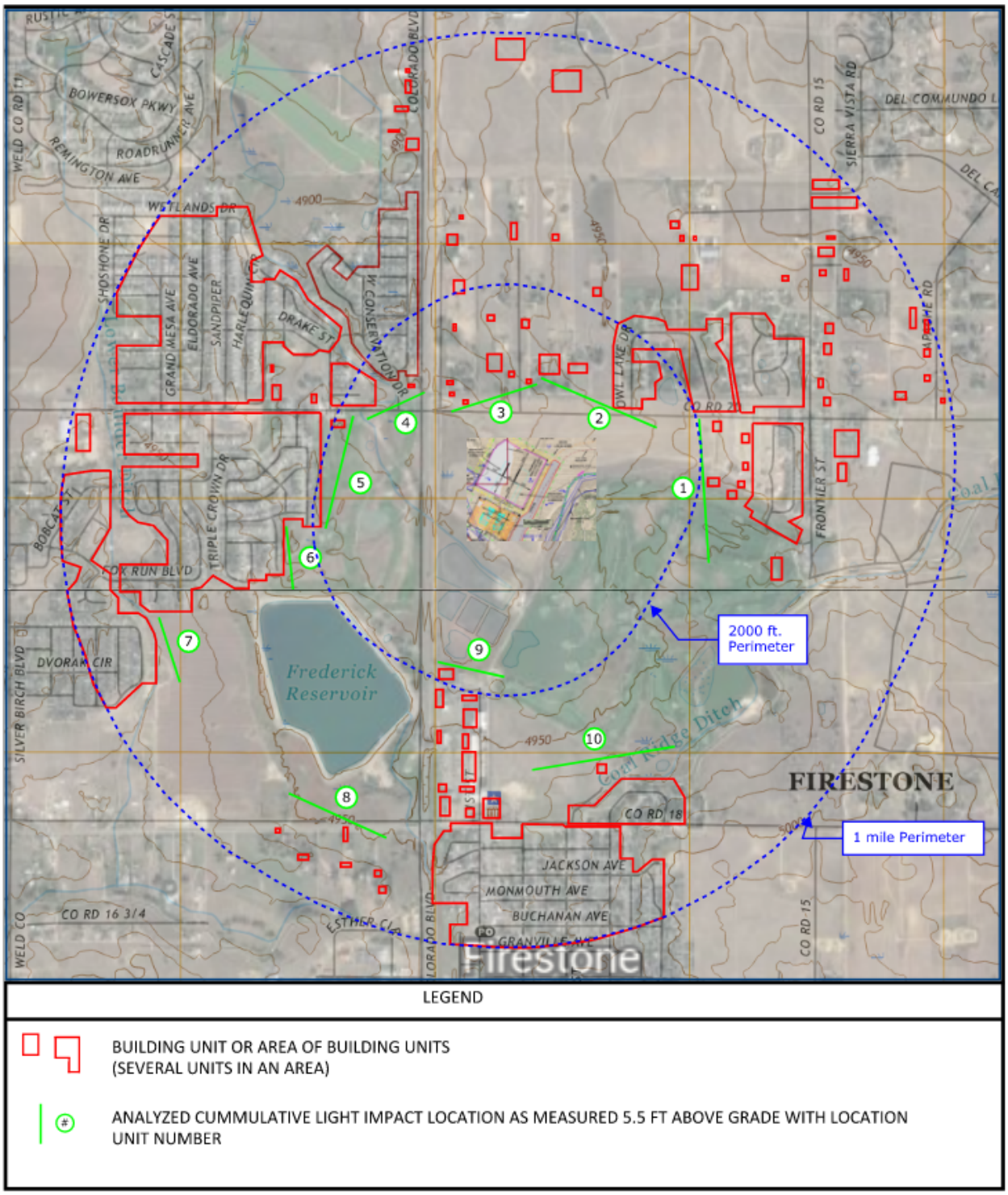
4.1 CUMULATIVE LIGHTING IMPACTS

Applicable Code Reference: COGCC Rule 424.f:
"Operators will develop site lighting to reduce cumulative nighttime light intensity from all Oil and Gas Facilities to 4 lux at any Residential Building Unit or High Occupancy Building Unit within 1 mile of any Oil and Gas Facility, measured at 5.5 feet above grade in a direct line of sight to the brightest light fixture onsite."

Due to the large number of building units located within the 1-mile radius of the site, buildings were grouped into clusters and a representative "wall" location was selected for analysis. These analyzed "wall" locations were selected to determine an upper cumulative light impact limit for that clustered group, considering the local topography, orientation, and distance to the site.

Figure 4.1 shows the building units that are located within a 1-mile radius of the McGavin 6-19 HZ site.

Figure 4.1 –Building Units Within a 1-Mile Radius of McGavin 6-19 HZ



Calculated Lighting Impact Results Building Units				
Location Unit No.	**Pre-Production Drilling**	**Pre-Production Completions (Single Crew)**	**Production**	**Regulatory Limit (COGCC 424.f)**
1	0.11 lux	0.32 Lux	< 0.1 lux	4 lux
2	1.6 lux	0.98 lux	< 0.1 lux	4 lux
3	1.1 lux	0.64 lux	< 0.1 lux	4 lux
4	0.12 lux	< 0.1 lux	< 0.1 lux	4 lux
5	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
6	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
7	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
10	< 0.1 lux	0.11 lux	< 0.1 lux	4 lux

Table 4.1 –Calculated Lighting Impact Results Building Units

Table 4.1 demonstrates compliance with COGCC Rule 424.f.

4.2 HARDSCAPE AND LUMEN LEVEL RESULTS

Lumens per Hardscape calculations were performed based on the number of exterior fixtures, light output (lumens) and the working pad surface (hardscape). These values were then compared to the regulatory allowed site lumens per square foot to demonstrate compliance.

4.2.1 PRE-PRODUCTION DRILLING LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Drilling Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	444,748 ft²	
Site Hardscape Acres:	10.21 Acres	
Site Total Lumens:	2,369,107 lm	See Section 5.2
Site Allowance Initial Lumens Total:	5,336,964 lm	
Calculated Site (Lumens / ft²):	5.3 lm/(ft²)	Construction Site is Verified

Table 4.2.1 –Pre-Production Drilling Operation Compliance Calculation

Based on the calculation shown in Table 4.2.1, the estimated site lighting during the Pre-Production Drilling operation phase is 5.3 lumens per square foot.

4.2.2 PRE-PRODUCTION COMPLETIONS LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Completions Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	444,748 ft²	
Site Hardscape Acres:	10.21 Acres	
Site Total Lumens:	4,082,512 lm	See Section 5.5
Site Allowance Initial Lumens Total:	5,336,964 lm	
Calculated Site (Lumens / ft²):	9.2 lm/(ft²)	Construction Site is Verified

Table 4.2.2 –Pre-Production Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.2, the estimated site lighting during the Pre-Production Completions operation phase is 9.2 lumens per square foot.

4.2.3 PRODUCTION LUMENS PER HARDSCAPE COMPLIANCE

Production Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	155,944 ft²	
Site Hardscape Acres:	3.58 Acres	
Site Total Lumens:	6,484 lm	See Section 5.6
Calculated Site Value:	< 0.1 lm/(ft²)	Production Site is Verified
Regulatory Allowed Limit:	2.5 lm/(ft²)	COGCC Rule 424.d.(2)

Table 4.2.3 –Pre-Production / Construction Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.3, the estimated site lighting during the Production operation phase is less than the regulatory maximum value and in compliance with COGCC Rule 424.d.(2) for Commercial/Agricultural.

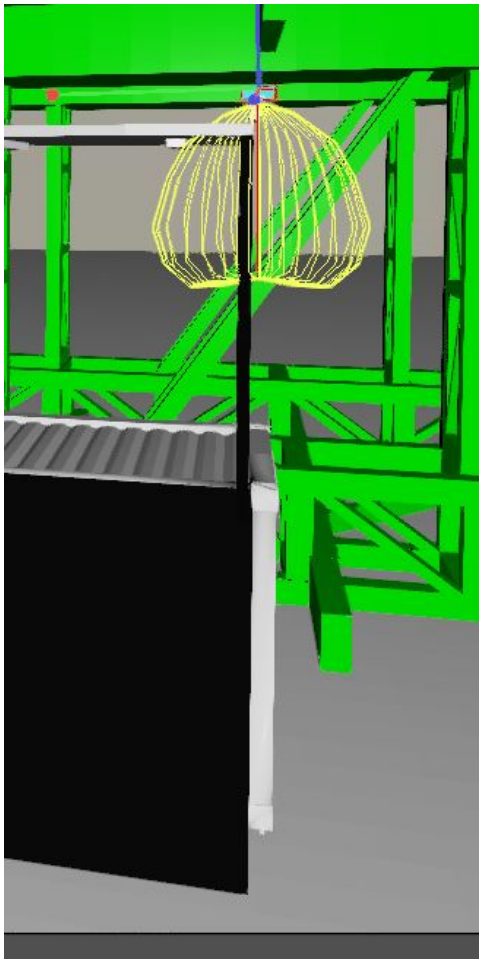
5.0 SITE LIGHTING POSITIONS AND ORIENTATION

5.1 SITE LIGHTING NOTES

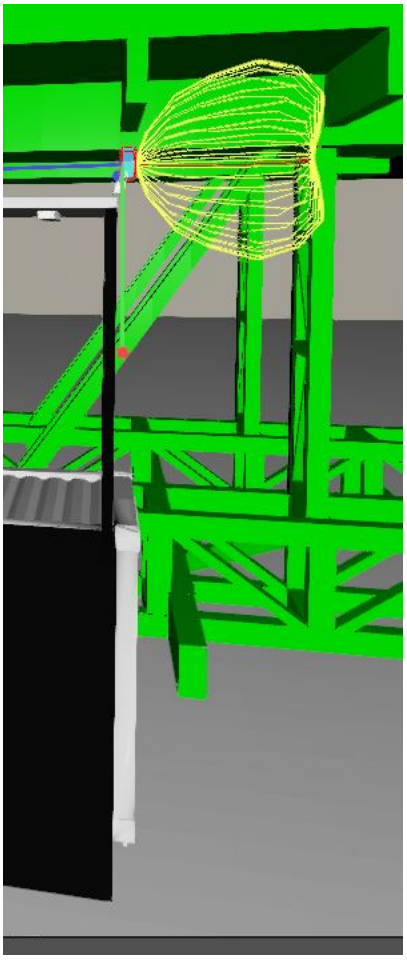
Applicable Code Reference: COGCC Rule 424(a)(2)(A)(ii)
Pertaining to Pre-Production activities: *"The proposed anticipated location, mounting, height, and orientation of all outdoor lighting fixtures on the site during pre-production activities"*

The following figures and tables in this section show the lighting location, mounting, height, and orientations for the Pre-Production Drilling, Completions, and Production Operations, in accordance with COGCC Rule 424(a)(2)(A)(ii). The following notes apply:

1) Stated tilt at zero (0) degrees represents a luminaire facing directly downward.



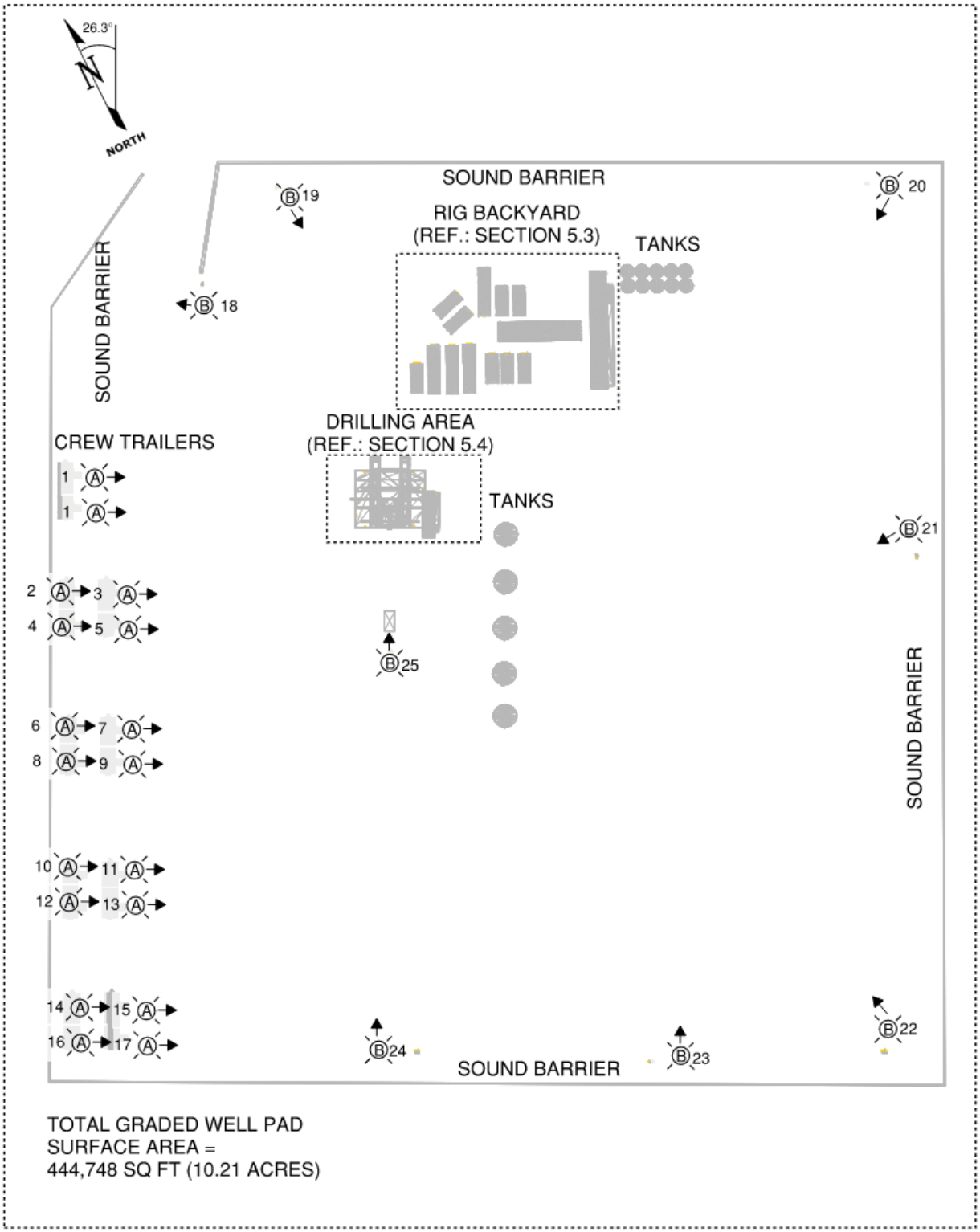
Example 0 degrees



Example 90 degrees

2) Intermittent sources of lights such as glow from on-site combustor and alarm lights are not included in this analysis.
3) Temporary lighting where necessary for safety reasons per COGCC 424.a.2.A.iii have not been modeled or accounted for in this analysis.
4) The quantity of lights and calculated values shown represents an estimated upper limit to the actual values that will be present on-site.
5) Refer to Attachment A for further lighting fixture information.

5.2 PRE-PRODUCTION - DRILLING SITE LAYOUT AND LUMINAIRE SCHEDULE



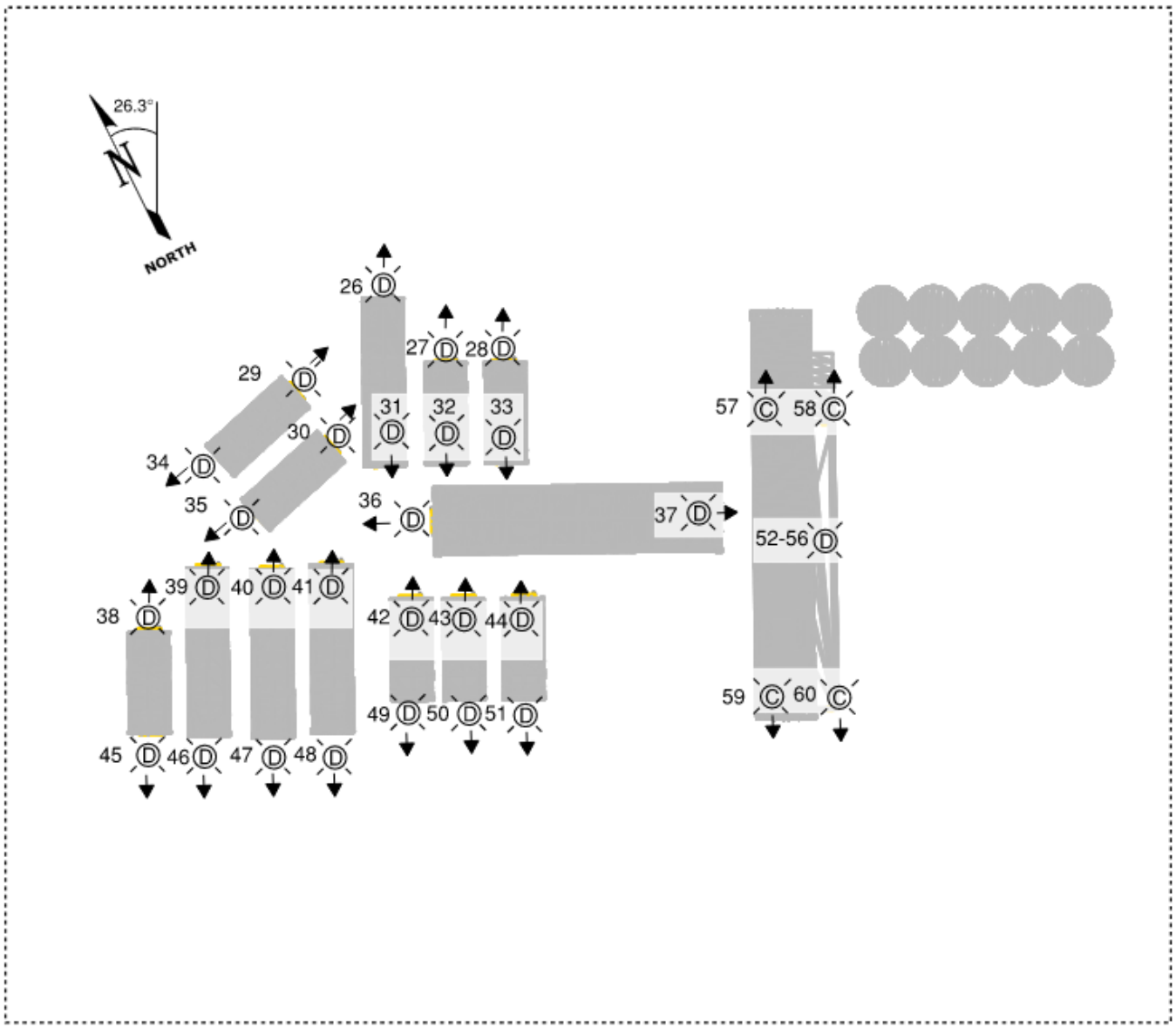
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – OVERALL PRE-PRODUCTION
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800 lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
1	11	90	A	5,800 lm
2	11	90	A	5,800 lm
3	11	90	A	5,800 lm
4	11	90	A	5,800 lm
5	11	90	A	5,800 lm
6	11	90	A	5,800 lm
7	11	90	A	5,800 lm
8	11	90	A	5,800 lm
9	11	90	A	5,800 lm
10	11	90	A	5,800 lm
11	11	90	A	5,800 lm
12	11	90	A	5,800 lm
13	11	90	A	5,800 lm
14	11	90	A	5,800 lm
15	11	90	A	5,800 lm
16	11	90	A	5,800 lm
17	11	90	A	5,800 lm
18	11	90	A	5,800 lm
19	30	75	B	213,648 lm
20	30	75	B	213,648 lm
21	30	75	B	213,648 lm
22	30	75	B	213,648 lm
23	30	75	B	213,648 lm
24	30	75	B	213,648 lm
25	30	75	B	213,648 lm

Total Lumens Calculation	
Subtotal Area Calculation:	1,599,936 lm
Total Section 5.3 Lumens:	332,553 lm
Total Section 5.4 Lumens:	436,618 lm
Total Area Lumens:	2,369,107 lm

5.3 PRE-PRODUCTION - DRILLING –RIG BACKYARD- SITE LAYOUT AND LUMINAIRE SCHEDULE



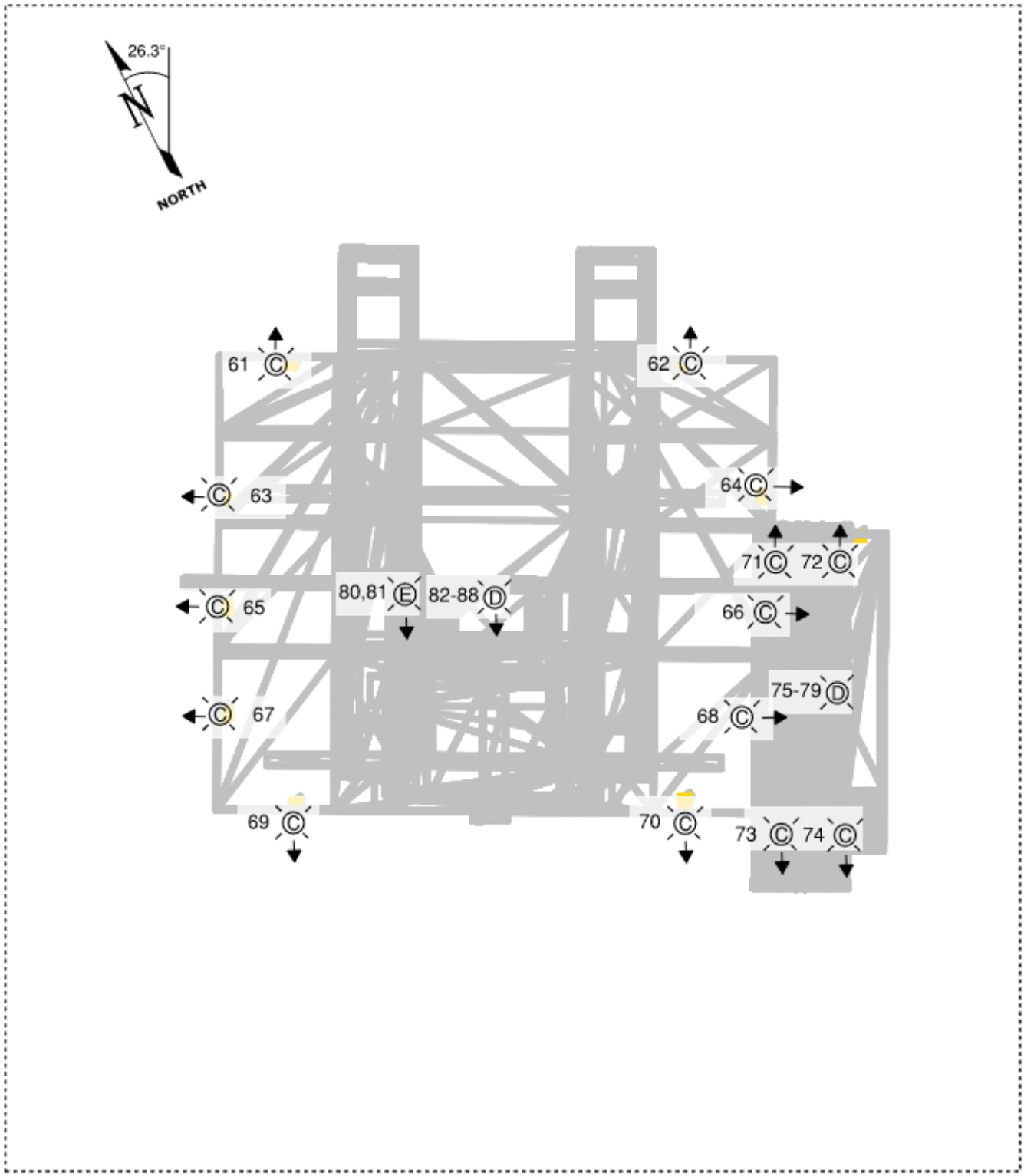
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – RIG BACKYARD
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091 lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
26	9	75	D	7,619 lm
27	9	75	D	7,619 lm
28	9	75	D	7,619 lm
29	9	75	D	7,619 lm
30	9	75	D	7,619 lm
31	9	75	D	7,619 lm
32	9	75	D	7,619 lm
33	9	75	D	7,619 lm
34	9	75	D	7,619 lm
35	9	75	D	7,619 lm
36	9	75	D	7,619 lm
37	9	75	D	7,619 lm
38	9	75	D	7,619 lm
39	9	75	D	7,619 lm
40	9	75	D	7,619 lm
41	9	75	D	7,619 lm
42	9	75	D	7,619 lm
43	9	75	D	7,619 lm
44	9	75	D	7,619 lm
45	9	75	D	7,619 lm
46	9	75	D	7,619 lm
47	9	75	D	7,619 lm
48	9	75	D	7,619 lm
49	9	75	D	7,619 lm
50	9	75	D	7,619 lm
51	9	75	D	7,619 lm
52	18	0	D	7,619 lm
53	18	0	D	7,619 lm
54	18	0	D	7,619 lm
55	18	0	D	7,619 lm
56	18	0	D	7,619 lm
57	20	75	C	24,091 lm
58	20	75	C	24,091 lm
59	20	75	C	24,091 lm
60	20	75	C	24,091 lm

Subtotal Lumens Calculation Section 5.3	
Subtotal Area Lumens:	**332,553 lm**

5.4 PRE-PRODUCTION - DRILLING –DRILL AREA - SITE LAYOUT AND LUMINAIRE SCHEDULE



LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – DRILL AREA

DRILLING OPERATIONS

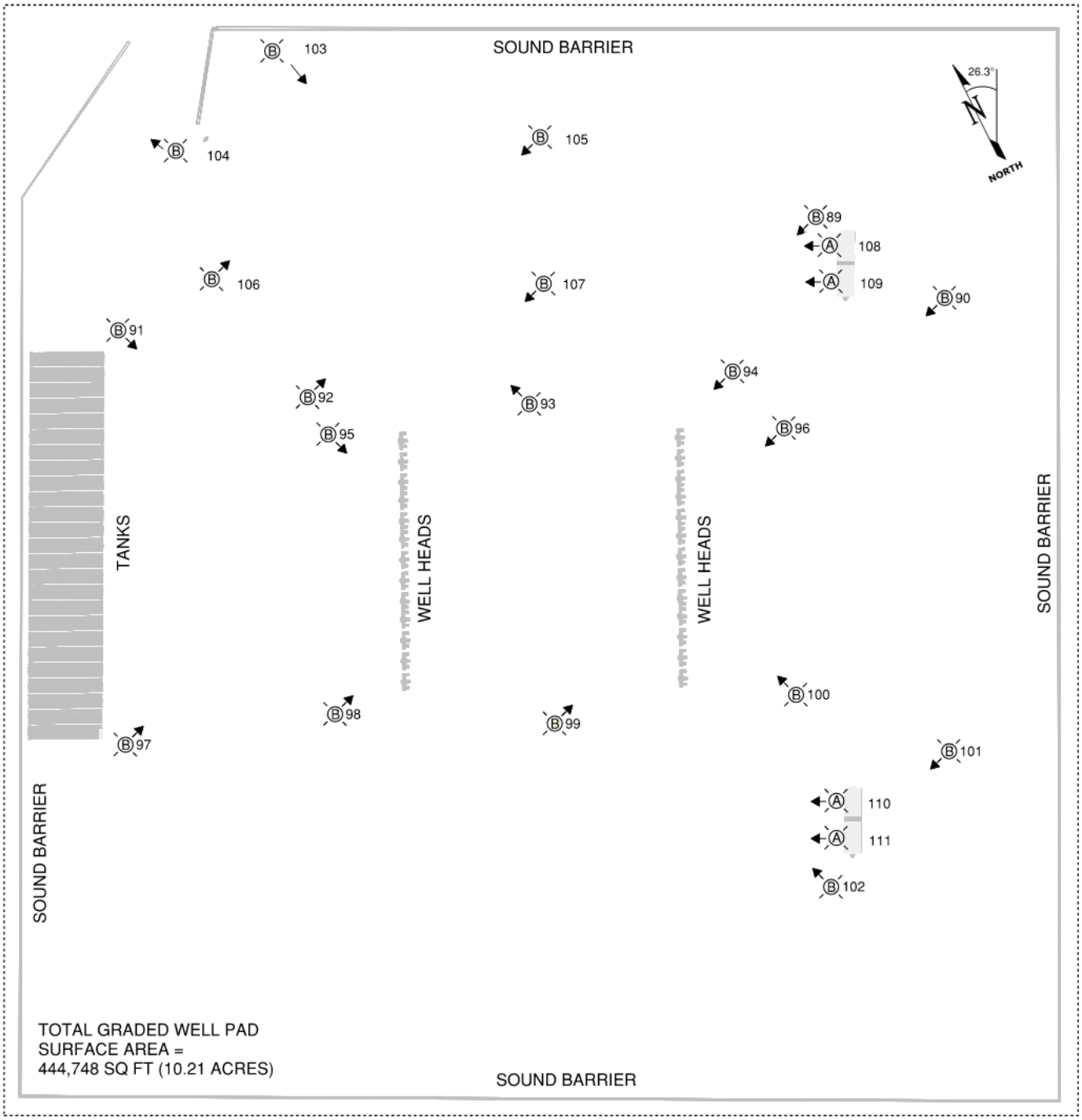
Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm
E	EATON – COOPER CROUSE HINDS	DLL2/UNV1S903	LED – 2FT LINEAR POLYCARBONATE	32 W	3,958 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
61	36	75	C	24,091 lm
62	36	75	C	24,091 lm
63	36	75	C	24,091 lm
64	36	75	C	24,091 lm
65	36	75	C	24,091 lm
66	36	75	C	24,091 lm
67	36	75	C	24,091 lm
68	36	75	C	24,091 lm
69	36	75	C	24,091 lm
70	36	75	C	24,091 lm
71	20	75	C	24,091 lm
72	20	75	C	24,091 lm
73	20	75	C	24,091 lm
74	20	75	C	24,091 lm
75	18	0	D	7,619 lm
76	18	0	D	7,619 lm
77	18	0	D	7,619 lm
78	18	0	D	7,619 lm
79	18	0	D	7,619 lm

Luminaire Position and Tilt *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
80	40	90	E	3,958 lm
81	167	90	E	3,958 lm
82	52	90	D	7,619 lm
83	61	90	D	7,619 lm
84	73	90	D	7,619 lm
85	82	90	D	7,619 lm
86	92	90	D	7,619 lm
87	149	90	D	7,619 lm
88	158	90	D	7,619 lm

Subtotal Lumens Calculation Section 5.4	
Subtotal Area Lumens:	436,618 lm

5.5 PRE-PRODUCTION - COMPLETIONS - SITE LAYOUT AND LUMINAIRE SCHEDULE



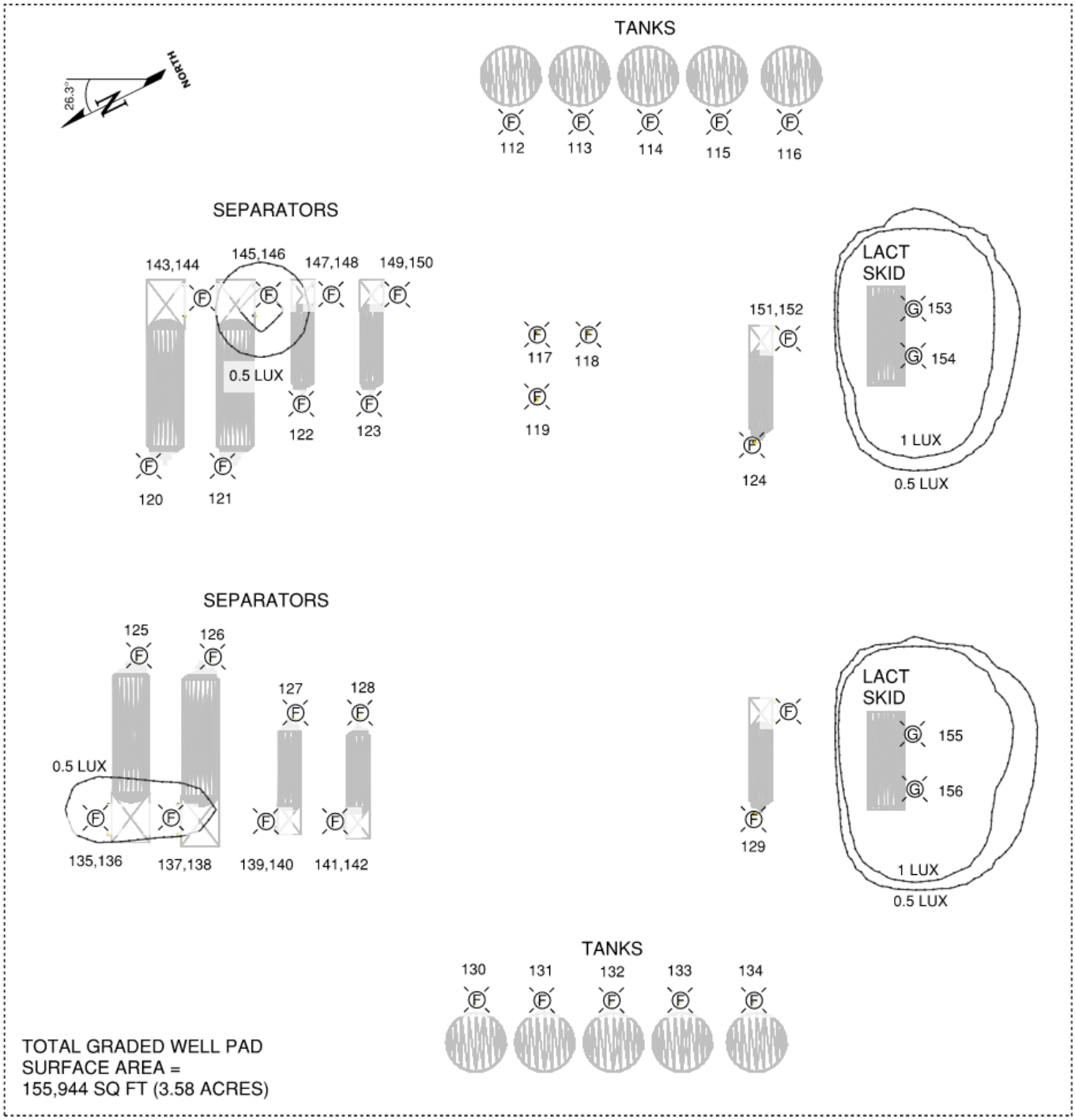
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – COMPLETIONS AREA
COMPLETIONS OPERATIONS

Luminaire Schedule Single Crew					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt Single Crew				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
89	30	75	B	213,648 lm
90	30	75	B	213,648 lm
91	30	75	B	213,648 lm
92	30	75	B	213,648 lm
93	30	75	B	213,648 lm
94	30	75	B	213,648 lm
95	30	75	B	213,648 lm
96	30	75	B	213,648 lm
97	30	75	B	213,648 lm
98	30	75	B	213,648 lm
99	30	75	B	213,648 lm
100	30	75	B	213,648 lm
101	30	75	B	213,648 lm
102	30	75	B	213,648 lm
103	30	75	B	213,648 lm
104	30	75	B	213,648 lm
105	30	75	B	213,648 lm
106	30	75	B	213,648 lm
107	30	75	B	213,648 lm
108	11	90	A	5,800 lm
109	11	90	A	5,800 lm
110	11	90	A	5,800 lm
111	11	90	A	5,800 lm

Total Lumens Calculation	
Total Area Lumens:	4,082,512 lm

5.6 PRODUCTION - SITE LAYOUT, LUMINAIRE SCHEDULE, AND PHOTOMETIC



LUMINAIRE LAYOUT& PHOTOMETRIC
MCGAVIN 6-19 HZ – PRODUCTION AREA
PRODUCTION OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
F	RAYCHEM	E-100	LED HEAT TRACE END SEAL KIT	2 W	60 lm
G	PHOENIX	CL	LED CUBE LIGHT	13 W	1006lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
112	4.5	180	F	60 lm
113	4.5	180	F	60 lm
114	4.5	180	F	60 lm
115	4.5	180	F	60 lm
116	4.5	180	F	60 lm
117	4.5	180	F	60 lm
118	4.5	180	F	60 lm
119	4.5	180	F	60 lm
120	4.5	180	F	60 lm
121	4.5	180	F	60 lm
122	4.5	180	F	60 lm
123	4.5	180	F	60 lm
124	4.5	180	F	60 lm
125	4.5	180	F	60 lm
126	4.5	180	F	60 lm
127	4.5	180	F	60 lm
128	4.5	180	F	60 lm
129	4.5	180	F	60 lm
130	4.5	180	F	60 lm
131	4.5	180	F	60 lm
132	4.5	180	F	60 lm
133	4.5	180	F	60 lm
134	4.5	180	F	60 lm
135	4.5	180	F	60 lm
136	4.5	180	F	60 lm
137	4.5	180	F	60 lm
138	4.5	180	F	60 lm
139	4.5	180	F	60 lm
140	4.5	180	F	60 lm
141	4.5	180	F	60 lm
142	4.5	180	F	60 lm
143	4.5	180	F	60 lm
144	4.5	180	F	60 lm
145	4.5	180	F	60 lm

Luminaire Position and Tilt - *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
146	4.5	180	F	60 lm
147	4.5	180	F	60 lm
148	4.5	180	F	60 lm
149	4.5	180	F	60 lm
150	4.5	180	F	60 lm
151	4.5	180	F	60 lm
152	4.5	180	F	60 lm
153	8.5	0	G	1,006 lm
154	8.5	0	G	1,006 lm
155	8.5	0	G	1,006 lm
156	8.5	0	G	1,006 lm

Total Lumens Calculation	
Total Area Lumens:	6484 lm

6.0 SITE MITIGATION NOTES AND BEST MANAGEMENT PRACTICES

The following mitigation notes and techniques apply:

1) To the extent possible, LED fixtures are used to reduce skyglow. This is based on the calculated results of the relative impact versus traditional lighting methods using DOE Skyglow comparison tool PNNL-SA-138348.

2) All lights have been positioned to point in a downward direction where vertical lighting is not required. Where it is required, lights are angled in a vertical direction to provide task lighting for safety and operations involving personnel.

3) Luminaire Type E and D used on the Derrick mast in Section 5.4 are facing horizontally to provide adequate lighting for safe operations.

4) To the extent possible, design considerations have been made regarding the type of light fixtures used, quantity, and positioning to reduce various forms of lighting pollution. Examples include:

   - Lighting is angled away from surrounding off site buildings.
   - Lighting within the Production area has been reduced to provide a minimum acceptable value for safe operations.
   - Light masts are automatically switched off/on based on lighting sensors.
   - Lights are switched off when not required.
   - Lights are directed to task areas only.
   - Low power (63W) LED lights are used for the drill rig.
   - Sound barriers are positioned to reduce lighting trespass to surrounding off-site buildings.
   - The calculated cumulative light impacts, as indicated in Section 4.1, on surrounding buildings within a one-mile radius area below 4 lux when measured 5.5 feet above grade.

5) Lighting Cut Sheet Notes for Attachment A

   1. Type A Fixtures
      - Type A fixtures are construction trailer lights. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. Lights varied significantly during site inspections. A representative model was selected based on a lumen output for a trailer.

   2. Type B fixtures
      - Type B fixtures are portable construction light towers with vertical masts. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. HP Winner M4 Model was selected for this analysis based on site inspections and current available units; however specific site units may vary based on time of construction. The model for these portable light towers consisted of a LED light source with 4 fixtures. Each of these fixtures were comprised of 4 LED modules mounted in a rectangular arrangement. The attached cut sheet for HP Winner represents 1 LED module. 16 total modules were modeled for each light mast.

- The typical light pole center of fixtures is raised approximately 30 feet from grade and pointed downward toward work area.

- The fixture mounting for portable light towers are articulated mountings which allows for both vertical and horizontal plane adjustments. For this analysis, the light mast fixtures were modeled at indicated angles.

3. Type F Fixtures
    - Type F Fixtures is an estimation of heat trace end kits. Photometric data from the manufacturer is not available. These lights are low power LED's mounted on the pipe where heat trace is installed. Mounting height, and location vary based on final design and installation.

7.0 ATTACHMENT

Attachment A – 21010 McGavin 6-19 HZ Lighting Fixture Cut Sheets Attachment

END OF REPORT

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Fax: 303-714-4800

ATTACHMENT A

FIXTURE CUT SHEETS TYPES A,B,C,D,E,F,G

LIGHTING MITIGATION PLAN

FOR

KERR MCGEE OIL & GAS ONSHORE LP

MCGAVIN 6-19 HZ

Project Number: 21010

Fixture Cut Sheet
Type A

STANPRO

Project: _____ Type: _____

Drawn by: _____ Catalogue #: _____ Date: _____

Series Spec Sheet

WPS GEN 4

CLASSIC WALL PACK

Selectable color temperature (3 000 K / 4 000 K / 5 000 K)[1]
Power selectable[1]
Integrated photocell[1]
Multi-Voltage (120-347 V)[1]

This wall pack series is a classic and familiar design integrated with modern LED technology to promote better energy efficiency and long life. Certain configurations come with integrated photocell, selectable power and/or selectable color temperature. It is best suited for entrances, underpasses or anywhere controlled security lighting is required, the series luminaire is a great addition to any commercial or industrial outdoor wall mount application. The tough die cast aluminum housing is moisture and dustproof. [1]



FEATURES AND SPECIFICATIONS

- **Construction**

  Housing
  - This luminaire is made of aluminum die cast and comes standard in a bronze powder coat finish.
  - The housing has four conduit entries of 1/2" on each sides and some of the configurations comes with a button type photocell that can be turned off by using the internal switch if needed.[1]

  Lens

  Prismatic tempered glass lens is standard in this product series.

- **Electrical**
  - The drivers allows an input voltage from 120-277 V or 120-347 V AC 50/60 Hz and are 0-10 V dimmable. They are coming with an onboard surge protection:
    - NS29: 2.5kV standard
    - NS40, NS60, NS80, PS40, PS100: 2kV standard
    - NS120: 4kV standard
  - This wall pack series is suitable for ambient temperature range of -40°C to +50°C. Available in color temperatures of 4 000 K, 5 000 K or 3CCT selectable (3 000/4 000/5 000 K) with a lumen per watt ratio of 140 lm/W to 152 lm/W depending on the lumen package.
  - The color temperature of the fixture is set by default at 4 000 K and can be changed on the field.

- **Compliances**
  - Wet location
  - IP65
  - Meets requirements of ICES-005 issue 5 for class B products
  - cULus
  - IK06
  - BC Hydro

OVERVIEW

Light source	LED
Watts (W)	25/30/40, 60/80/100 30, 40, 60, 80, 120
Lumens output (lm)	3 625 - 17 885
Efficiency (lm/W)	140 - 152
Color temperature (K)	3CCT (3 000/4 000/5 000) 4 000, 5 000
CRI	> 80

[1] Integrated photocell, multi-volt driver, CCT and Power selectable on some configurations. Consult Quick ship and technical specification table for more details.

5 yrs warranty

quick ship

LED fixture

power selectable [1]

3 CCT TCC [1]
3000 K / 4000 K / 5000 K

dimmable fixture

wet location

IP 65

ICES 005

IK06

DLC QPL LISTED PREMIUM

cULus

Not all products are qualified on the DLC QPL. To view our DLC qualified products, please consult the DLC Qualified Products List at www.designlights.org/search.

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STANPRO

QUICK SHIP AND TECHNICAL SPECIFICATION TABLE [1]

Order code	Model number	DLC unique ID	Watts (W)	Volts (V)	Color temp. (K)[2]	Lumen output (lm)[3]	Effi-ciency (lm/W)	Photo-cell[6]	CRI	Life L70 (hrs)[5]	Tested hours LM-80 (hrs)[5]	Calculated TM21 (hrs)[5]	Finish	Dim-ming	B.U.G.	LED current (mA)	Power factor	THD (%)	Case qty (master)
Power Select, CCT Select and Integrated Photocell[6]																			
68314	WPS-PS40-Q-3C	PLW61NEJG50K	25/30/40	120-347	3000/4000/5000	3875/4500/5800[4]	141	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	850	≥0.9	≤20	1
68315	WPS-PS100-Q-3C	PLE7PYF9LCSH	60/80/100	120-347	3000/4000/5000	9300/12000/14500[4]	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	2 100	≥0.9	≤20	1
Single Power, Single CCT and Integrated Photocell[6]																			
68524	WPS-NS30-W-40K/P127		29	120-277	4 000	4 200	150	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
68525	WPS-NS30-W-50K/P127		29	120-277	5 000	4 300	148	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
Single Power and Single CCT																			
68490	WPS-NS40-W-40K	PLVM09BUX07G	40	120-277	4 000	6 004	142	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68491	WPS-NS40-W-50K	PL3ULW7TEV5H	40	120-277	5 000	6 034	144	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68492	WPS-NS60-W-40K	PL6EFOUTBPWB	60	120-277	4 000	8 458	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68493	WPS-NS60-W-50K	PL01JETYSQ80	60	120-277	5 000	8 611	147	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68497	WPS-NS80-W-40K	PLVXL8TOP2UF	80	120-277	4 000	11 242	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
68498	WPS-NS80-W-50K	PL2AZJG3L0RQ	80	120-277	5 000	11 446	148	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
Single Power, CCT Select and Integrated Photocell[6]																			
68316	WPS-NS120-Q-3C	PLYRMZYS3AY3	120	120-277	3000/4000/5000	16 943	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B2U4G5	2 600	≥0.9	≤20	1

[1] **QUICK SHIP:** Product availability is subject to change without notice. Please contact your Stanpro customer service representative to confirm inventory levels at time of order.
[2] Typical color temperature range: +/- 5 %.
[3] Lumen values are derived from photometric testing. Initial lumens range: +/- 10 %.
[4] Lumen values are based on 4 000 K default settings. Please refer to Quick ship Technical Specification Table for more details on other color temperatures.
[5] Life hours are derived from IESNA LM-80-08 testing report and projected per IESNA TM-21-11 extrapolations.
[6] Integrated ON/OFF photocell that can be easily disabled.

ACCESSORIES (order separately)

Order code	Description
68370	18'' Bronze metal backplate
68371	Bronze glareshield
68372	Stainless Steel wireguard





ORDERING GUIDE

WPS — ____ — ____ — ____ — ____ / ____

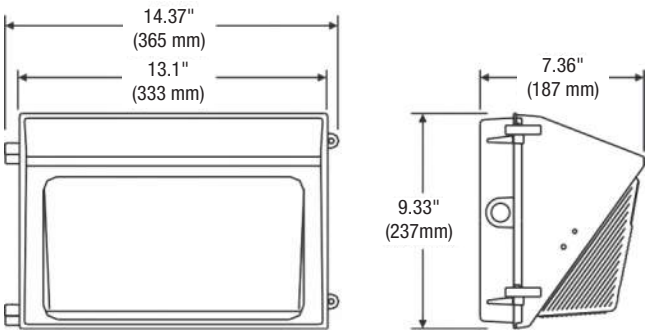
Series	Lumen package (W)	Volts (V)	Color temp. (K)	Casting color	Options
WPS	**PS40 -** 25/30/40 **PS100 -** 60/80/100 **NS120 -** 120	**Q -** 120-347	**3C -** 3 000/4 000/5 000	**BR -** Bronze (standard) **BK -** Black **WH -** White **SP-** Special color	**KV -** 10 kV surge Protection **PC -** Polycarbonate lens
	NS30 [1] **-** 29 **NS40 -** 40 **NS60 -** 60 **NS80 -** 80	**W -** 120-277	**40K -** 4 000 **50K -** 5 000		**KV -** 10 kV surge Protection **P127** [1] **-** Button type photocell 120-277 V **PC -** Polycarbonate lens

[1] Button type photocell 120-277 V comes standard with the ''NS30'' lumen package.

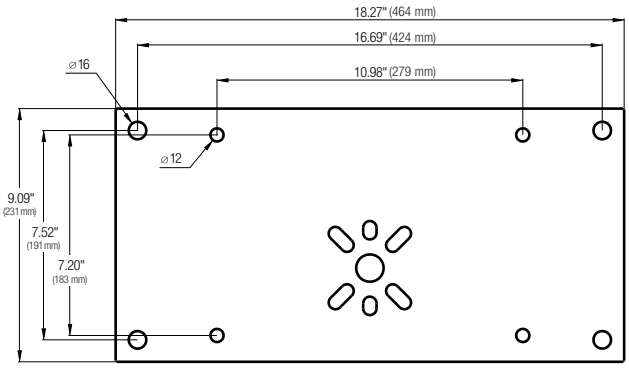
Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
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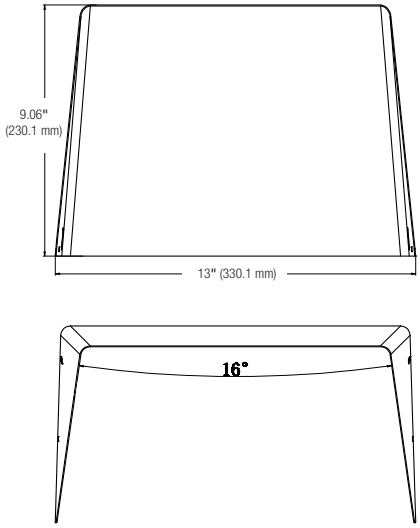
DIMENSIONS



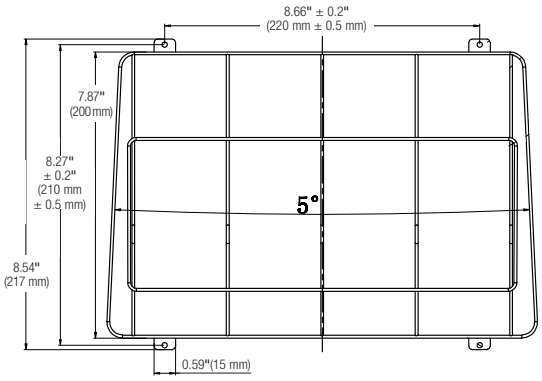
BACKPLATE



GLARESHIELD



WIREGUARD

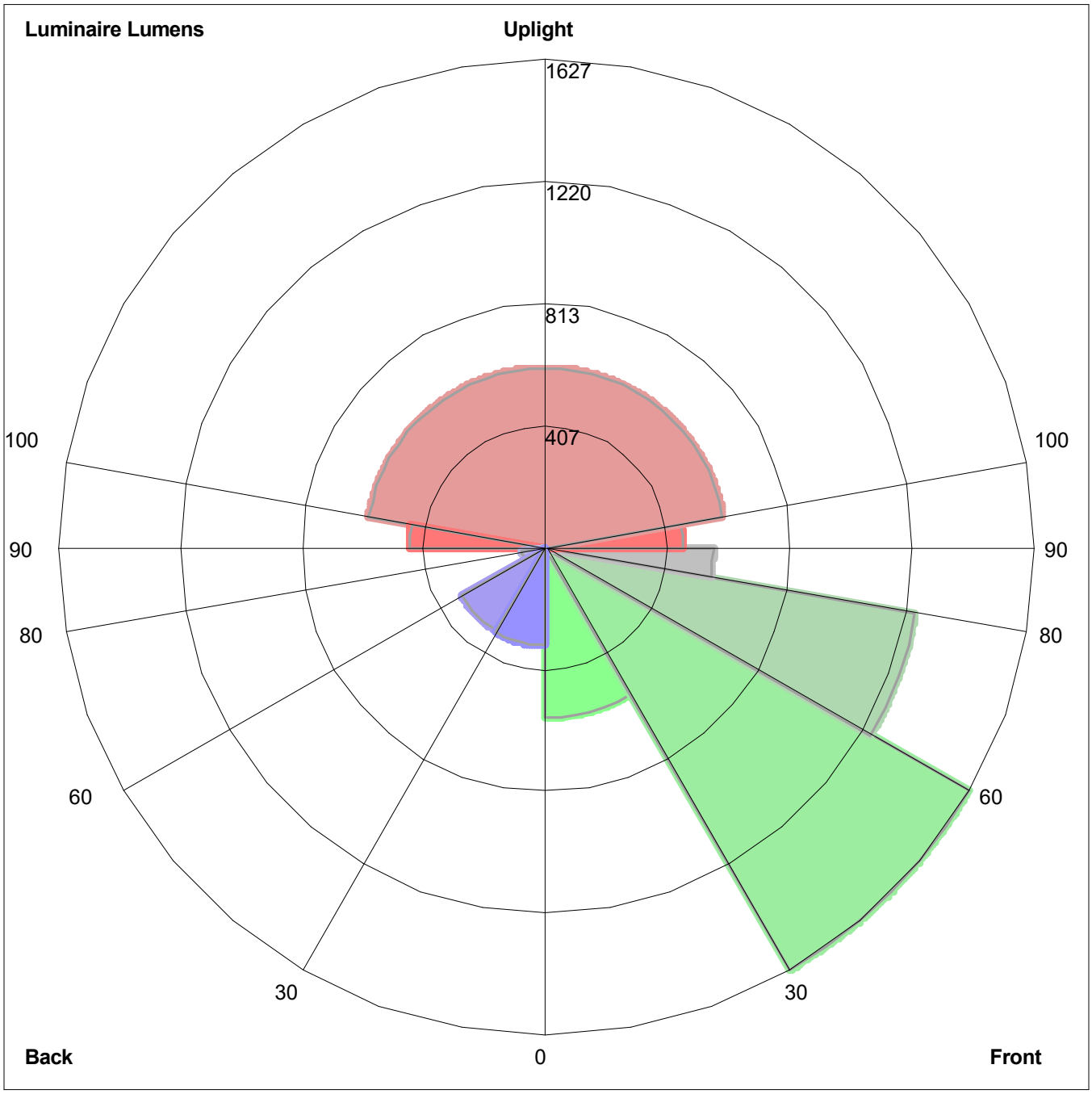


Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
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IES ROAD REPORT
PHOTOMETRIC FILENAME : WPS-PS40-Q-3C-40W-40K-68314.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=566.0, Medium=1626.5, High=1251.8, Very High=558.0
Back: Low=327.7, Medium=323.2, High=79.4, Very High=11.6
Uplight: Low=456.3, High=599.7

BUG Rating : B1-U4-G4

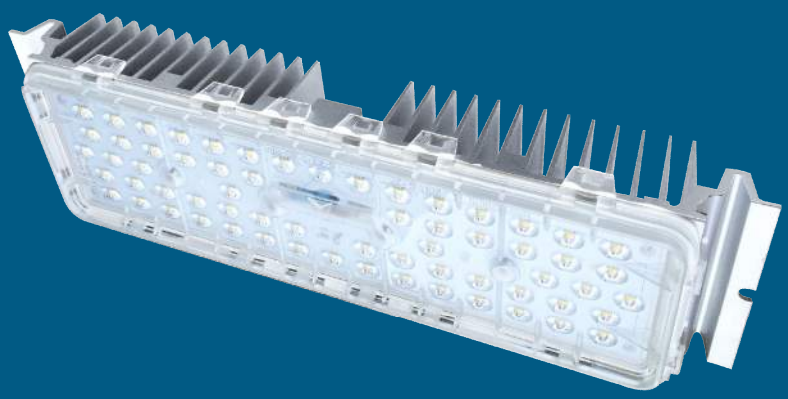
Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type B

Example Used



LED Module
M8B
Series



Specification

Working Environment: -40℃~+50℃

Storage Temperature: -40℃~+50℃

Relative humidity: 10%~90%RH

Typical value of pad temperature[1]: 70℃

IP Rating of LED Light Engine: IP68

Impact Protection Level: IK09

Color Temperature (CCT)[2]: 3000K, 4000K, 5000K, 5700K

Main Material: Aluminum 6063

Module N.W.: 0.67±0.04 kg

Note :

[1] Typical values of pad temperature is obtained based on 60W with a ambient temperature of 25℃.

[2] Efficacy of 3000K is 5% lower than other CCTs.

Features

- Lumileds Luxeon 3030;
- Super long lifetime(Lumen maintenance);
- Multiple lighting distributions available;
- Wide applicability for complex situations;
- High versatility apply for all sorts of lamps retrofit.

Application

- Street lighting retrofit and application;
- Factory lighting retrofit and application;
- Tunnel lighting retrofit and application;
- Sports lighting retrofit and application.

Ordering Information

For example: M8B-VCA-63 -1321-7040-LU

Module Model	Interface	Dimension of LEDS	Wire Material	LED Qty	Lens Model		Ra & CCT	LED Brand
M8B	**V:** V-shape Groove	**C:** 3030	**A:** CCC+VDE	**49** 49PCS	**1324** Type II Short	**1325** 25 DEG	**7030:** Ra≥70, 3000K	**LU:** Lumileds
			C: PSE	**63** 63PCS	**2322** Type II Short (V)	**2360** 60 DEG	**8040:** Ra≥80, 4000K	**SN:** Sanan
			H: UL		**5321** Type II Short	**5340** 40 DEG	...	**XX:** Others
			X: Others		**2321** Type II Short	**5390** 90 DEG		
					1321 Type III Medium	**1310** Lambert Type		
						1390 Tunnel Lighting		

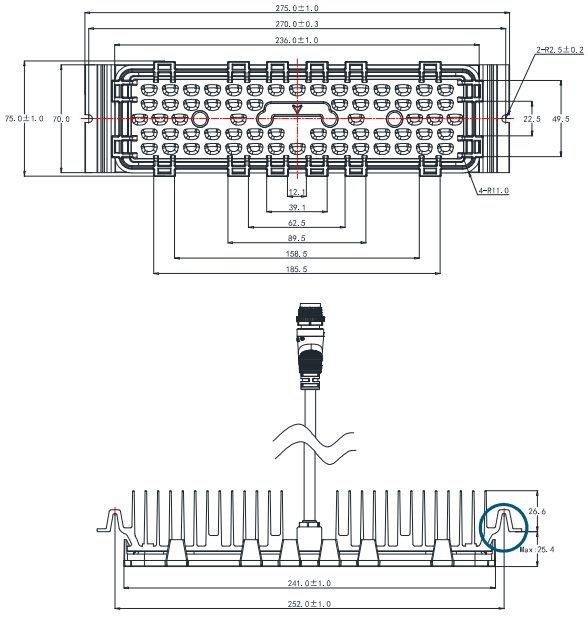
Performance

Model	Power (W)	Driving current (mA)	Input voltage (Vdc)	Efficacy (lm/W)	Lumens (lm)
M8B-VCA-63	40	700	48~61	140	5600
M8B-VCA-49	50	1050	38~48	127	6350
M8B-VCA-63	50	860	48~61	135	6750
M8B-VCA-63	60	1050	48~61	127	7620

Note : Values shown are subject to ±5%~±8% tolerance; Cable default A type;

Efficacy above is based on calculated @92% power efficiency ; Light efficacy of 3000K is 5% lower than other CCTs.

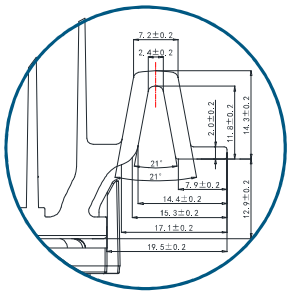
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

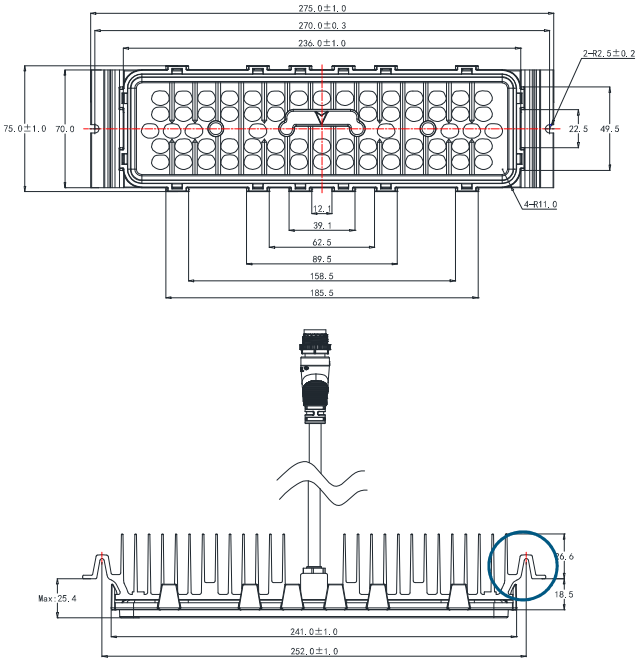
Tolerance: ±0.5mm



Available Lens Model

1321	1324	1390
1232	2322	5321

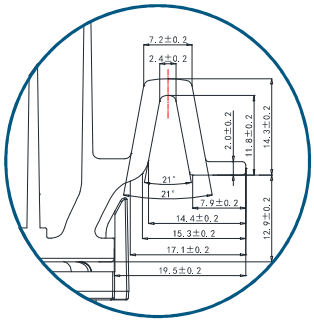
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

Tolerance: ±0.5mm



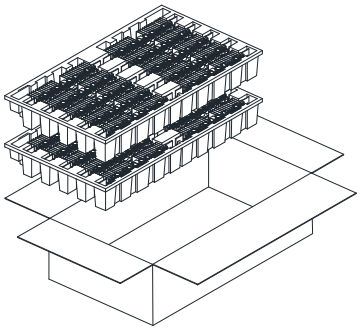
Available Lens Model

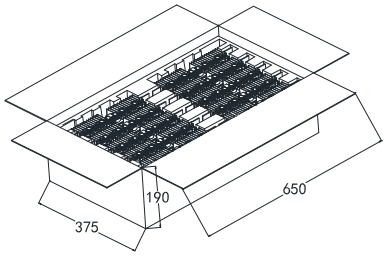
1310	1325	5340	2360
5390			

Package Information

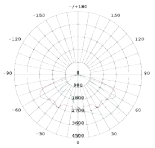
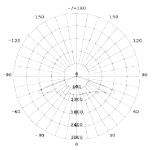
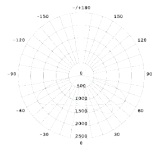
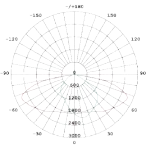
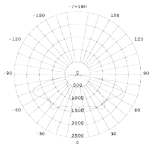
L (mm)	W (mm)	H (mm)	Module pcs/carton (PCS)	Package weight (kg)
650	375	190	20	14.9

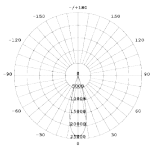
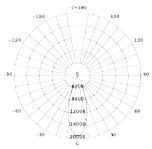
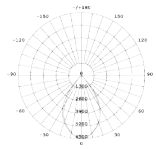
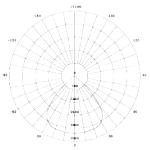
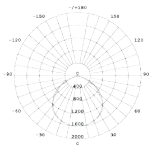
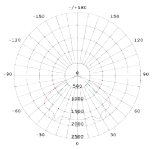
Values shown are subject to ±5% tolerance.





Lighting distributions

T2S1324	T2S(V)2322	T2S5321	T2S2321	T3M1321
				

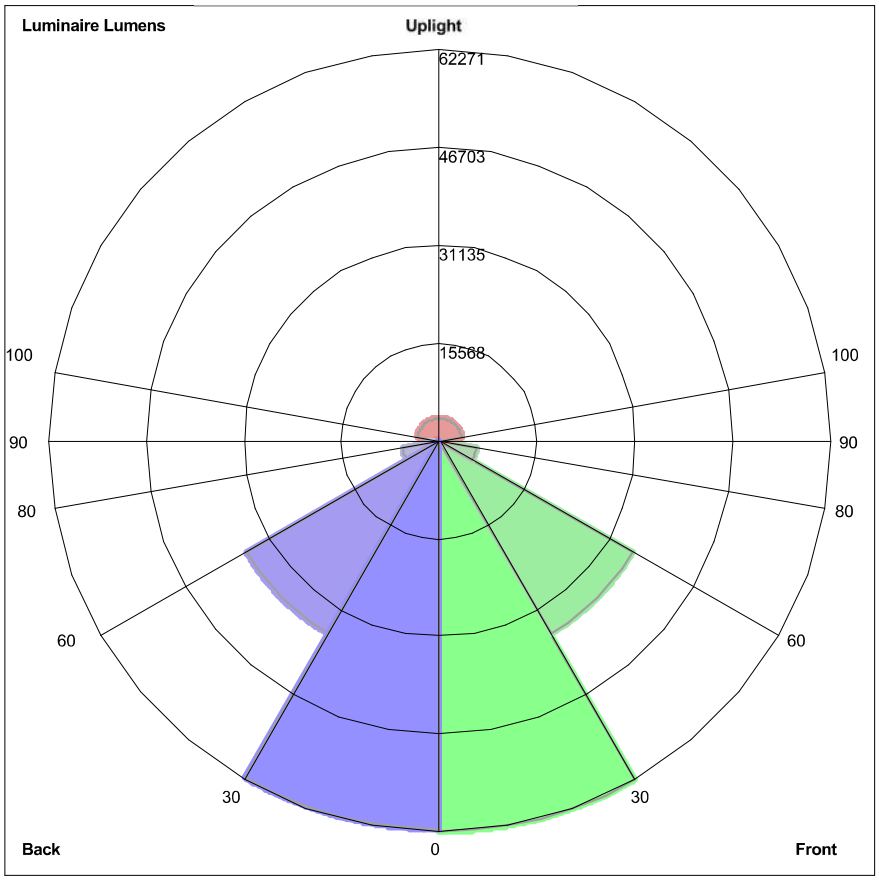
25D1325	40D5340	60D2360	90D5390	LBN1310	Tunnel lighting 1390
					

Version History

Change Date	Version	Description of Change		
		Item	From	To
20190905	Ver2.0	Data sheets release (new version)		
		Update of luminous efficacy		
		Optimized G.W of Module package	16.2kgs	14.9kgs

IES ROAD REPORT
PHOTOMETRIC FILENAME : 3560-400W 16 BANKS ESTIMATE.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=62270.6, Medium=35421.7, High=5946.3, Very High= 1328.0
Back: Low= 61920.0, Medium=35466.8, High=5958.8, Very High=1320.7
Uplight: Low=493.0, High=3564.5

BUG Rating : B5-U5-G5

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type C

Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Applications:

- Onshore drilling and exploration
- Pipeline compressor and storage
- Corrosive environments
- Façade security lighting

Features:

- 150-400W high pressure sodium or 175-400W metal halide
- AEx nR, Ex nR restricted breathing rating is standard – restricted breathing offers cooler T-numbers for increased hazardous locations suitability
- NEMA 7x6 butterfly beam floodlight pattern – wide, uniform and far reaching to provide excellent efficiency and more light where you need it
- NEMA Type 4X and IP66 heavy duty, die cast copper-free aluminum construction is designed for use indoors and outdoors in marine and wet locations with stainless steel external hardware suitable for saltwater and corrosive applications
- 40°C, 55°C and 65°C ambient suitability – addresses high ambient common at industrial facilities
- Low ambient capability to -40°C – perfect for colder climates
- Hinged door frame assembly – has captive cover screws for ease of relamping
- Yoke mount design – standard construction provides the greatest mounting flexibility; can be mounted vertically (wall), horizontally (rooftop or floor) or any angle in between
- 3-axis resonance withstand and UL844 vibration compliant – can stand up to the tough jobs
- Precision formed aluminum reflector – superior beam control, distribution and efficiency
- High light output with a low cost of operation – cost-effectiveness in a high wattage floodlight
- Slipfitter adapter for pole mounting and wall mounting bracket available

Certifications and compliances:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx nR II
- Class II, Division 1, Groups F, G (250W maximum)
- Ex nR II
- UL/cUL844 – Hazardous Locations
- UL/cUL1598 – Luminaires
- UL/cUL1598A – Supplemental Requirements for Luminaires for Installation on Marine Vessels
- 60079-15
- NEMA Type 4X
- IP66
- Marine and wet locations
- ABS



Standard materials and finishes:

- Housing and lens frame – heavy duty die cast copper-free aluminum with Corro-free epoxy powder coat finish
- Lens – heat- and impact-resistant tempered glass
- Gasket – one-piece silicone
- Mounting brackets – aluminum with Corro-free epoxy powder coat finish
- Reflector – precision formed aluminum
- Lamp holder – porcelain
- Hardware – stainless steel

Technical specifications:

- Entries – one ¾" AEx/Ex gland
- Wind rating – EPA: 2.90 at vertical
- Lamp type – high pressure sodium; probe start metal halide[A]; pulse start metal halide (lamps not provided)
- Lamp holder – mogul base
- Ballast – multi-tap 120/208/240/277V, 60 Hz (standard); 220-240V, 50 Hz (optional); tri-tap 120/277/347V (optional); 480V (optional)

Mounting option:

- Yoke mount

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

[A] Not available in the U.S.

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Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Options:

Description	Suffix
• Lamps included	L[B]
• 480V	480
Replace /MT in catalog number with /480	
• 230V	230
Replace /220 ONLY in catalog number with /230	

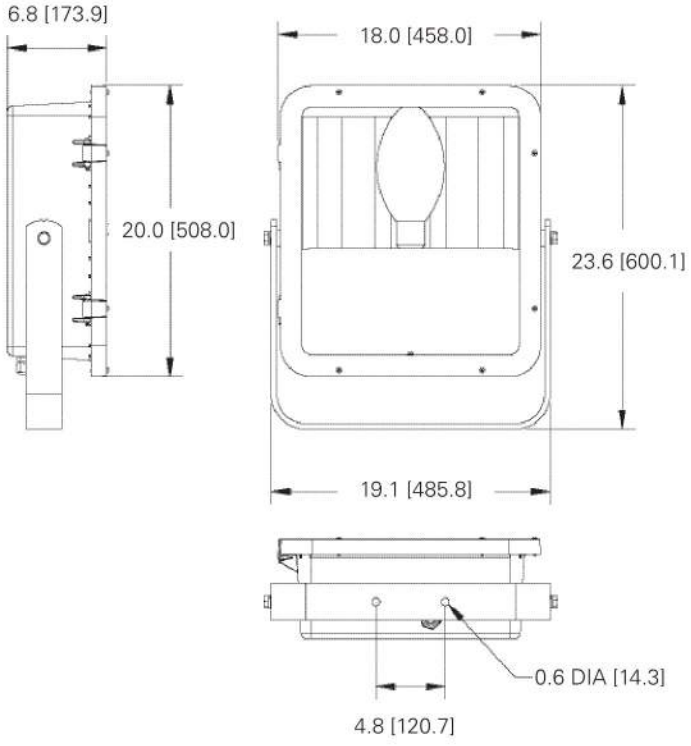
Accessories (ordered separately):

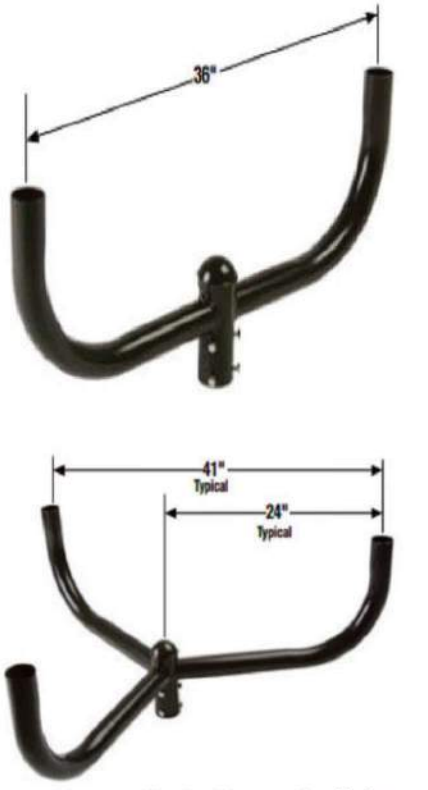
Description	Cat. #
• Pole mount slipfitter adapter	SFA6
• Wall mount bracket adapter	SWB6
• Bull horn, 2 tenon, gray	BLHN2
• Bull horn, 3 tenon, gray	BLHN3

Ordering information:

Cat. #	Lamp type	Watts	Weight (lbs.)	ANSI lamp type	Zone T-code	Division T-code	Ambient temperature °C	Supply wire °C
DFLMY250/MT 76 S828	Pulse start metal halide	250	42.0	M153	T3	T1	40/55/65	90/90/105
DFLMY400/MT 76 S828	Pulse start metal halide	400	44.0	M155	T3	T1	40/55	105/105
DFLMY320/MT 76 S828	Pulse start metal halide	320	44.0	M154	T3	T1	40/55	105/105
DFLMY250/TT 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/TT 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLMY250/220 50 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/220 50 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLSY250/MT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/MT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/TT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/TT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/220 50 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/220 50 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105

Dimensions (in inches):





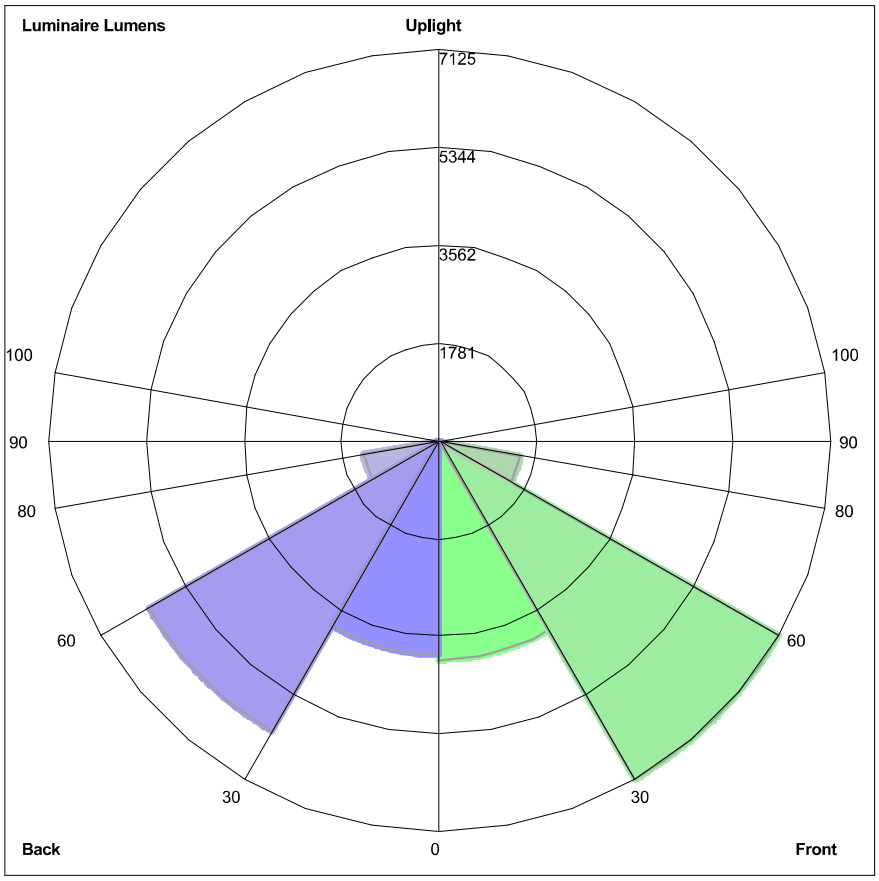
Bull horns – provided with 2 3/8" pole tenon

[B] Lamp is not included unless option 'L' is selected.
[C] Not available in the U.S.

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IES ROAD REPORT
PHOTOMETRIC FILENAME : DFLMYM400.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=3985.6, Medium= 7125.0, High=1500.3, Very High=28.6
Back: Low=3894.8, Medium=6102.1, High=1404.5, Very High=40.2
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G3

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type D

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%



Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5

Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

Ⓐ One year warranty.

Ⓑ Refer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

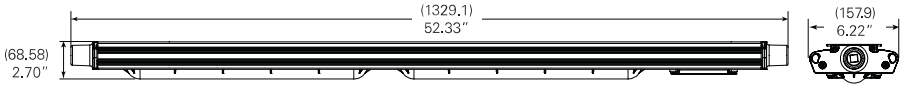
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

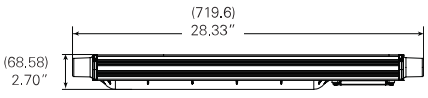
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

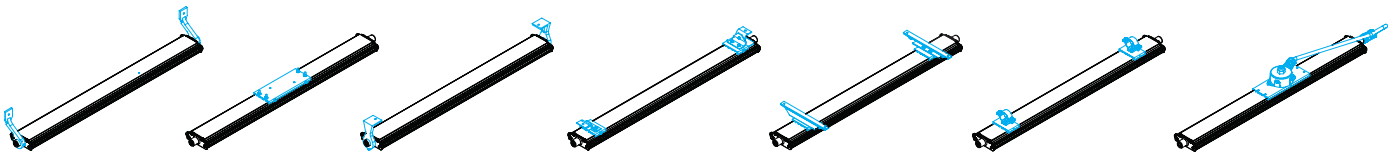
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

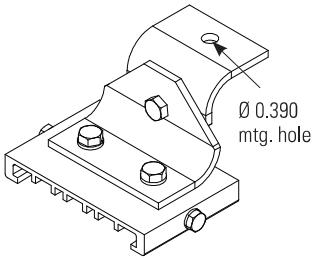
For land-based drilling

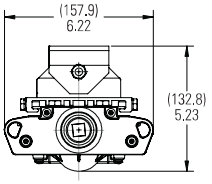
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

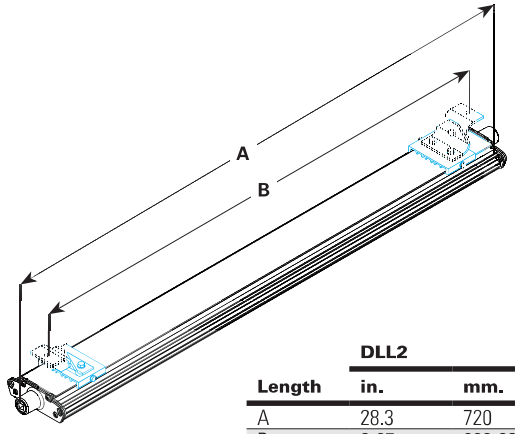
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

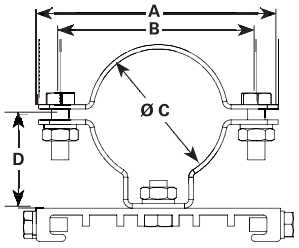




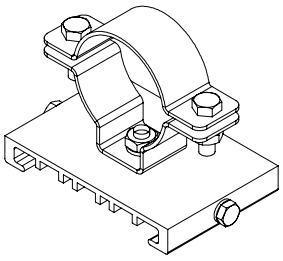


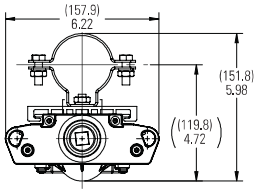
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

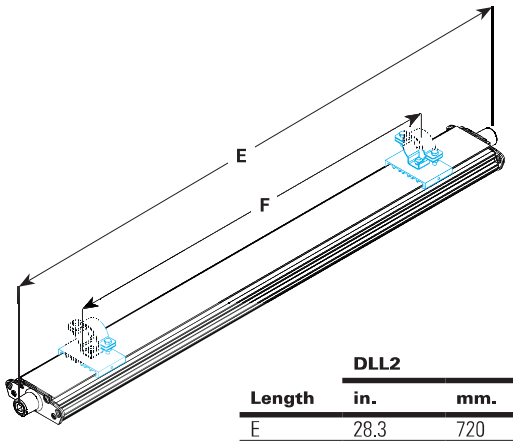
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

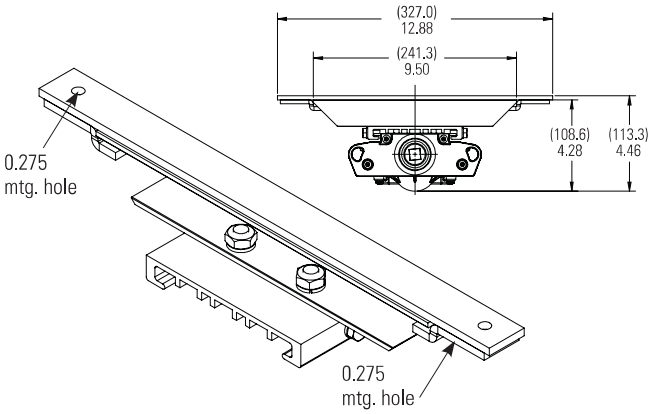


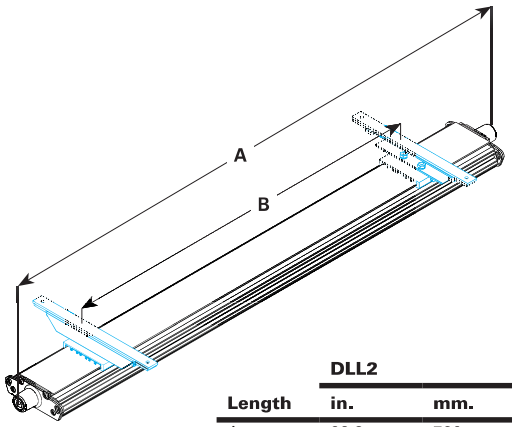




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



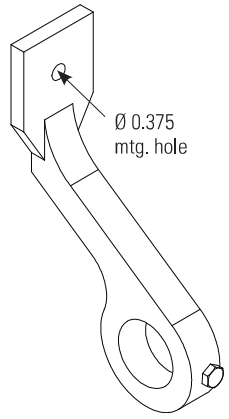


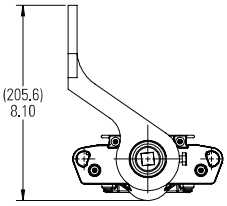
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

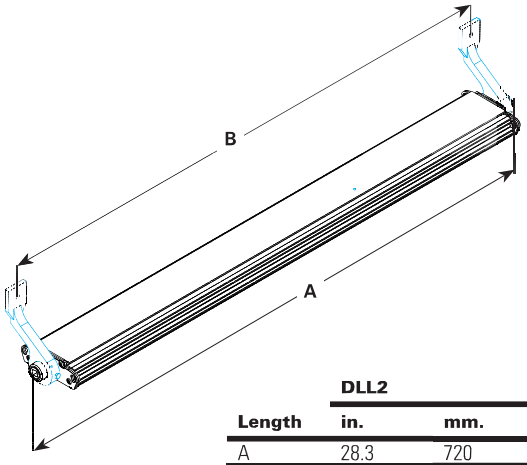
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Mounting options (continued):

Offset wall
DP1052MTK

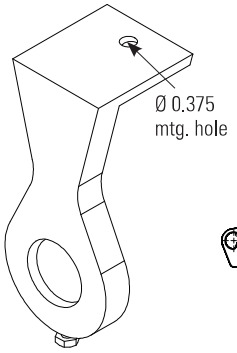


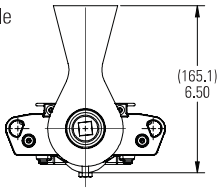


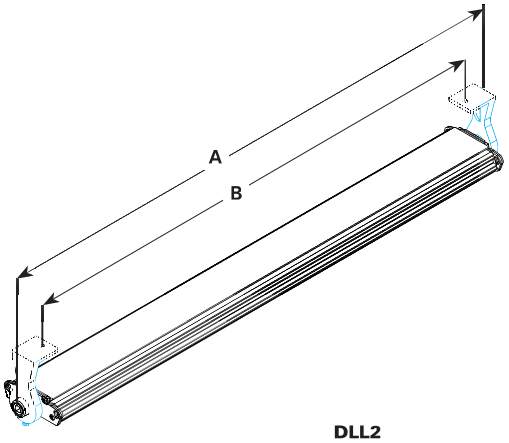


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

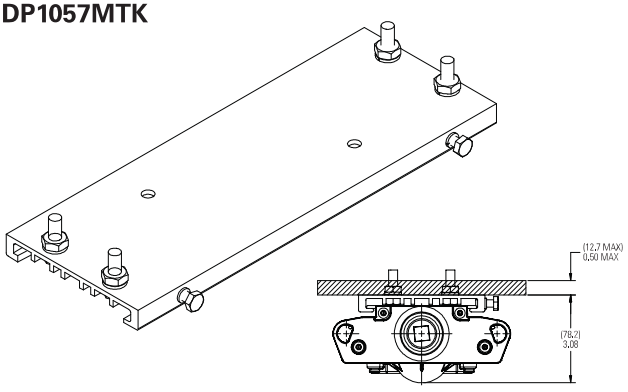


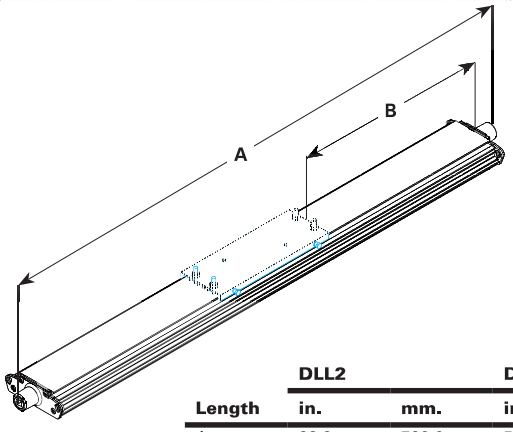




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



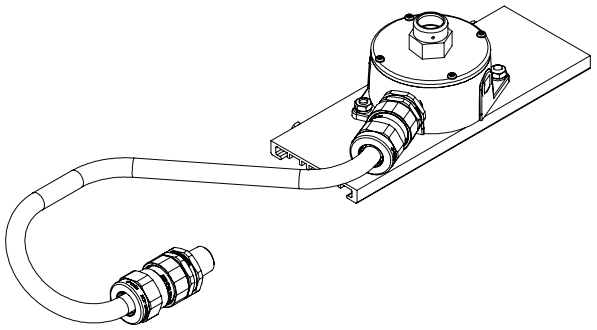


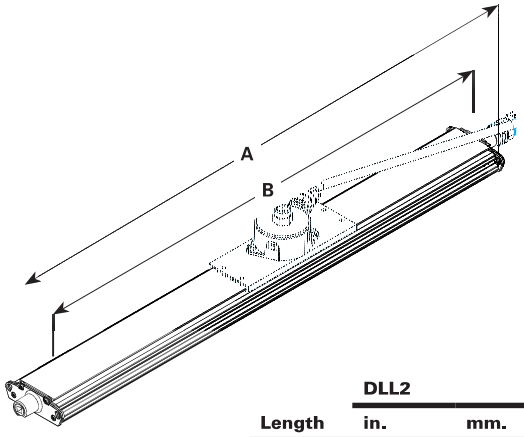
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

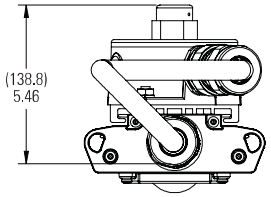
www.crouse-hinds.com US: 1-866-764-5454 CAN: 1-800-265-0502 Copyright® 2019 Eaton

Mounting options (continued):

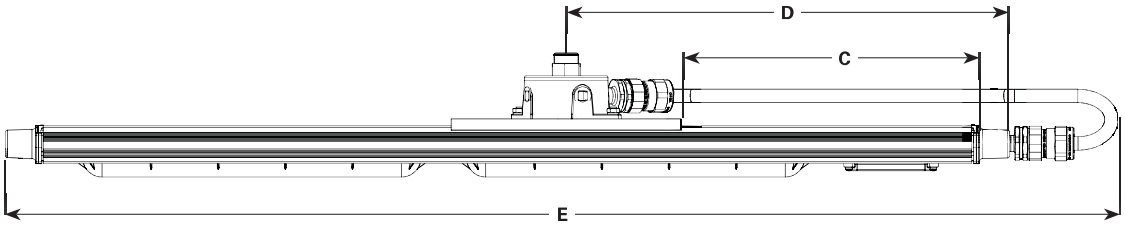
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

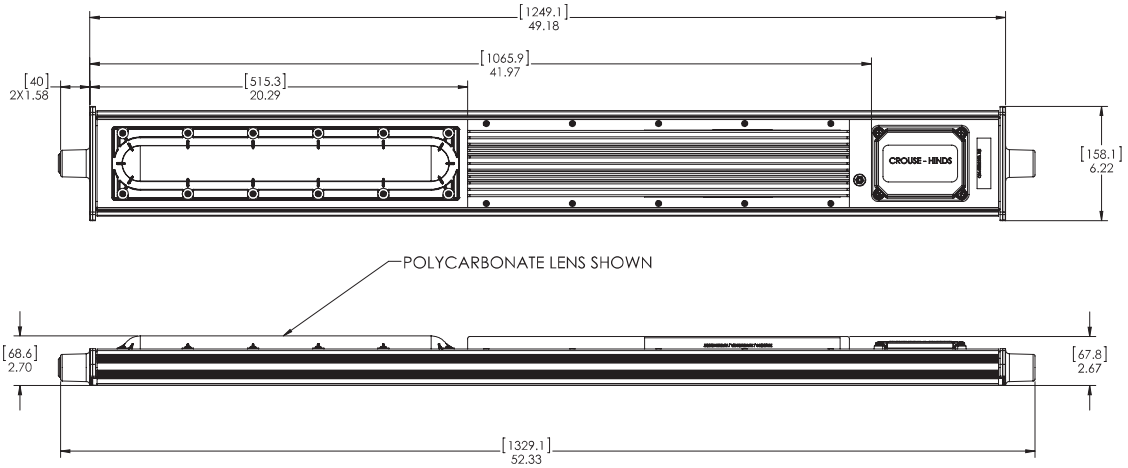
Temperature performance data:

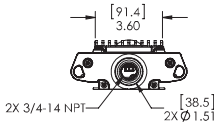
				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Dimensions:

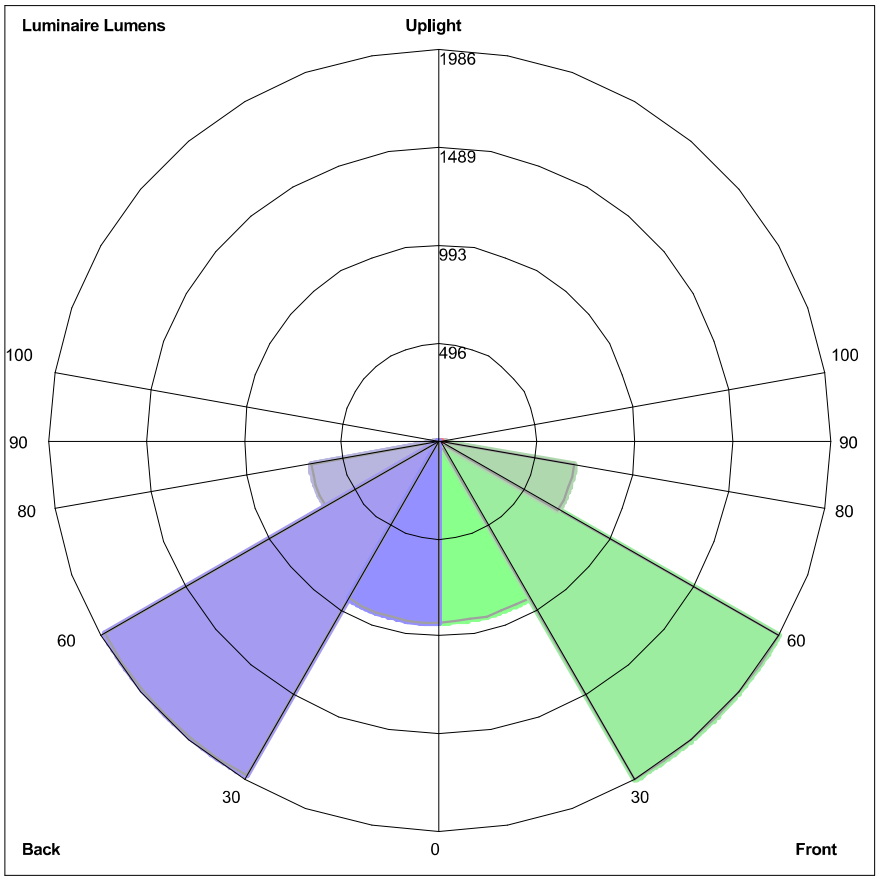




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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL4 UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=921.0, Medium=1985.6, High=698.7, Very High=29.2
Back: Low=925.1, Medium=1963.4, High=664.7, Very High=26.5
Uplight: Low=4.7, High=1.2

BUG Rating : B2-U1-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type E

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%

Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5



Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

ⒶOne year warranty.

ⒷRefer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

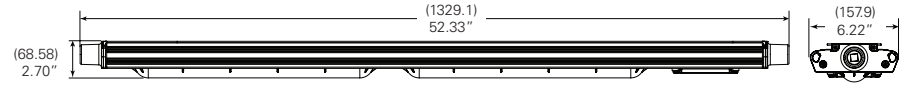
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

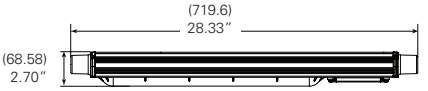
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

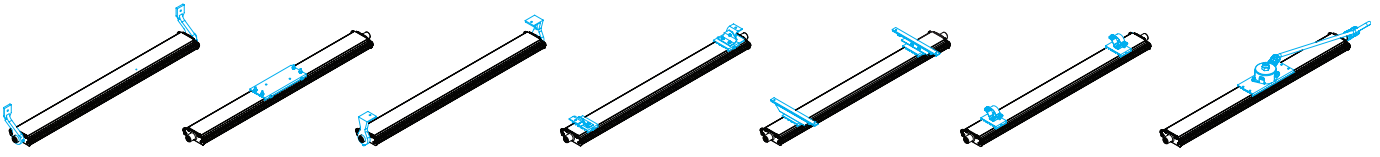
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

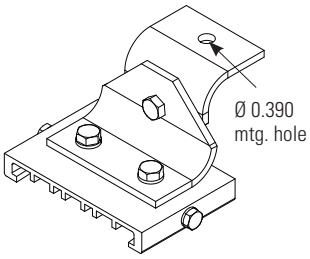
For land-based drilling

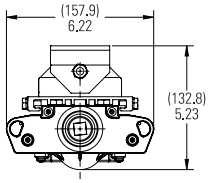
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

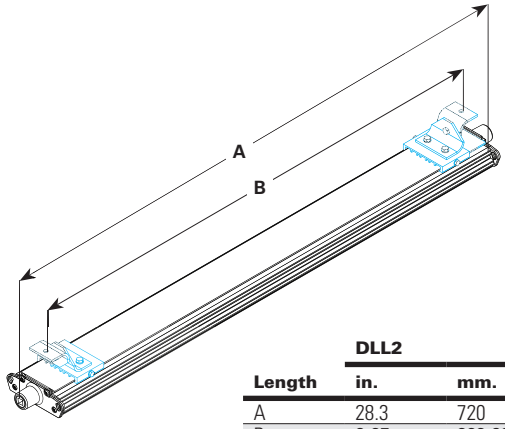
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

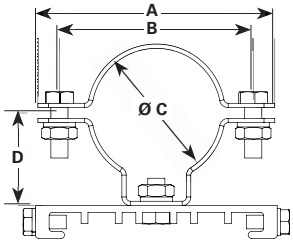




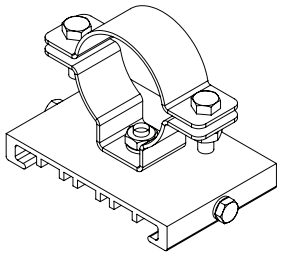


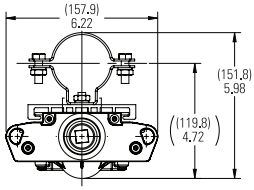
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

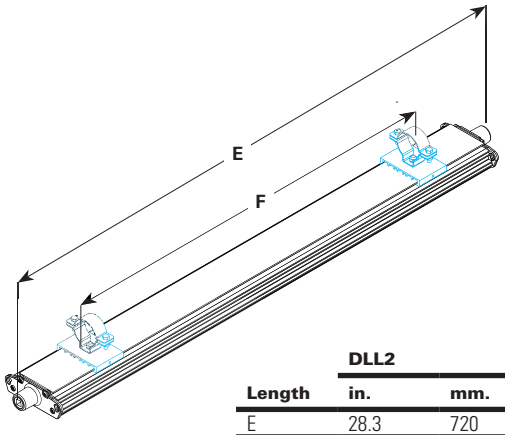
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

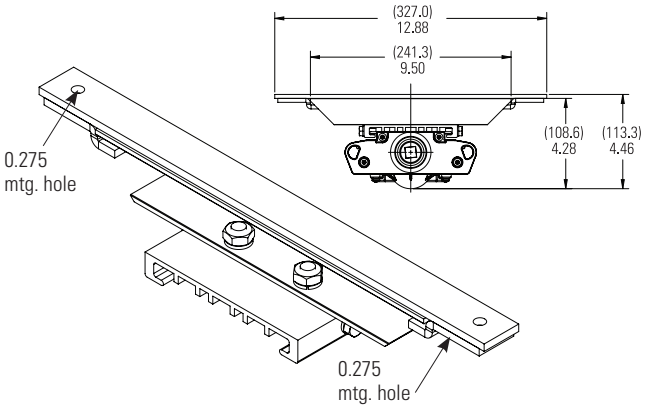


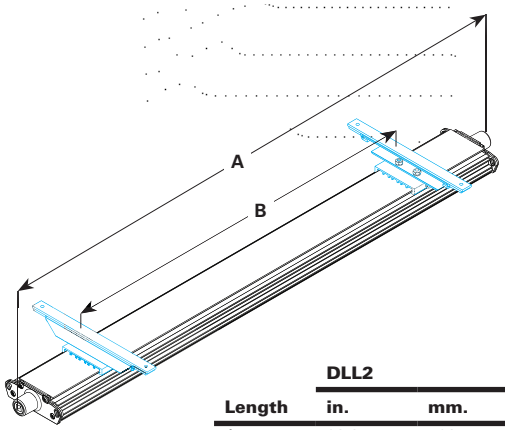




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



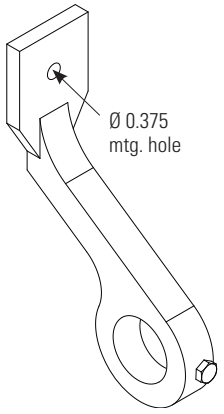


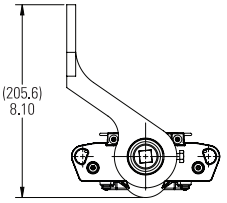
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

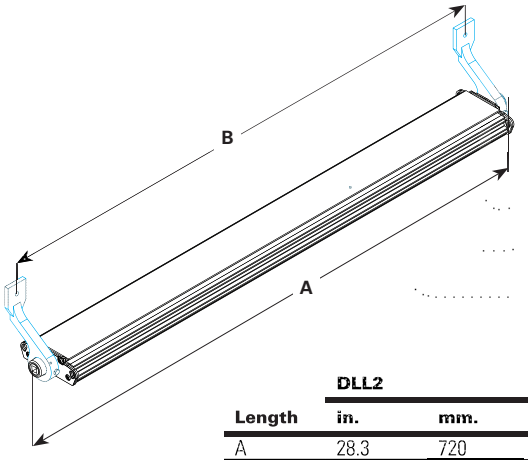
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Mounting options (continued):

Offset wall
DP1052MTK

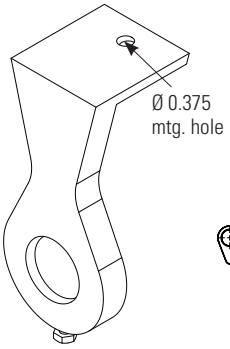


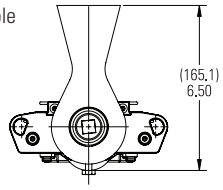


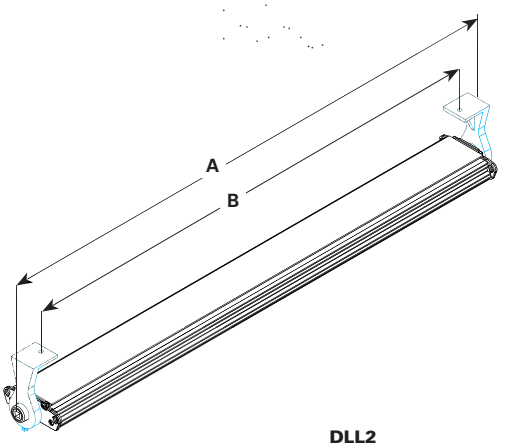


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

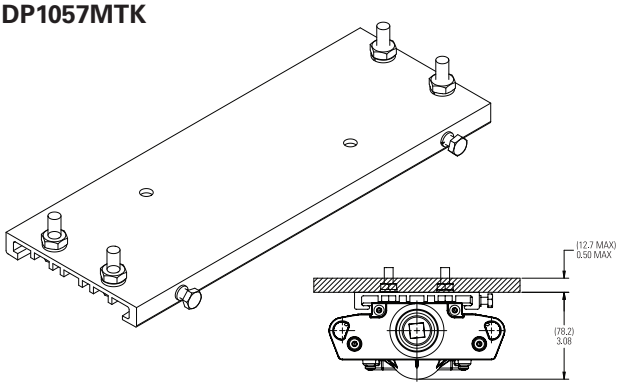


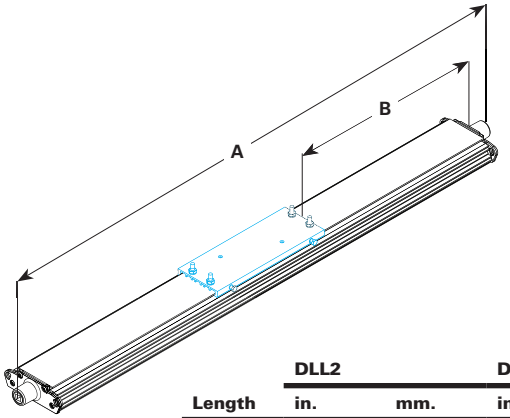




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



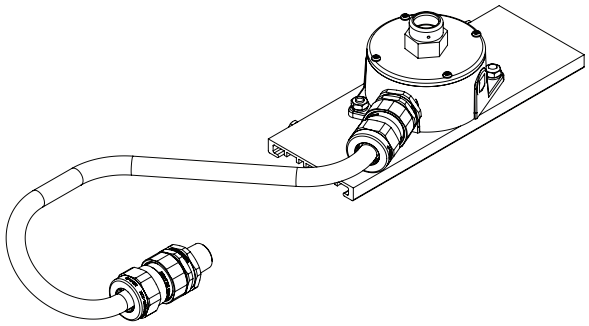


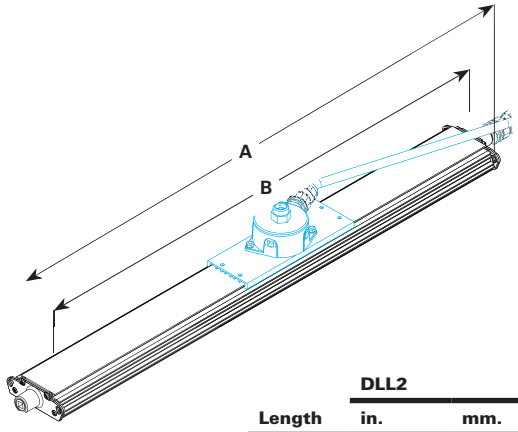
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

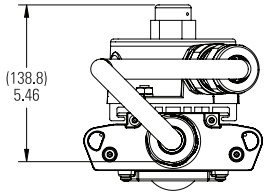
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Mounting options (continued):

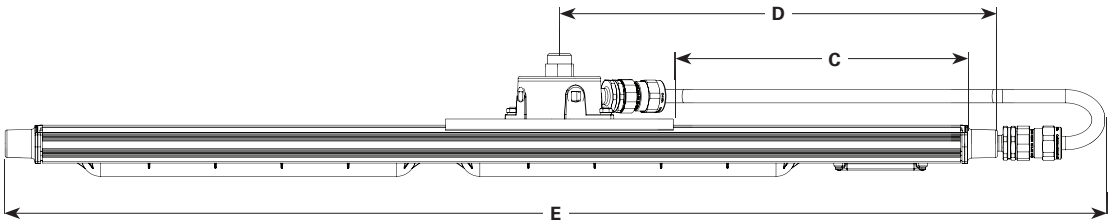
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

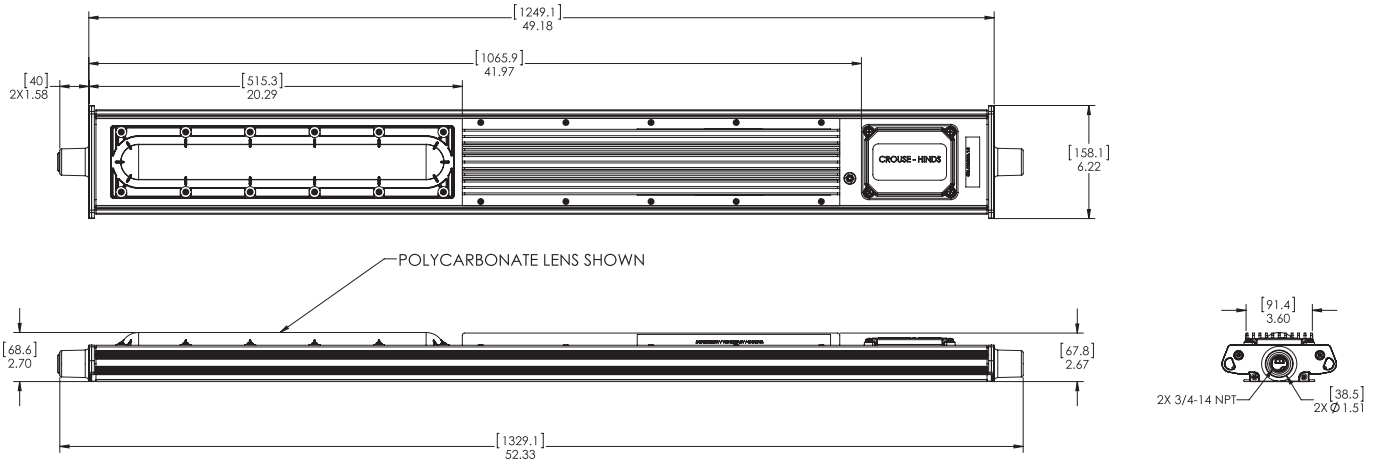
Temperature performance data:

				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

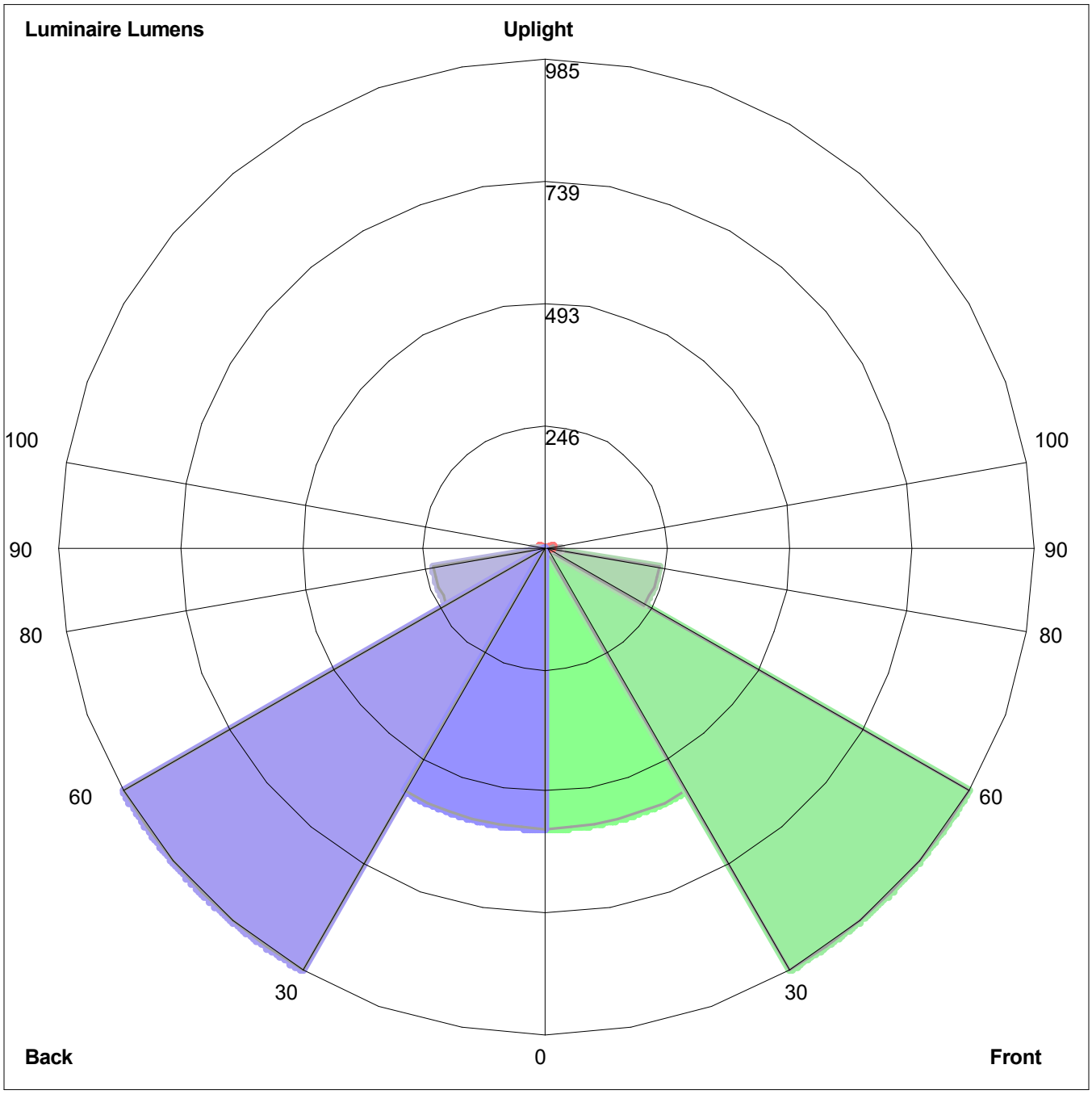
Dimensions:



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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL2-UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Back: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Uplight: Low=12.8, High=0.3

BUG Rating : B2-U2-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type F



Mounting: Vertical Green LED Heat Trace End Seal Kit

Mounting Height: Piping Height Varies.

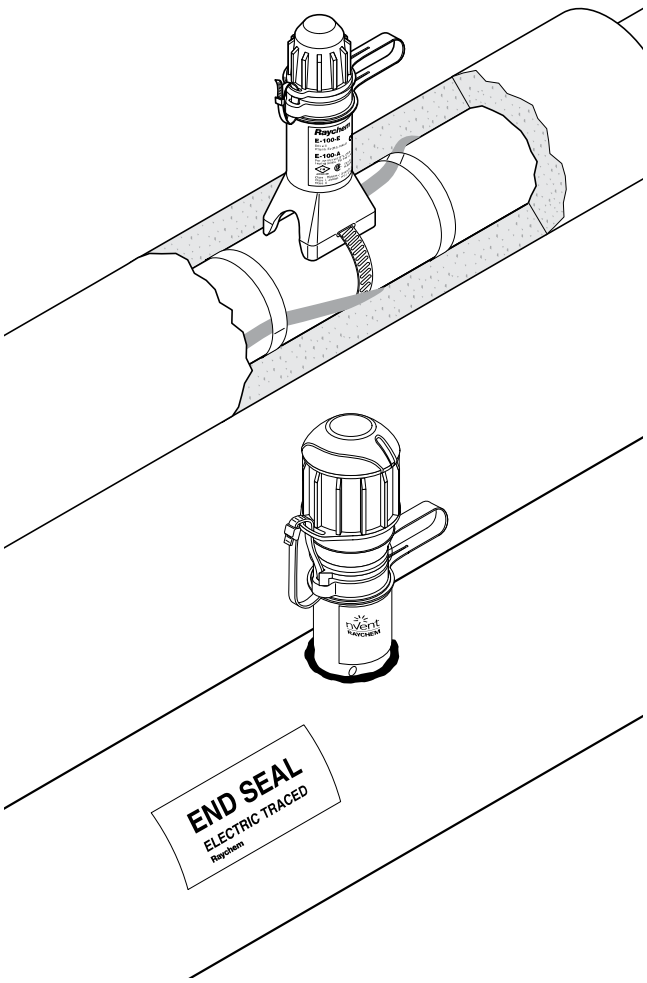
Part Number: E-100-L-A

Manufacturer: Raychem

Wattage: 2 watts at 60 Lumens/watt LED. 120 Lumens per end seal

E-100-E AND E-100-L-E

END SEAL AND LIGHTED END SEAL



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTV, KTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

KIT CONTENTS

	E-100-E	E-100-L-E
	1 end seal 1 cable tie 1 polywater sachet 1 installation instruction	1 end seal with indicator light 1 cable tie 1 polywater sachet 2 insulated parallel crimps 1 core sealer 1 installation instruction

APPROVAL DATA

Area of use	Hazardous or ordinary (indoors and outdoors)

APPROVALS

E-100-E	E-100-L-E
PTB 09 ATEX 1060 U Ⓔx II 2G Ex e II II 2D Ex tD A21 IP66 IECEx PTB 09.0038U Ex e II Ex tD A21 IP66 SP Ex e II T*	Sira 14ATEX3015X Ⓔx II 2GD Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C IECEx SIR 14.0007X Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C FM CLI, ZN1, AEx e mb IIC T* Gb (1) ZN21 AEx tb IIIC T* SP Ex e mb IIC T* Gb Ex tb IIIC T***°C Db

DNV Certificate No. E-11564 and E-11565
*For T-rating, see heating cable or design documentation
(1) Except VPL

EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"
EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"

PRODUCT SPECIFICATIONS

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	480 V*	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	−50°C to +56°C*	−40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the summary the certificate or installation instructions for full details.	
Min. installation temperature	−50°C	−40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

LIGHT SOURCE

Type	Green LEDs
Voltage rating range	110-277 Vac, 50/60 Hz
Power consumption	< 2 W
Electromagnetic immunity/emissions	Complies with IEC61000-6 and IEC61000-4

INSTALLATION DATA

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers

ORDERING DETAILS

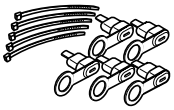
End seal		
Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied) PTB, DNV and EAC approved product

ACCESSORIES

Small pipe adaptor	JBS- SPA, required for pipes ≤ 1" (DN 25), E 90515-000 (bag of 5 adaptors)

SPARE PART

Boot pack for E-100-E



Part description	E-100-BOOT-5-PACK
PN (Weight)	281053-000 (140 g)
Pack size	5 sealant filled boots and 5 cable ties

Replacement indicator light for E-100-L

Part description:	E-100-LR-E
PN	P000001586

North America
Tel +1.800.545.6258
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thermal.info@nVent.com

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Fax +1.713.868.2333
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nVent

nVent.com

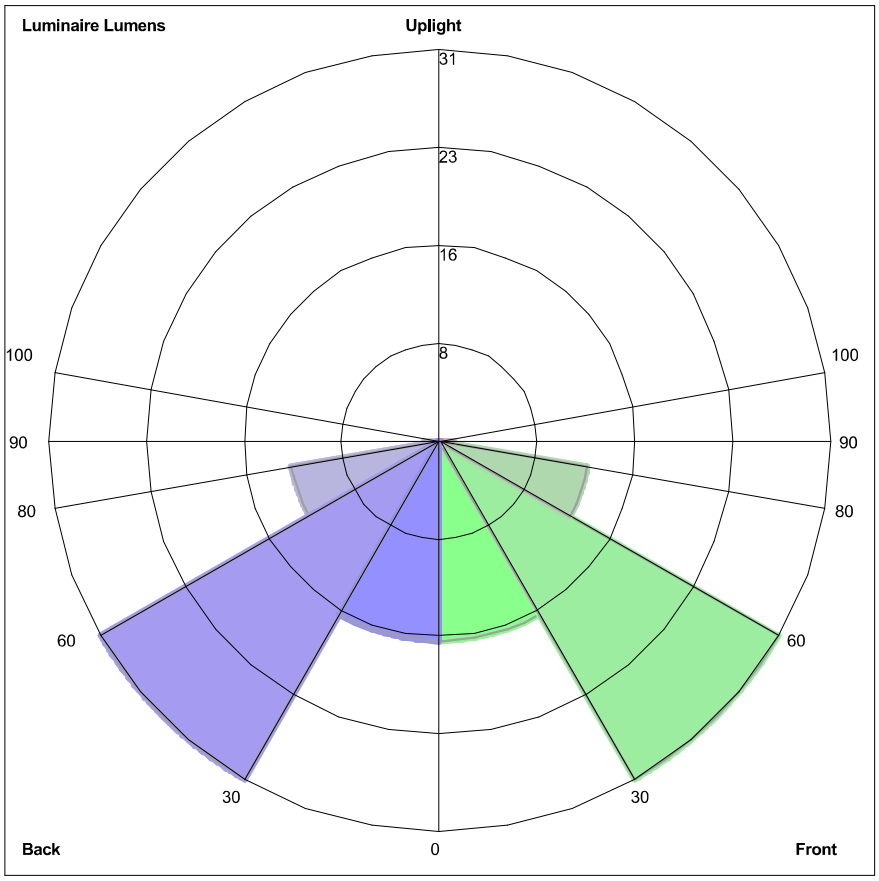
Our powerful portfolio of brands:
CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER

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nVent reserves the right to change specifications without notice.

RAYCHEM-DS-EU1421-E100EE100LE-EN-1911

IES ROAD REPORT
PHOTOMETRIC FILENAME : APPROXIMATION RAYCHEM END KITS.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH

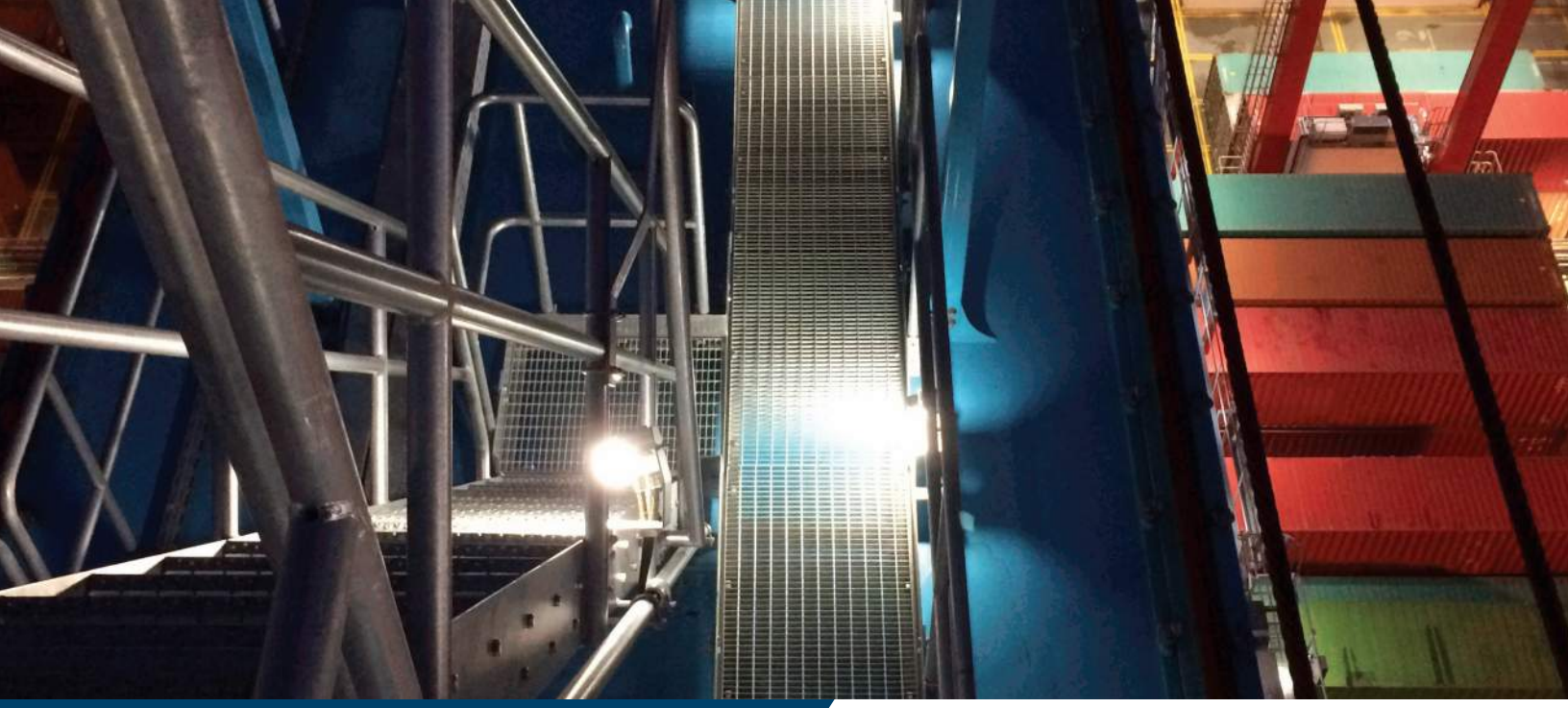


Luminaire Lumens:
Front: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Back: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type G



PHOENIX®
DURABILITY X DESIGN™

Cube-Light

Compact LED Area Light



Australian Design No. 359170
US Patent No. D762,321 S

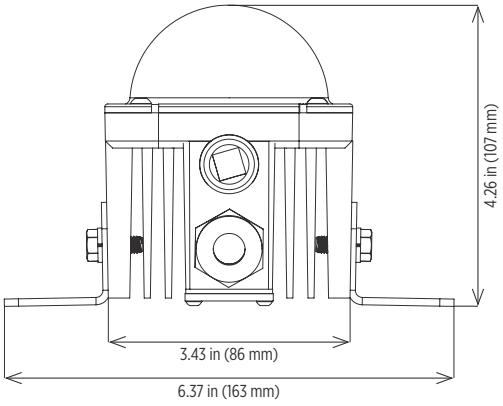
Delivers up to 1000 lumens to doorways, walkways, cabins or other small areas

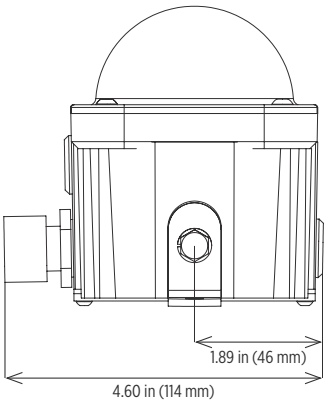
Competitive pricing with short lead times

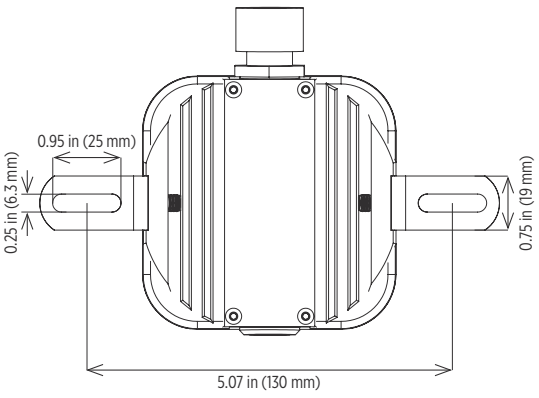
Various mounting options for maximum versatility

LED technology increases efficiency, eliminates maintenance and supports green initiatives

Dimensions







Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Cube-Light

Compact LED Area Light

Specifications

Construction	Cast aluminum housing
Finish	White thermoset powder coat
Hardware	Marine grade (316) stainless steel
Lens	Impact-resistant, diffuse polycarbonate Diffuse red, green, blue and amber lens accessories available (AMB-CL, BLU-CL, GRN-CL, RED-CL)
Light source	13W, up to 1000 lumens Conformal coated CRI ≥ 70 CCT 5000K 50,000 hour rated life
Power source	120-240V, 50/60Hz 240V, 50/60Hz 13-27V DC
Wiring	Stranded wires Cord not included - standard 72.00 inch (1829 mm) cord with pigtail option (CD) NEMA 5-15 plug (120V only) sold separately (PLG-515)
Through wiring	Continuous row mounting option (TW)
Ambient operating temperature	-30°C to +50°C
Mounting	Flush mount brackets - standard Harp mount available Rail mount available - 2.00 inch overall diameter Fixture can be mounted in any orientation
Weight	2.0 lb (0.9 kg)
Warranty	3 years

For IES files, see website or contact factory

Compliances

ETL/cETL Listed to:

- UL 1598 Suitable for Wet Locations
- UL 1598A Marine Outside Type (Saltwater)
- CSA C22.2 No. 250.0

CE
ABS
IP66 rated
LM79 and LM80 reports available



The Cube-Light on an STS crane

Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Ordering Information

Example: CL-13LED-120-240

Fixture	Wattage/Type	Voltage	Options
CL	13LED	120-240 [1,2]	CD
		240 [2]	TW
		DC [3]	

Wattage/Type

13LED	13W, up to 1000 lumens

Voltage

120-240 [1,2]	120-240V, 50/60Hz
240 [2]	240V, 50/60Hz
DC [3]	13-27V DC

Options

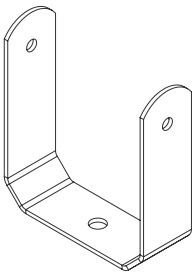
CD	72.00 inch (1829 mm) cord with pigtail option
TW	Continuous row mounting

Notes

1	ETL/cETL listed
2	CE
3	No certifications

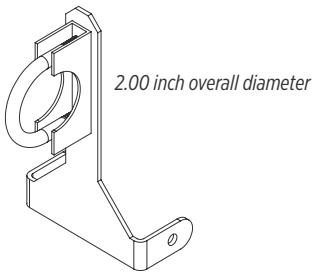
Special Projects: We may be able to accommodate your special projects, so please don't hesitate to ask about additional options. Minimum order quantities and/or extended lead times will apply. Contact your Phoenix representative with specific inquiries.

Mounting (order separately)



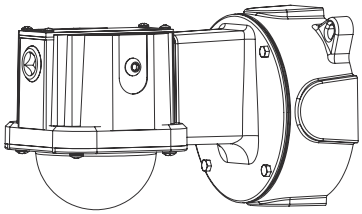
Harp Mount

HRP-CL



Rail Mount

RLMT-CL
Contact factory

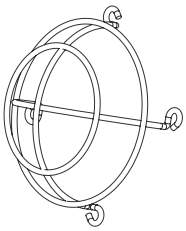


Wall Mount

Complete fixture sold separately
Refer to Cube-Light Wall Mount spec sheet

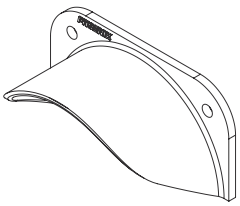
Flush mount comes standard with fixture

Accessories (order separately)



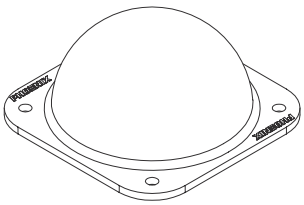
Wire Guard Kit

WG-CL



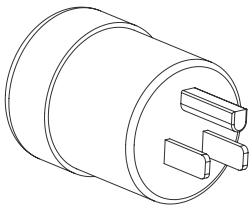
Visor Kit

VSR-CL



Color Lens Kits

AMB-CL	amber lens kit
BLU-CL	blue lens kit
GRN-CL	green lens kit
RED-CL	red lens kit

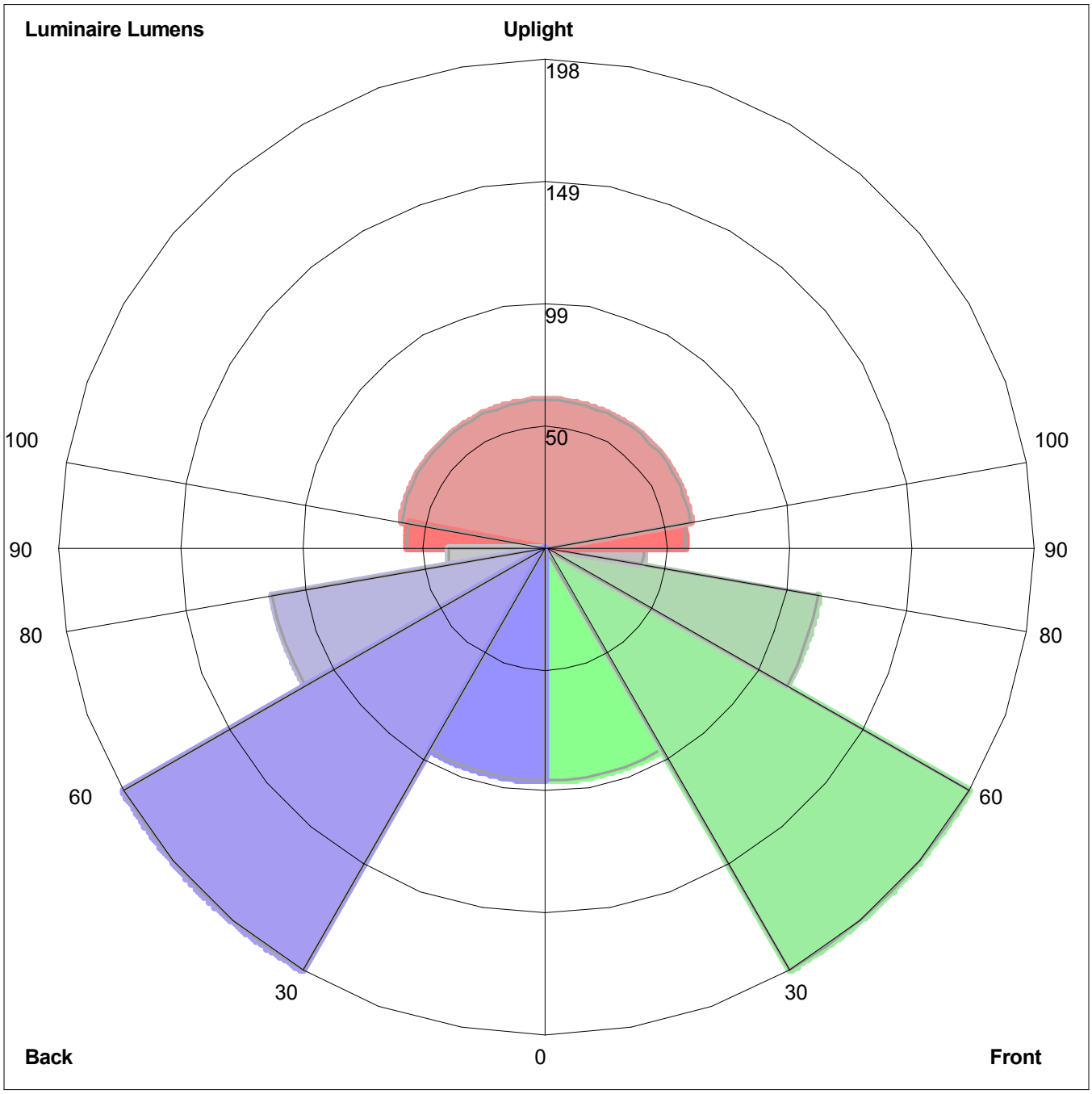


NEMA 5-15 plug (120V only)

PLG-515

IES ROAD REPORT
PHOTOMETRIC FILENAME : CL-13LED (CUBE 120V ITL TESTED).IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Back: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Uplight: Low=56.4, High=59.7

BUG Rating : B1-U3-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Section 12

Noise Mitigation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

McGavin 6-19HZ Pad - Noise Mitigation and Monitoring Plan

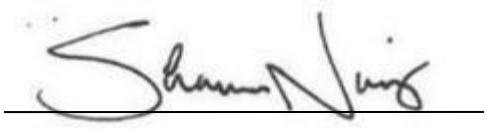
June 28, 2021

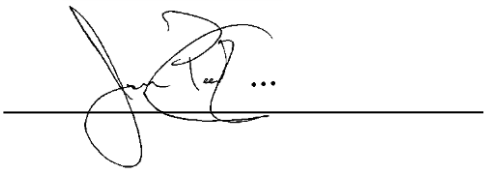
Prepared for:

Kerr-McGee Oil & Gas Onshore, LP
1099 18th Street
Denver, CO 80202

Prepared by:

Behrens and Associates, Inc.
9536 E. I-25 Frontage Rd.
Longmont, CO 80504





Shaun Norris
Staff Acoustical Engineer

Jason Peetz
Engineering Manager

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1. Executive Summary

The following Noise Mitigation and Monitoring Plan (NMP) was prepared by Behrens and Associates Environmental Noise Control (BAENC) for the planned operations associated with the proposed McGavin 6-19HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG). Predictive noise models representing the planned operations for the site were developed and assessed against the maximum permissible noise levels described in Rule 423 of the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The following tasks were completed during development of the NMP:

- Completion of a 4-location, 72-hour ambient sound level survey at the site
- Development of a site-specific drilling noise model representing the Precision 461 rig
- Development of a site-specific completions noise model representing a Haliburton Quiet Fleet crew
- Development of a site-specific production noise model

The ambient sound level survey was conducted to document the existing ambient sound levels at the site and determine if an increase in maximum permissible sound levels was appropriate per Rule 423.d.(2).

The site-specific noise models were developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the COGCC and CDA maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, buildings, barriers, and ground cover. Both A-weighted (dBA) and C-weighted (dBC) noise levels were measured during the ambient survey and considered during the noise modeling assessment.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

Additionally, the area surrounding the site was evaluated to establish noise points of compliance per Rule 423.a.(5). The need for continuous noise monitoring was also evaluated per Rule 423.c.(1) and the CDA. Table 1-1 below summarizes the analysis and mitigation findings in the noise mitigation and monitoring plan and presents them in the form of best management practices.

Table 1-1 Site Mitigation and Best Management Practices

Task	Result of Analysis/Recommended Action
Ambient Survey	• Ambient survey conducted to document noise levels in area around the site (April 2021) • Max permissible noise levels adjusted

Drilling Noise Model	• Developed noise model representing drilling to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, east, south, and west sides of the pad
Completions Noise Model	• Developed noise model representing completions to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, east, south, and west sides of the pad
Production Noise Model	• Developed noise model representing production to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Noise mitigation not recommended
Land Use Evaluation	• Residential building units located within 2,000 ft • Planned Unit Development zoning (Firestone)
Continuous Monitoring Evaluation	• Noise points of compliance proposed (where applicable) • Continuous monitoring proposed at 4 locations

Based on the noise modeling analysis, with the implementation of the best management practices outlined in Table 1-1, the drilling, completions, and production operations are predicted to comply with the COGCC dBA and dBC noise limits and associated requirements of the Firestone CDA.

2. Introduction

The following report provides a noise modeling assessment of the proposed activities at the McGavin 6-19HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG) in relation to the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The assessment includes a modeling analysis of the Precision 461 production rig, Halliburton Quiet Fleet completion crew and McGavin 6-19HZ production facility. The McGavin 6-19HZ pad (40.129063, -104.937746) is located approximately 0.2 miles southeast of the intersection of County Road 20 and County Road 13, Colorado as shown in Figure 2-1. The Weld County GIS portal indicates that the parcel in question, parcel # 131119200045, has been assigned a zoning designation of Planned Unit Development (PUD) by Firestone, and an image depicting the parcel as defined by Weld County is shown in Figure 2-2 below.

To assess the operational noise levels of the proposed McGavin 6-19HZ pad, file noise level data previously measured and typical of the Precision 461 production rig, and Halliburton Quiet Fleet completion crew and production facility equipment were utilized in the noise modeling. The noise models were developed using SoundPLAN 8.1 software.

PD 461 drilling operations are scheduled to occur for 75 days, Haliburton completions operations are scheduled to occur for 45 days, flowback operations are scheduled to occur for 48 days and production operations are scheduled to occur for 360 months.

The following is provided in this report:

- Documentation of ambient sound level survey results
- A review of applicable COGCC noise standards and the CDA with the Town of Firestone
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to the COGCC noise limits
- Proposed continuous noise monitoring procedure



Figure 2-1 McGavin 6-19HZ Pad Location

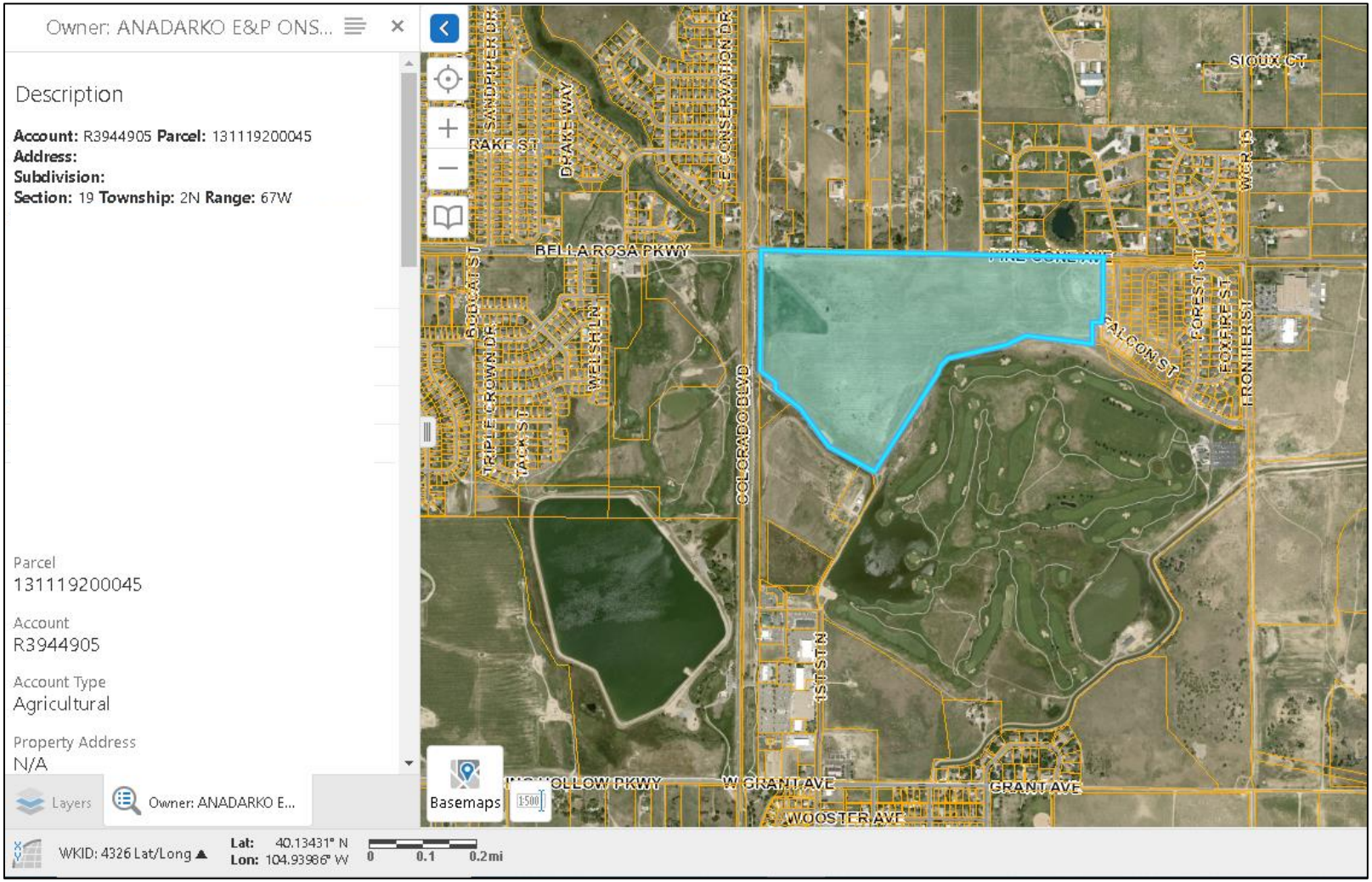


Figure 2-2 Weld County Geographic Information Systems (GIS) Parcel # 131119200045

3. Noise Fundamentals

Sound is most commonly experienced by people as pressure waves passing through air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. The rate at which sound pressure changes occur is called the frequency. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear range from approximately 20 Hz to 20,000 Hz. Toward the lower end of this range are low-pitched sounds, including those that might be described as a “rumble” or “boom”. At the higher end of the range are high-pitched sounds that might be described as a “screech” or “hiss”.

Environmental noise generally derives, in part, from a combination of distant noise sources. Such sources may include common experiences such as distant traffic, wind in trees, and distant industrial or farming activities. These distant sources create a low-level "background noise" in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment but varies slowly from hour to hour as natural forces change or as human activity follows its daily cycle.

Superimposed on this low-level, slowly varying background noise is a succession of identifiable noisy events of relatively brief duration. These events may include the passing of single-vehicles, aircraft flyovers, screeching of brakes, and other short-term events. The presence of these short-term events causes the noise level to fluctuate. Typical indoor and outdoor A-weighted sound levels are shown in Figure 3-1.

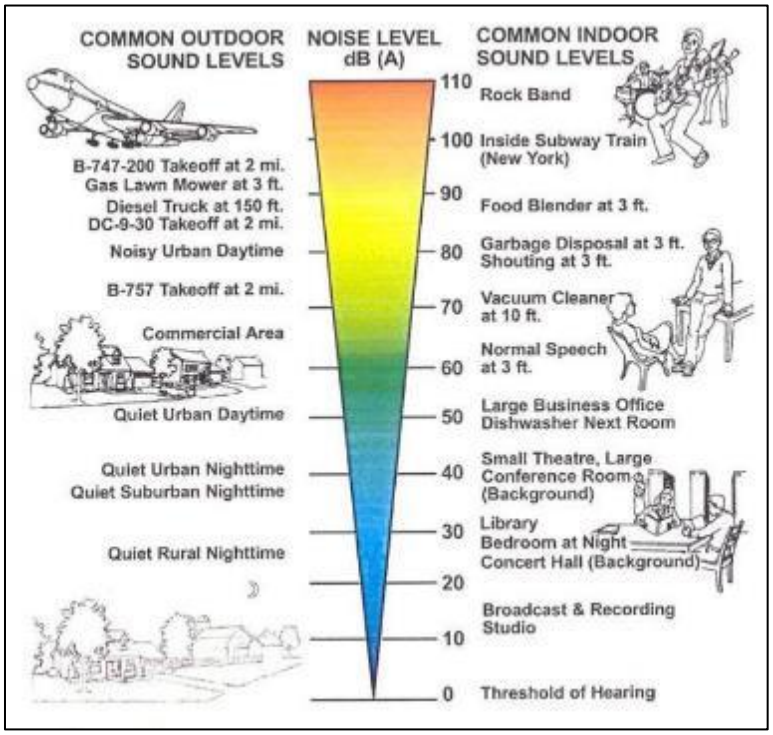


Figure 3-1 Typical Indoor and Outdoor A-Weighted Sound Levels

4. Noise Standards

The pad is located in Firestone in the state of Colorado and is subject to the regulations of the Colorado Oil and Gas Conservation Commission (COGCC) and the Cooperative Development Agreement with the Town of Firestone. The COGCC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423.

4.1 Colorado Oil and Gas Conservation Commission (COGCC)

The COGCC Code lists noise limits for oil and gas operations. "All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423." The noise limits are provided in Table 4-1.

Table 4-1 COGCC Table 423-1 – Maximum Permissible Noise Levels

Zone	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential / Rural / State Parks & State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2):

(2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:

A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 db(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(A) in the hours between 7:00 a.m. to 7:00 p.m.; and

B. In all zones maximum permissible noise levels will be 65 db(C) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(C) in the hours between 7:00 a.m. to 7:00 p.m.

To demonstrate compliance with the sound level limits, Rule 423.c.(2).A states:

A. In response to a complaint or at the Director's request, Operators will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dbC) indicated issues. For high frequency (dbA) measurement will be at the nearest point of compliance. For equipment installed at Oil and Gas Locations subject to a Form 2A approved prior to January 15, 2021, after the Commencement of Production Operations, no single piece of equipment will exceed the maximum permissible noise levels listed in Table 423-1 as measured at a point 350 feet from the equipment generating the noise in the direction from which the complaint was received.

Defining noise points of compliance, Rule 423.a.(5) states:

(5) For proposed Oil and Gas Locations with a Working Pad Surface within 2,000 feet of one or more Residential Building Units, at least one, and no more than six noise points of compliance where monitors will be located. Operators will identify noise points of compliance using the following criteria:

A. Provide one noise point of compliance in each direction in which a Residential Building Unit is located within 2,000 feet of the proposed Working Pad Surface.

B. Noise points of compliance will be located at least 350 feet from the Working Pad Surface, and no less than 25 feet from the exterior wall of the Residential Building Unit that is closest to the Working Pad Surface. If a Surface Owner or tenant refuses to provide the Operator with access to install a noise monitor, then the noise point of compliance will be located at either the next-closest Residential Building Unit or an alternative location approximately the same distance and direction from the Working Pad Surface.

With regards to adjusting maximum permissible noise levels based on measured ambient sound levels, Rule 423.d. states:

d. Cumulative Noise. All noise measurements will be cumulative.

(1) Noise measurements taken at noise points of compliance designated pursuant to Rule 423.a.(5) will take into account ambient noise, rather than solely the incremental increase of noise from the facility targeted for measurement.

(2) At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m. This Rule 423.d.(2) does not allow Operators to increase noise above the maximum cumulative noise thresholds specified in Table 423-2 after the Commencement of Production Operations.

(3) After the Commencement of Production Operations, if ambient noise levels already exceed the maximum permissible noise thresholds identified in Table 423-1, under no circumstances will new

Oil and Gas Operations or a significant modification to an existing Oil and Gas Operations raise cumulative ambient noise above:

Table 423-2 – Maximum Cumulative Noise Levels

LAND USE	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential /Rural/State Parks/State Wildlife Areas	65 db(A)	60 db(A)
Commercial/Agricultural	70 db(A)	65 db(A)
Light Industrial	80 db(A)	75 db(A)
Industrial	90 db(A)	85 db(A)
All Zones	75 db(C)	70 db(C)

4.2 Cooperative Development Agreement (CDA)

Kerr-McGee Oil & Gas Onshore, LP (KMOG) and the Town of Firestone have entered into a Cooperative Development Agreement (CDA) to develop and implement a Noise Mitigation and Monitoring Plan. The Operational Standards identified in the CDA state:

(2) **Noise Mitigation**. To reduce the noise effects of the Town and its residents during drilling, and provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at last 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

4.3 Summary of COGCC Maximum Permissible Noise Levels

Notwithstanding any influence or adjustments due to ambient noise or maximum cumulative noise levels of Rule 423 – Table 423-2, based on COGCC Rule 423, the allowable noise level limits applicable to the site are as follows:

Table 4-2 Unadjusted Maximum Permissible Noise Levels

Operation	Applicable Zoning	Noise Limits (dBA)	Noise Limits (dBC)
Drilling	Agricultural/Commercial	65 day / 60 night	65 day and night
Completions	Agricultural/Commercial	65 day / 60 night	65 day and night
Production	Agricultural/Commercial	60 day / 55 night	60 day and night

5. Ambient Sound Level Survey

5.1 Ambient Sound Level Survey Procedure

Four Type 1 SVANTEK SVAN 971 sound level meters were utilized to conduct an ambient sound level survey adjacent to the McGavin 6-19HZ pad. The sound level meters conform to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meters were calibrated prior to deployment. The sound level monitoring period began on Thursday, April 22, 2021 with the meters programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, April 26, 2021. The locations of the sound level meters and weather station used to conduct the ambient sound level survey can be seen in Figure 5-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

Per COGCC Rule 423.c.(2), the measurements were conducted at an approximate height of 5 feet. When calculating the ambient average sound levels shown in Table 5-1 and Table 5-2, the weather data collected during the survey was used to exclude periods from the calculation when winds exceeded 5 mph. The graphed ambient survey results show the measurement data before periods of wind above 5 mph were removed.

5.2 Ambient Sound Level Survey Results

The measured A-weighted and C-weighted hourly average Leq for each monitoring location can be seen in Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5, respectively. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1 and 2 are shown in Table 5-1 below. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 3 and 4 are shown in Table 5-2 below.

Table 5-1 Ambient Sound Level Survey Results for Monitoring Locations 1 & 2

Day	Location 1				Location 2			
	Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels		Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	57	72	54	63	63	75	57	64
2	56	75	52	70	62	70	55	63
3	57	74	52	68	61	70	54	62
4	56	75	55	66	59	69	56	64
5	60	72	-	-	64	70	-	-
Overall Leq	57	75	54	68	61	70	56	63

Note: Day 1 Daytime is an L_{eq} from 4pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 11am.

Table 5-2 Ambient Sound Level Survey Results for Monitoring Locations 3 & 4

Day	Location 3				Location 4			
	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	48	69	44	57	51	68	51	61
2	48	64	42	59	59	75	51	67
3	62	67	44	63	61	71	50	69
4	47	65	45	59	62	73	54	64
5	55	68	-	-	52	67	-	-
Overall Leq	58	66	44	60	61	73	51	66

Note: Day 1 Daytime is an L_{eq} from 4pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 11am.

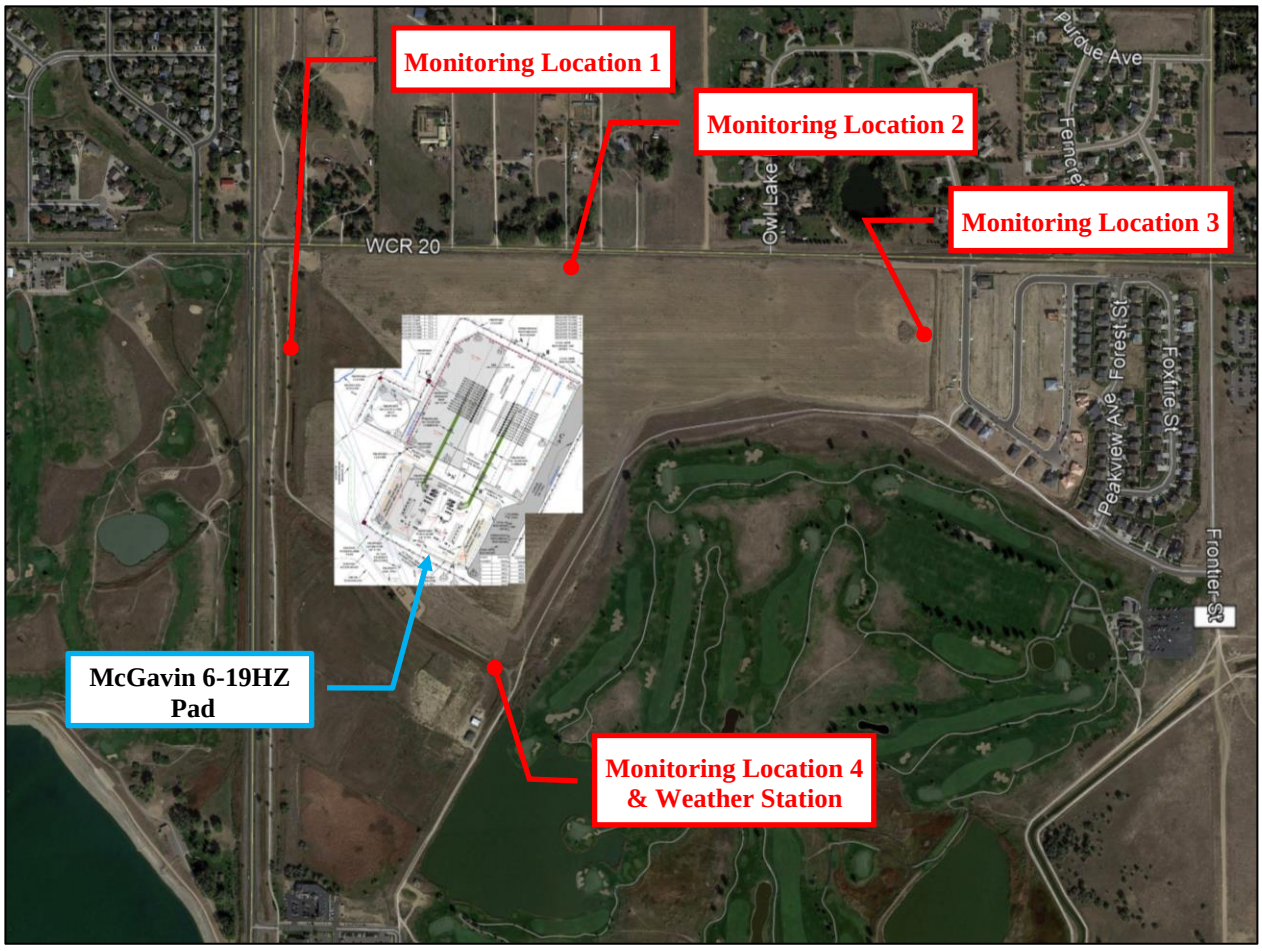


Figure 5-1 Ambient Monitoring Locations

5.3 Maximum Adjusted Noise Levels

The measured ambient sound levels already exceed the maximum permissible noise thresholds identified in COGCC Table 423-1 at multiple locations. Based on COGCC Rule 423.d.(2), for drilling and completions operations, the operational noise levels at the site will be limited to the measured ambient noise level plus 5 dBC during nighttime and 7 dBC during daytime. The following table presents the adjusted allowable noise levels for the site.

Table 5-3 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Drilling and Completions (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	75/68 dBC	82/73 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	73/66 dBC	80/71 dBC

Table 5-4 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBA)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	61/56 dBA	68/61 dBA

Table 5-5 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	75/68 dBC	75/70 dBC
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	70/63 dBC	75/68 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	73/66 dBC	75/70 dBC

Note: Maximum adjusted production cumulative noise levels capped at 75/70 day/night dBC

The drilling, completions, and production operations are planned to occur 24 hours a day, as such, the stricter nighttime allowable level will be utilized in the noise modeling analysis.

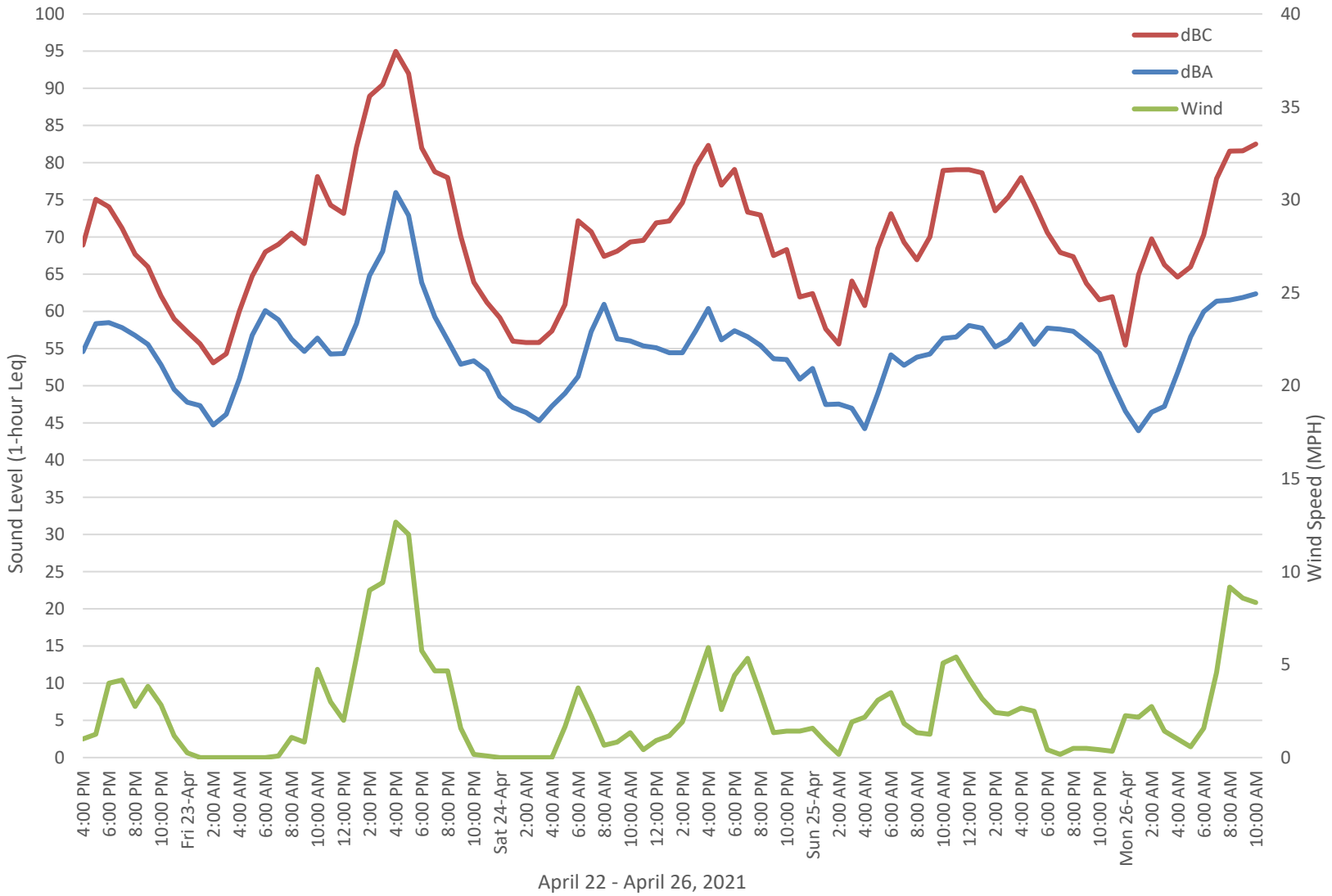


Figure 5-2 Ambient Sound Level Data for Measurement Location 1

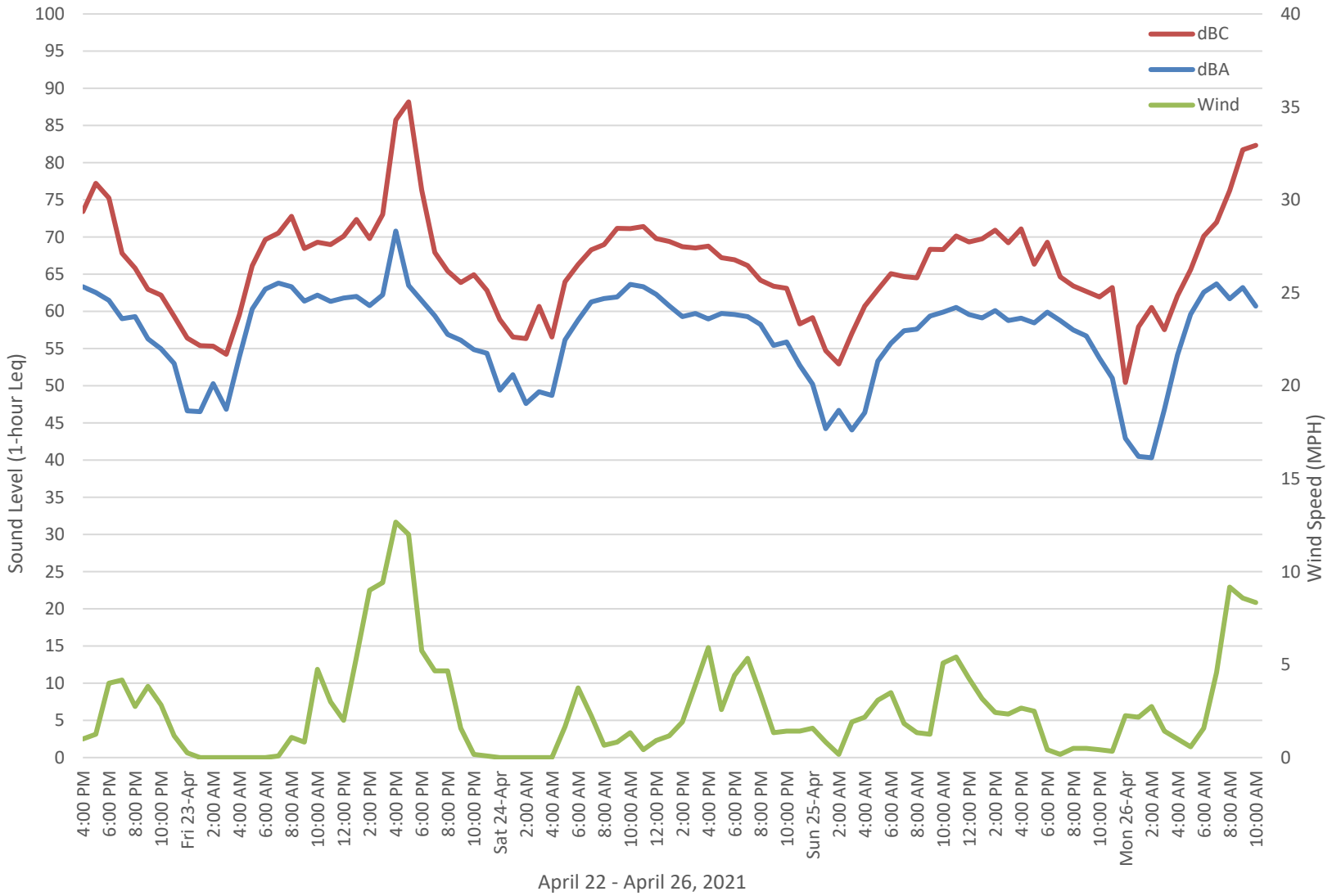


Figure 5-3 Ambient Sound Level Data for Measurement Location 2

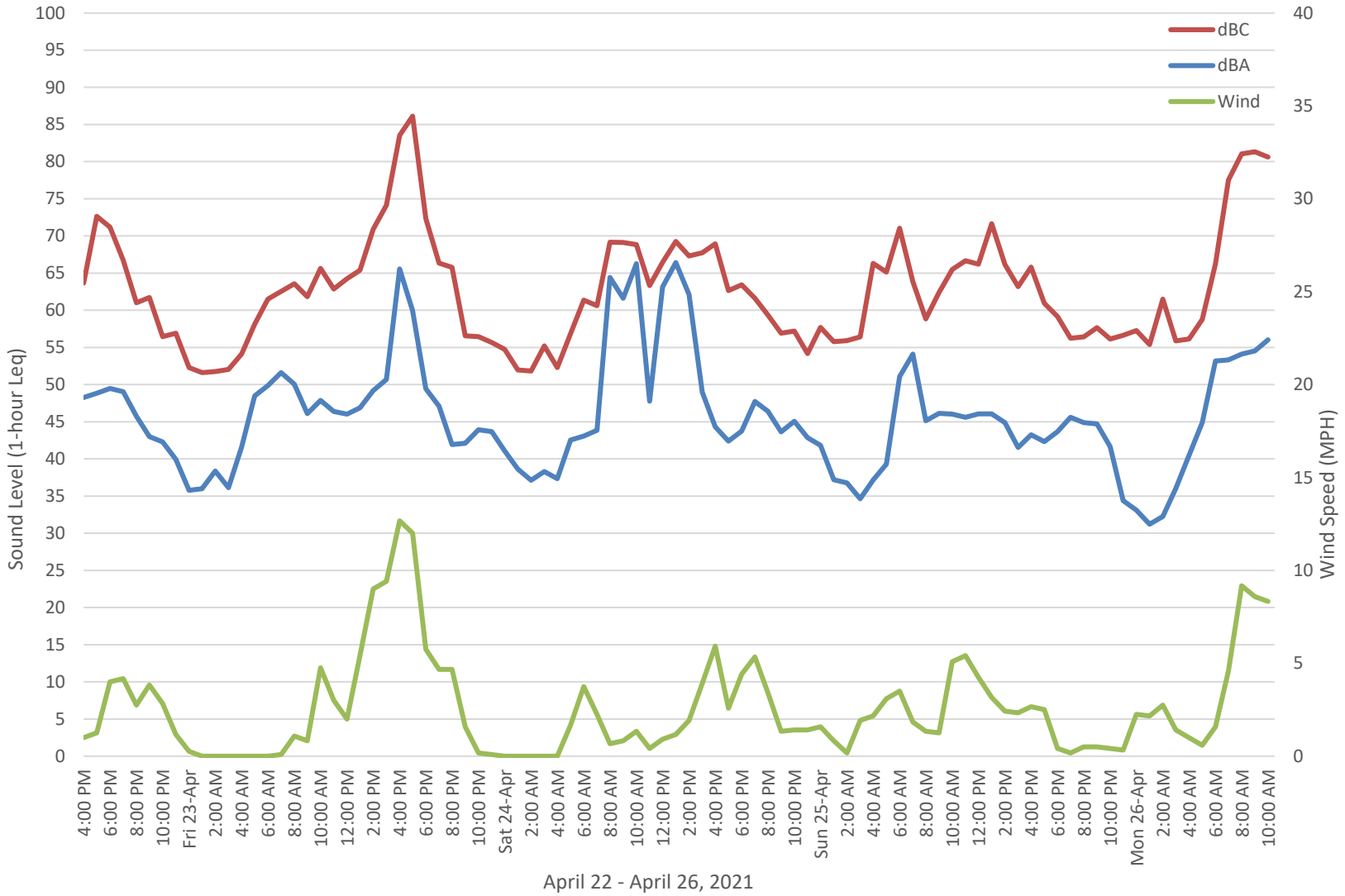


Figure 5-4 Ambient Sound Level Data for Measurement Location 3

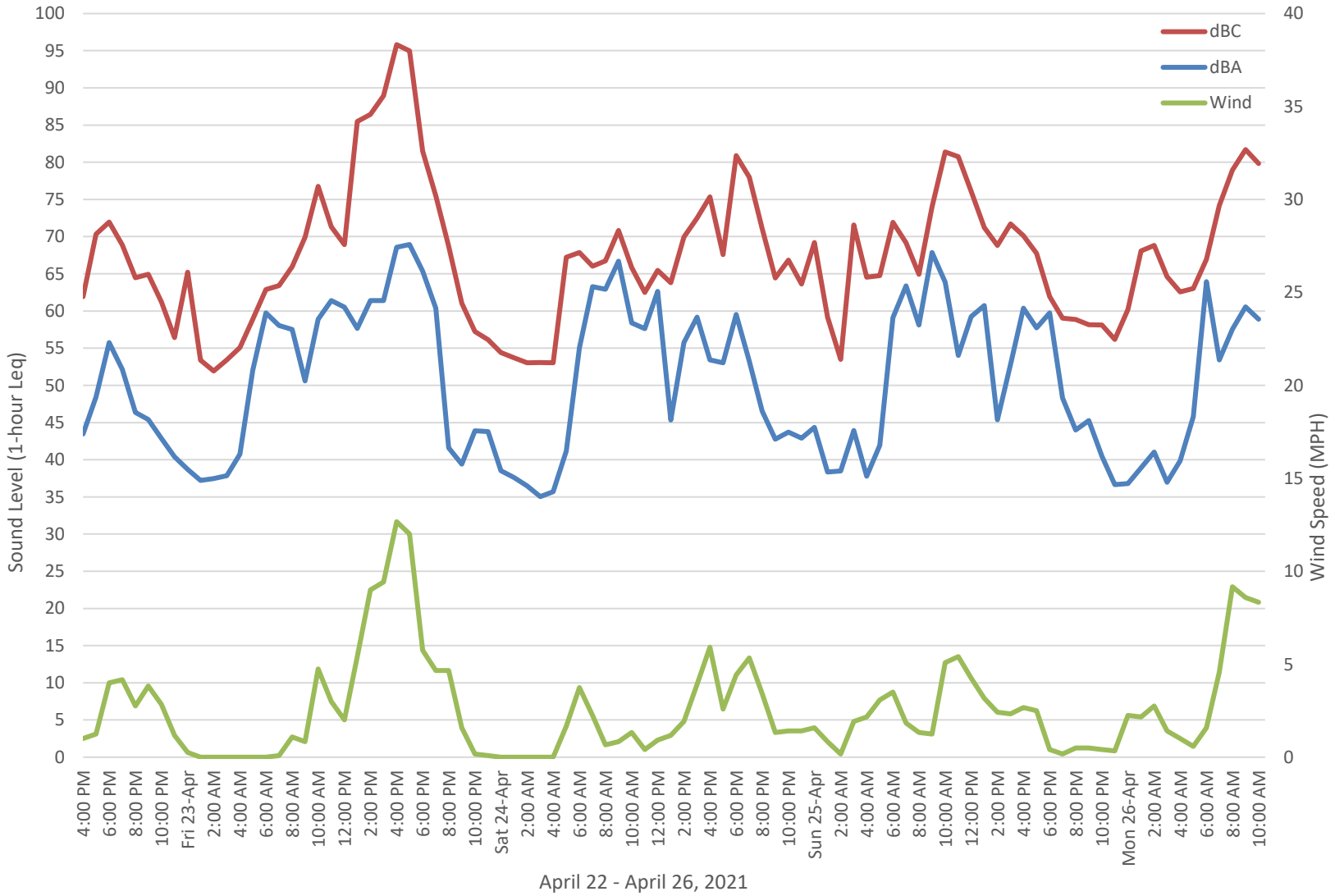


Figure 5-5 Ambient Sound Level Data for Measurement Location 4

6. McGavin 6-19HZ Pad Noise Modeling

6.1 Noise Modeling Methodology

The noise modeling was completed with use of three-dimensional computer noise modeling software. All models in this report were developed with SoundPLAN 8.1 software using the ISO 9613-2 standard. Noise levels are predicted based on the locations, noise levels and frequency spectra of the noise sources, and the geometry and reflective properties of the local terrain, buildings and barriers. To ensure a conservative assessment and compliance with ISO 9613-2 standards, light to moderate winds are assumed to be blowing from the source to receptor. The predicted noise levels represent only the contribution of the drilling, completions and production facility equipment operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Sound level data utilized in the surface drilling model was based on file data of the Precision 461 rig collected by BAENC. The V door faces south with the backyard equipment positioned to the north. Rig placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

Sound level data utilized in the completions model was based on file data of the Halliburton Quiet Fleet completions crew collected by BAENC. The model consists of 12 completions trucks positioned north of the well heads. Completions equipment placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

6.2 Noise Sensitive Receptors

The noise sensitive receptors utilized in the drilling and completions modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the drill pad surface. Receptor points used in the modeling can represent multiple closely located RBU's. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 6-1 shows the dBA and dBC noise sensitive receptor locations.

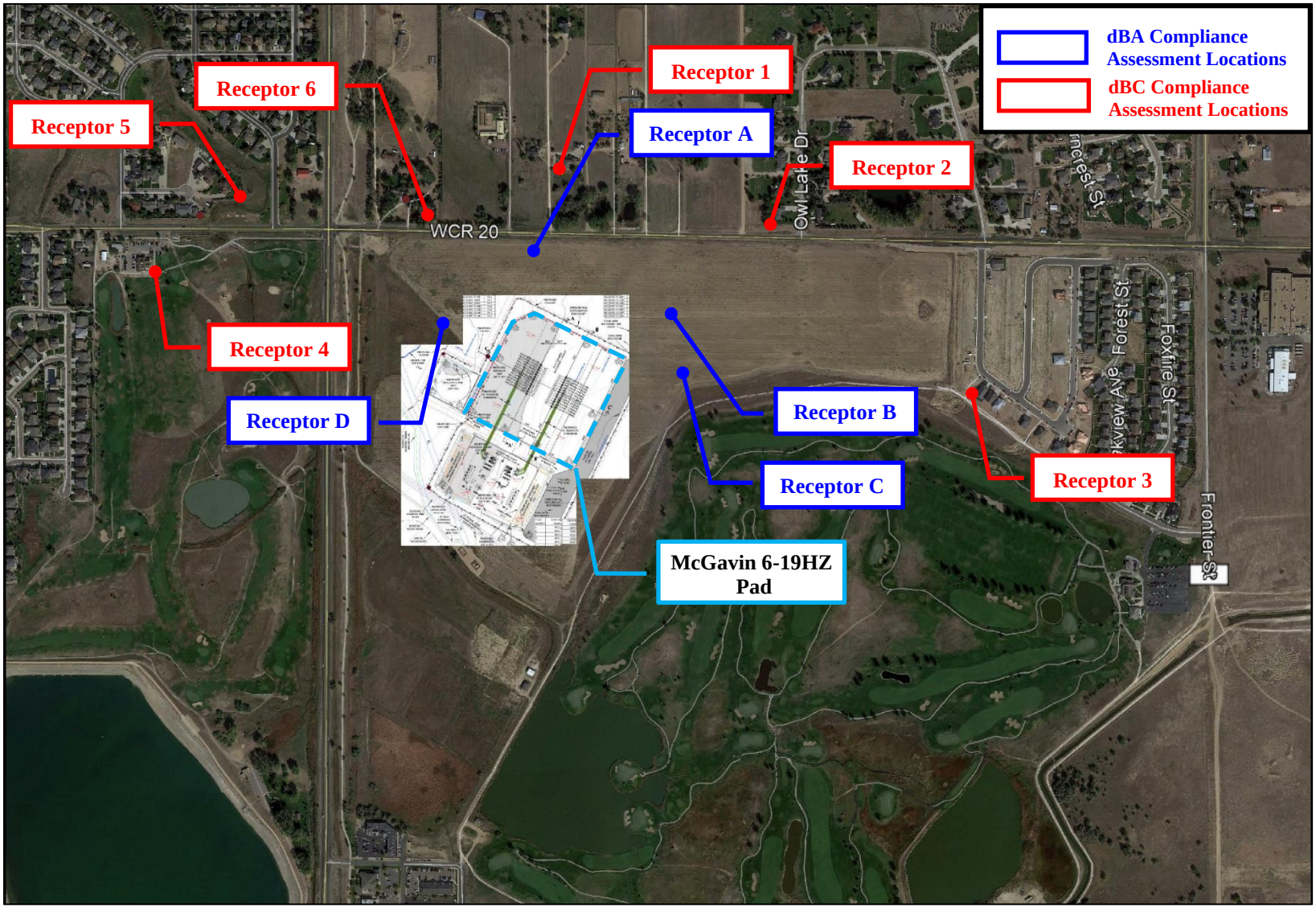


Figure 6-1 Noise Sensitive Receptor Locations

6.3 Unmitigated Drilling and Completions Noise Modeling Results

The unmitigated modeling is based off of current drilling and completions plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated drilling noise modeling are presented in Table 6-1 and Table 6-2. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-2 and Figure 6-3 shows the Unmitigated PD 461 Noise Contour Map in dBA and dBC respectively. Figure 6-4 and Figure 6-5 shows the Unmitigated Halliburton Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

Table 6-1 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location A	350 Feet North	57	58
Location B	350 Feet Northeast	54	61
Location C	350 Feet East	54	62
Location D	350 Feet Northwest	55	59
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**	**65 Day / 60 Night**

Table 6-2 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location 1	6261 County Road 20	67	67
Location 2	9010 Owl Lake Drive	62	65
Location 3	8865 Falcon Street	57	61
Location 4*	5830 Bella Rosa Parkway	59	61
Location 5*	5709 Capistrano Way	60	63
Location 6*	6099 County Road 20	64	67
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted noise level limits. However, the results of the unmitigated noise modeling indicate that drilling operations will exceed the COGCC C-weighted noise level limits. The results of the unmitigated noise modeling indicate that completions operations will exceed the COGCC A-weighted and C-weighted noise level limits. Therefore, mitigation will be recommended for drilling and completions.

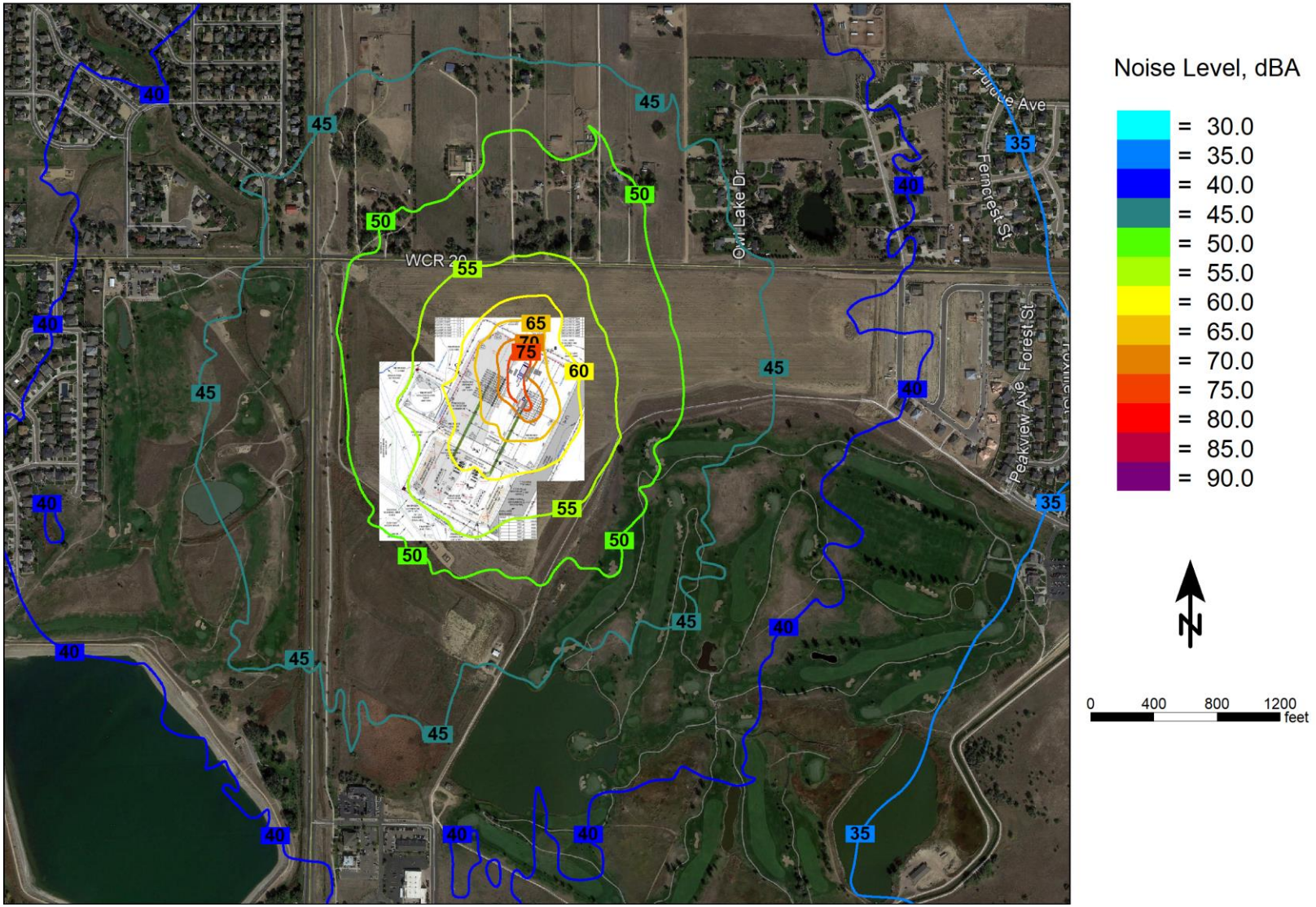


Figure 6-2 PD 461 Unmitigated Noise Contour Map (dBA)

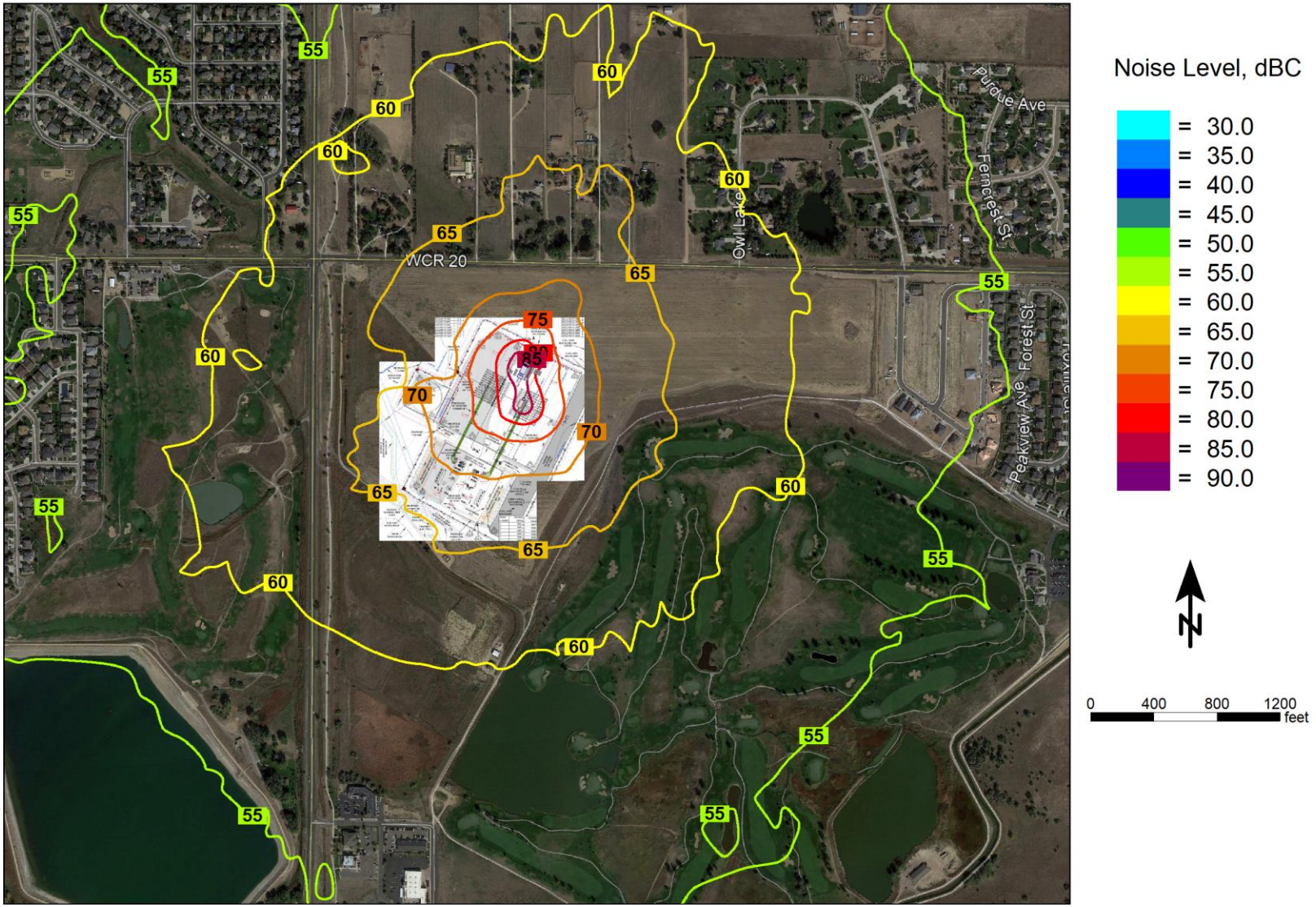


Figure 6-3 PD 461 Unmitigated Noise Contour Map (dBC)

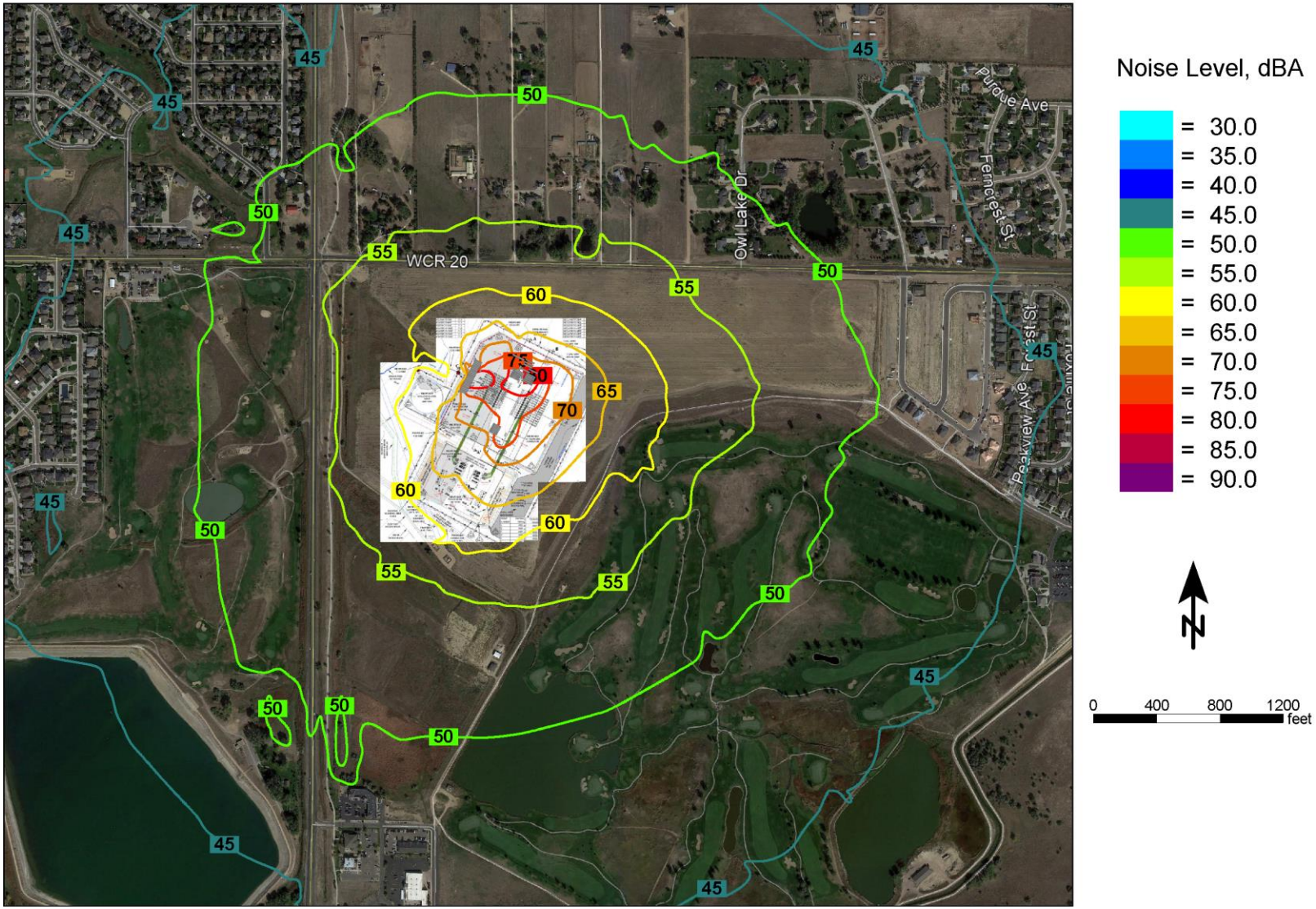


Figure 6-4 Halliburton Unmitigated Noise Contour Map (dBA)

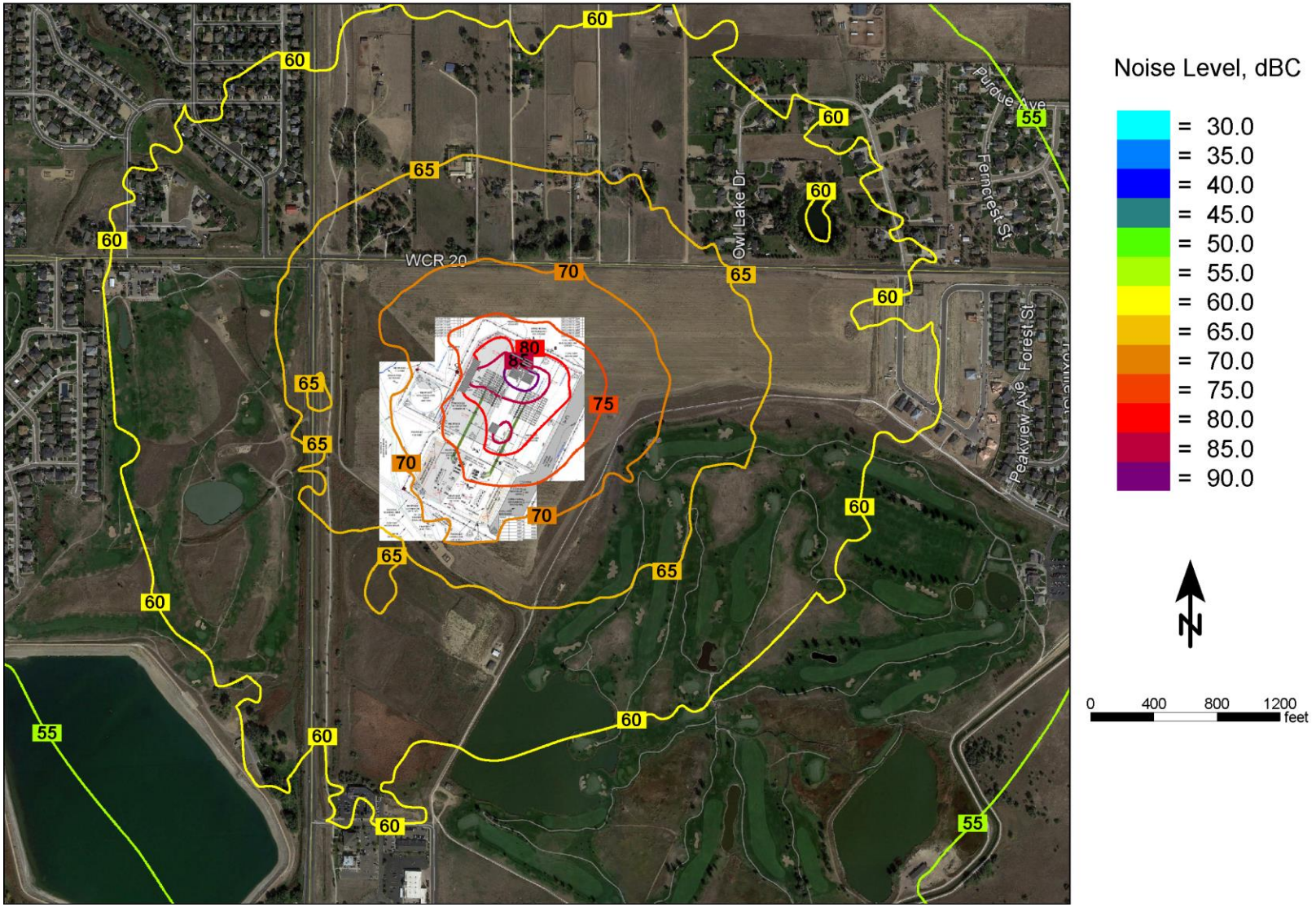


Figure 6-5 Halliburton Unmitigated Noise Contour Map (dBC)

6.4 Drilling Mitigated Modeling Results

Noise mitigation for drilling operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 2,600 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-6.

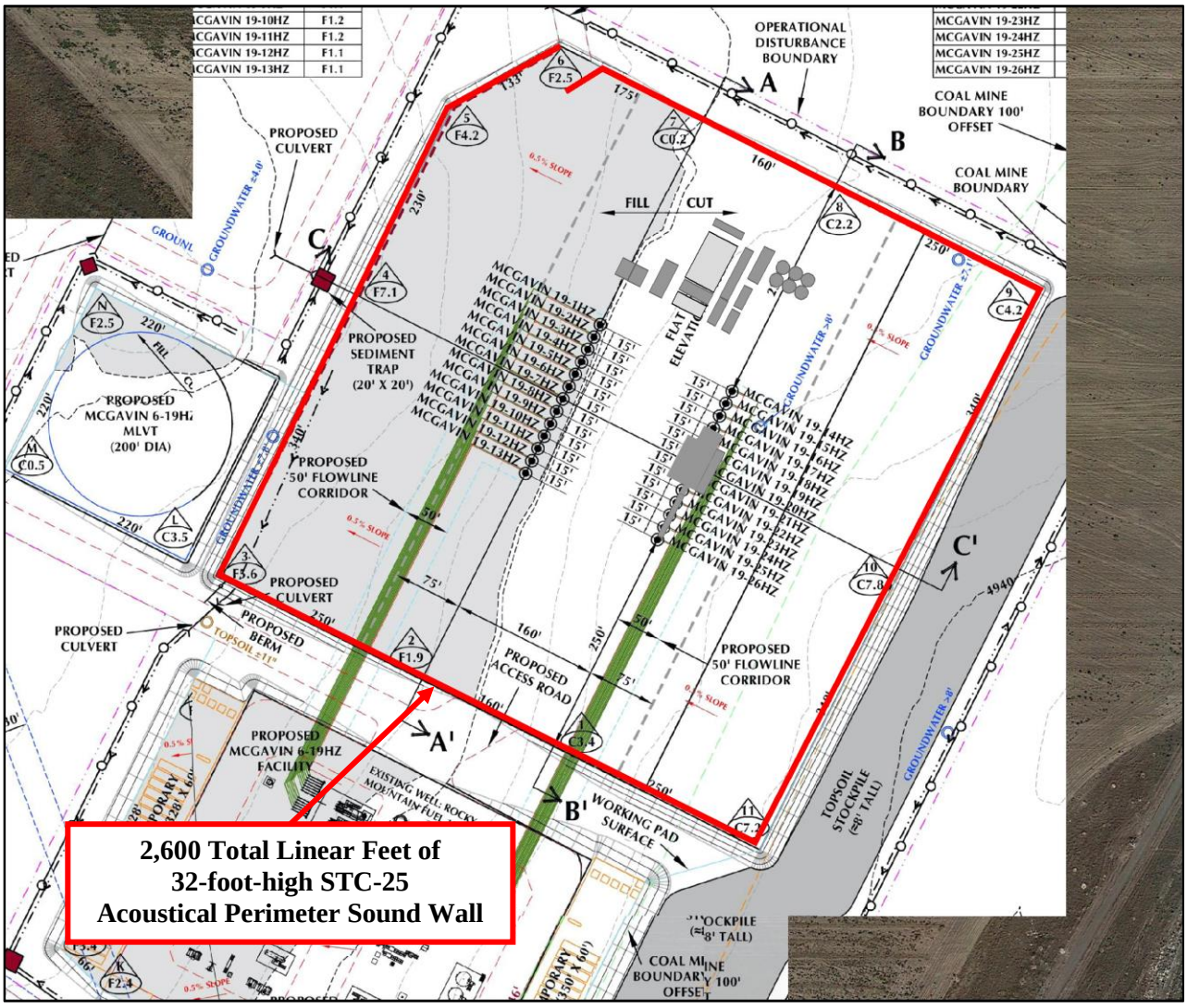


Figure 6-6 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-6. The results of the mitigated noise modeling are presented in Table 6-3 and Table 6-4. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the drilling operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-3 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461
Location A	350 Feet North	49
Location B	350 Feet Northeast	48
Location C	350 Feet East	49
Location D	350 Feet Northwest	47
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-4 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461
Location 1	6261 County Road 20	61
Location 2	9010 Owl Lake Drive	60
Location 3	8865 Falcon Street	56
Location 4*	5830 Bella Rosa Parkway	55
Location 5*	5709 Capistrano Way	56
Location 6*	6099 County Road 20	60
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed drilling operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-7 shows the Mitigated PD 461 Noise Contour Map in the A-weighted scale and Figure 6-8 shows the Mitigated PD461 Noise Contour Map in the C-weighted scale.

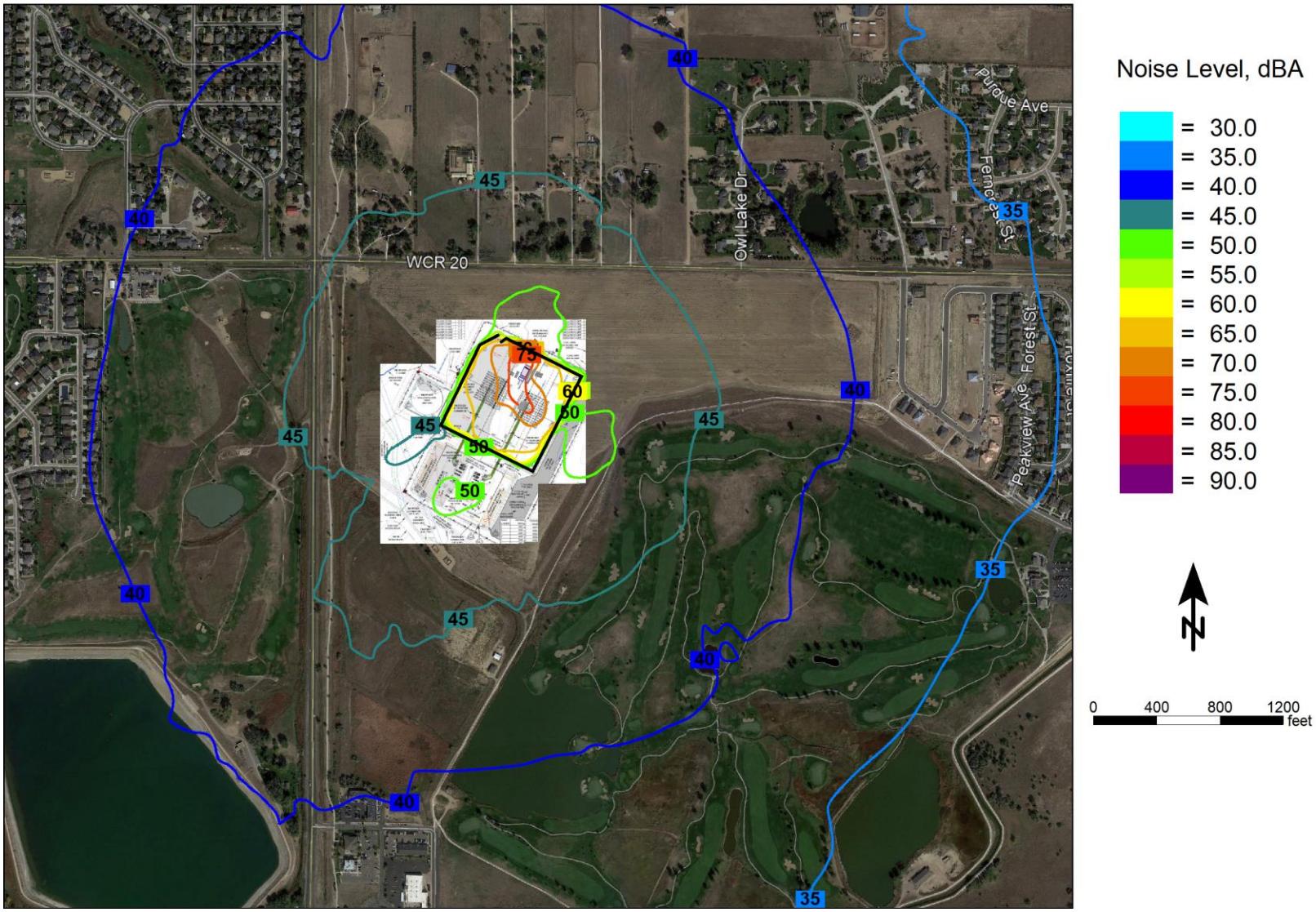


Figure 6-7 Mitigated PD 461 Noise Contour Map (dBA)

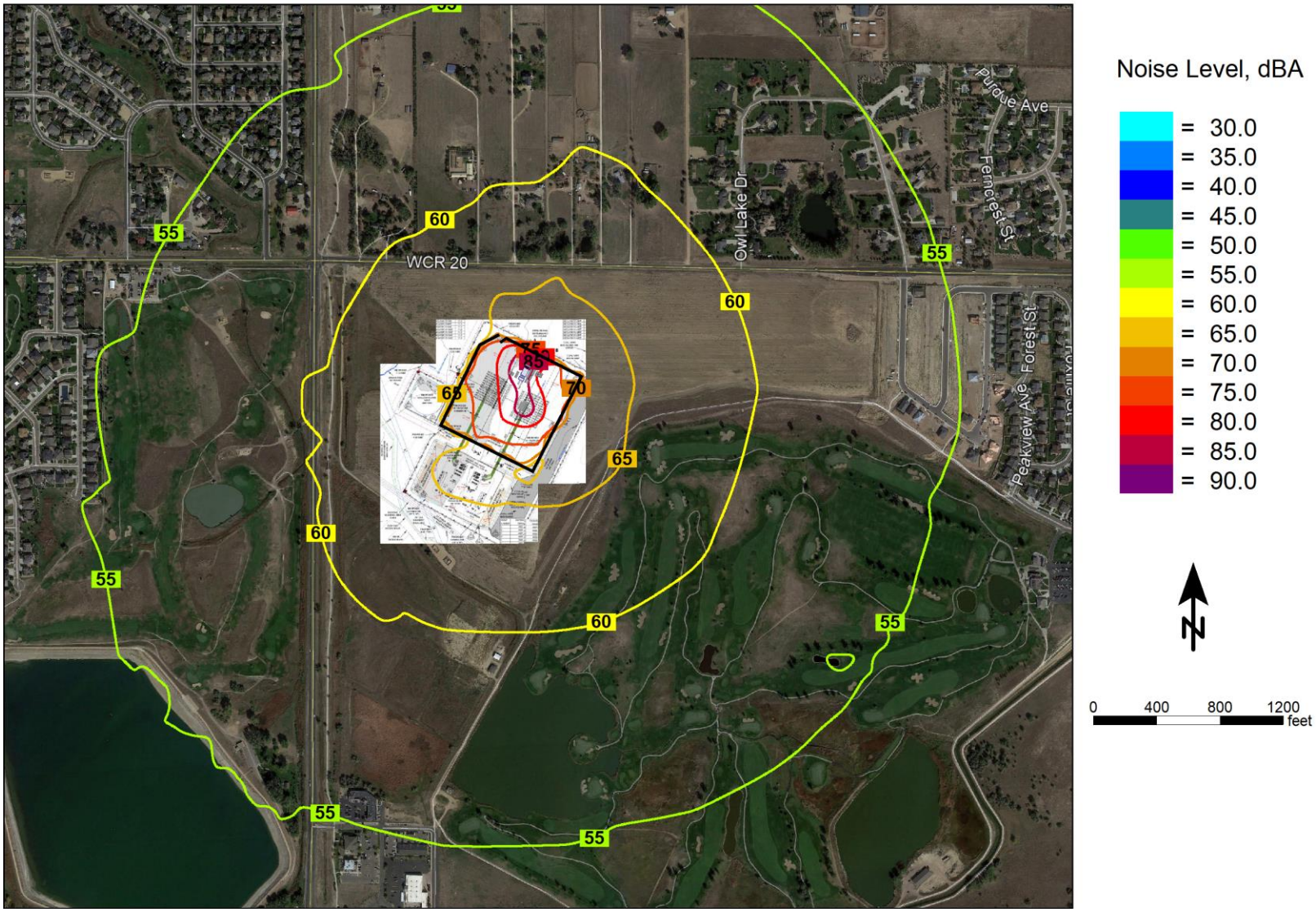


Figure 6-8 Mitigated PD 461 Noise Contour Map (dBC)

6.5 Completions Mitigated Modeling Results

Noise mitigation for completions operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 2,600 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-9.

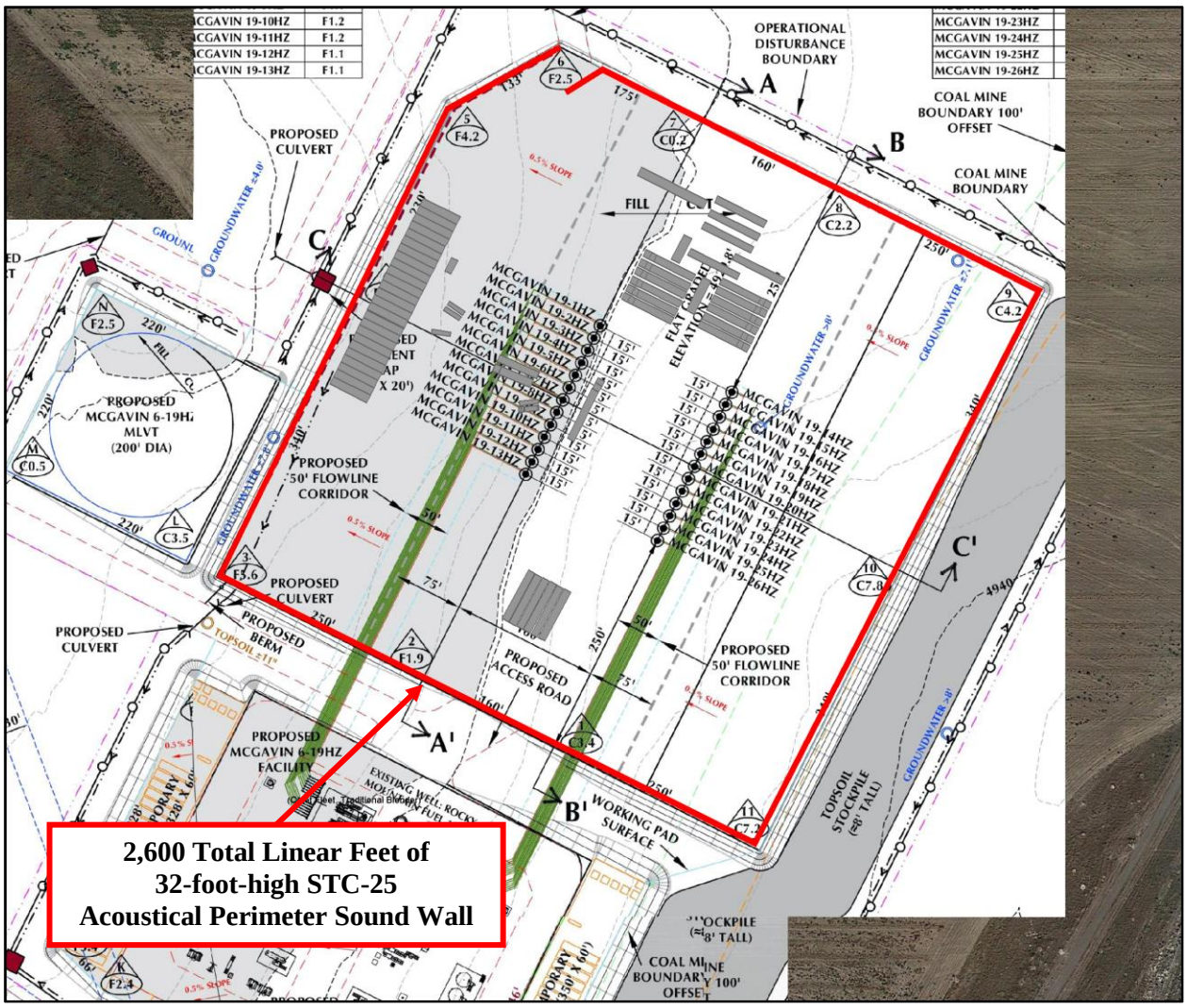


Figure 6-9 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-9. The results of the mitigated noise modeling are presented in Table 6-5 and Table 6-6. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the completions operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-5 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Halliburton Quiet Fleet
Location A	350 Feet North	54
Location B	350 Feet Northeast	55
Location C	350 Feet East	57
Location D	350 Feet Northwest	53
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-6 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Halliburton Quiet Fleet
Location 1	6261 County Road 20	64
Location 2	9010 Owl Lake Drive	63
Location 3	8865 Falcon Street	60
Location 4*	5830 Bella Rosa Parkway	59
Location 5*	5709 Capistrano Way	60
Location 6*	6099 County Road 20	63
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed completions operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-10 shows the Mitigated Halliburton Noise Contour Map in the A-weighted scale Figure 6-11 shows the Mitigated Halliburton Noise Contour Map in the C-weighted scale.

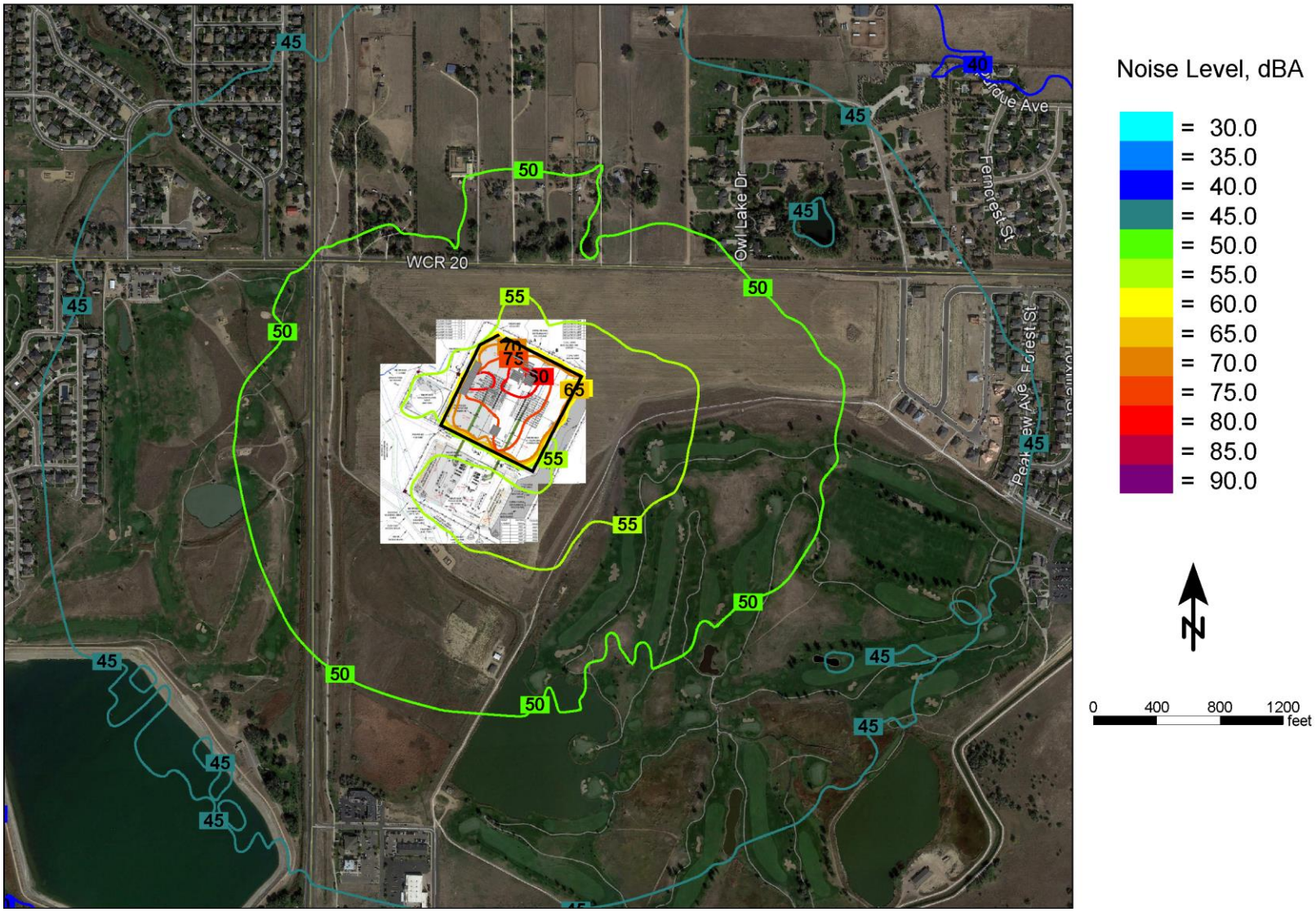


Figure 6-10 Mitigated Halliburton Noise Contour Map (dBA)

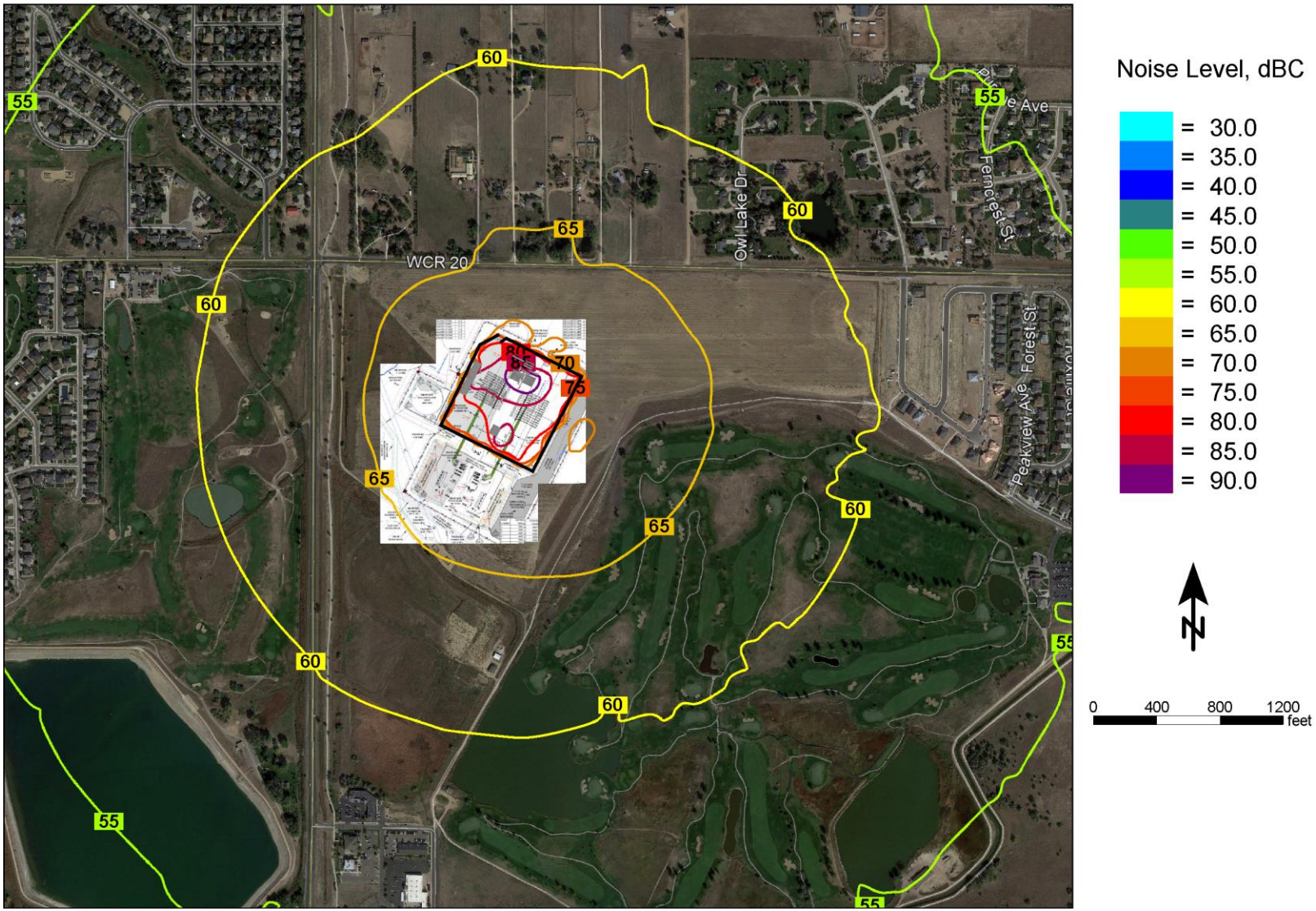


Figure 6-11 Mitigated Halliburton Noise Contour Map (dBC)

7. McGavin 6-19HZ Pad Production Facility Noise Modeling

7.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off of current production site plans and does not include sound walls or other third-party acoustical mitigation measures. The production facility operational noise model was created to predict the constant, steady-state noise levels at the McGavin 6-19HZ pad and adjacent surroundings. The production facility was modeled assuming all listed equipment was operating simultaneously to represent the loudest operating scenario. Sound level data utilized in the production model was based on file data previously collected by BAENC at a KMOG production facility with similar equipment. The production facility equipment list and equipment orientation were supplied by KMOG and can be seen Figure 7-1. The predicted modeling results are dependent on equipment and orientation as indicated.

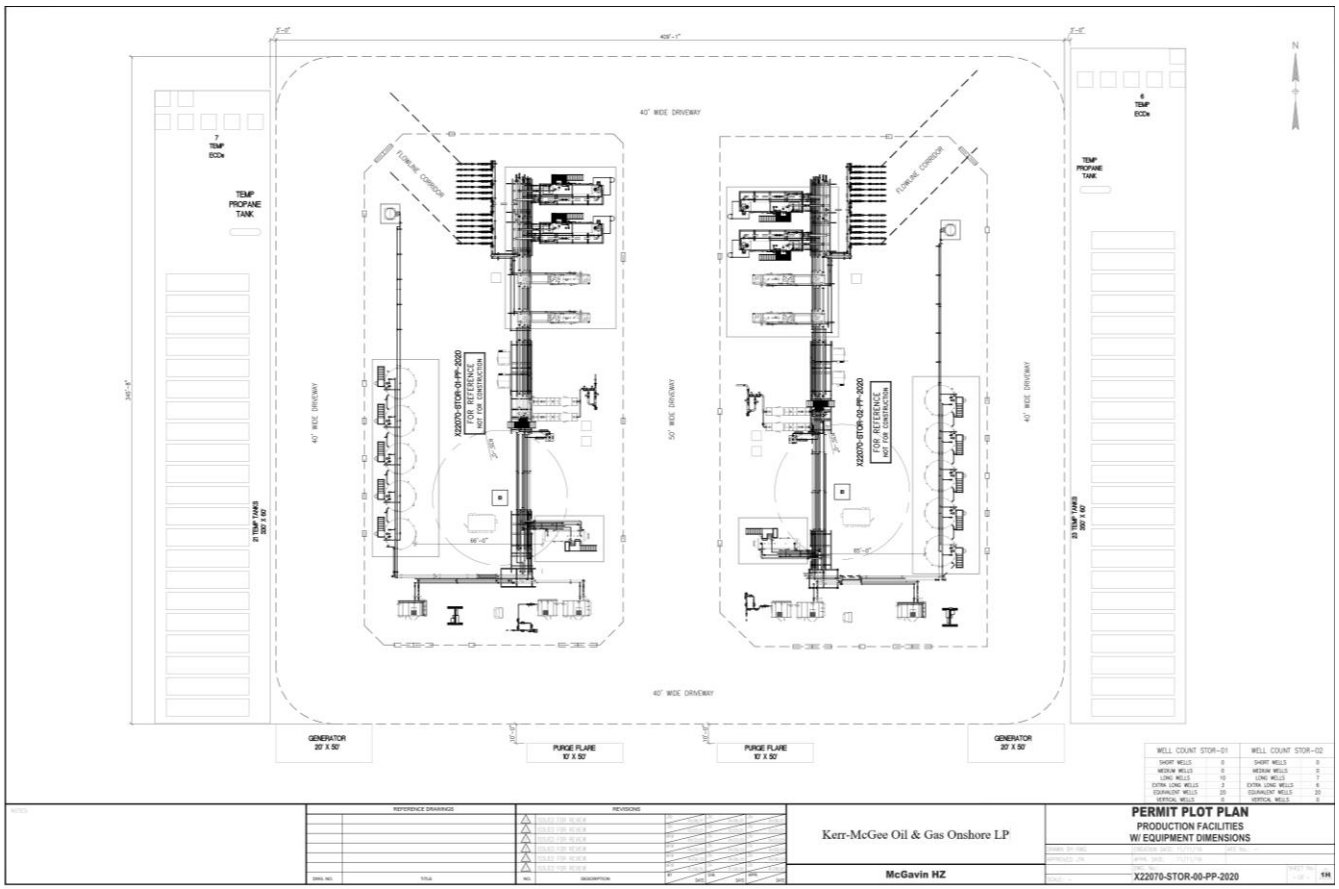


Figure 7-1 Modeled McGavin 6-19HZ Production Facility Layout
(DWG # X22070-STOR-00-PP-2020, 11/11/2016)

The equipment list and layout were scrutinized to determine the major noise emitting sources planned for the site. These major noise sources, listed in Table 7-1, were included in the production modeling. Other auxiliary/temporary equipment or smaller equipment not anticipated to generate significant noise was not included in the production model.

The noise sensitive receptors utilized in the production modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the production pad surface. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 7-2 shows the dBA and dBC noise sensitive receptor locations.

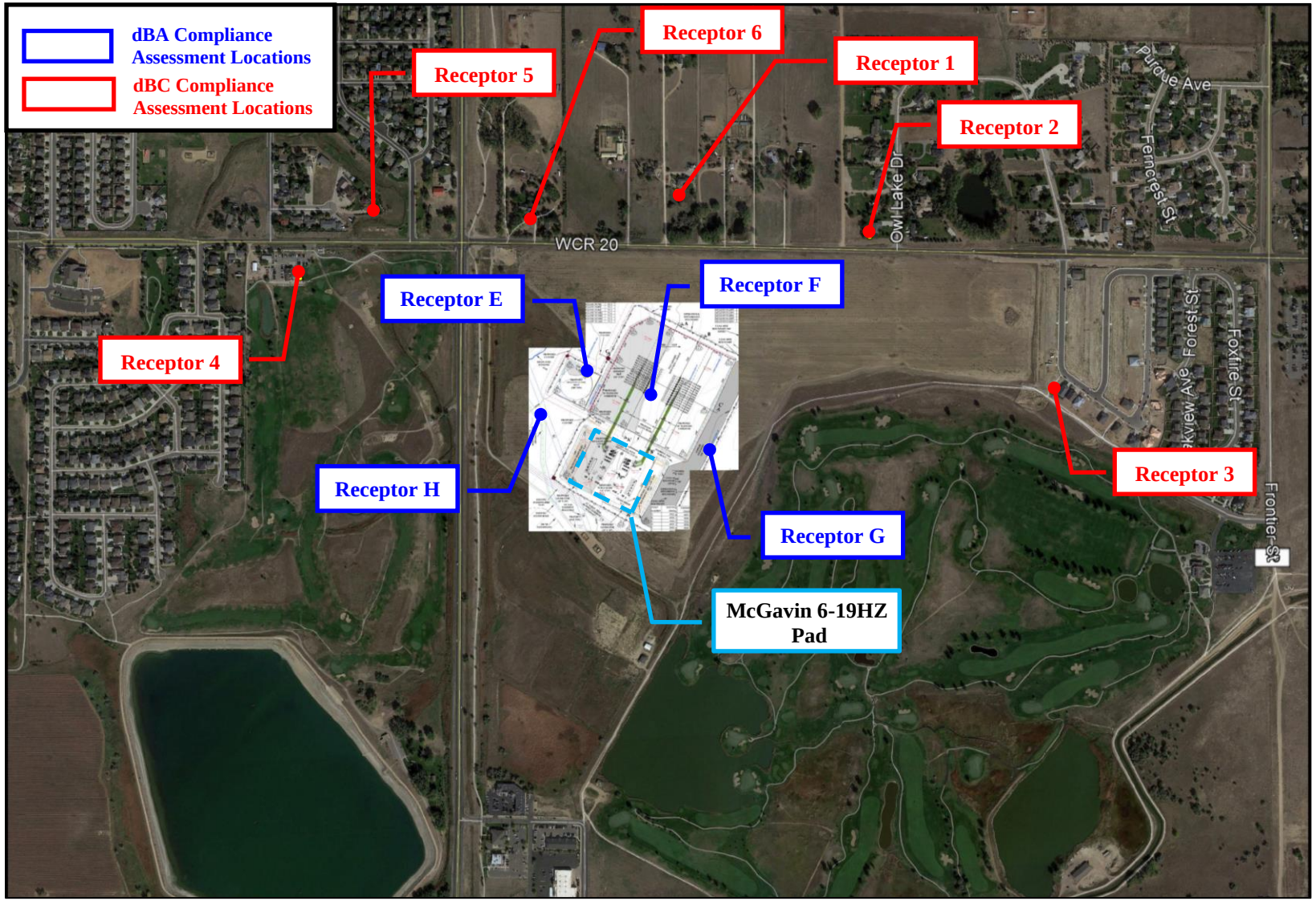


Figure 7-2 Noise Sensitive Receptor Location

The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 7-1.

Table 7-1 Production Facility Major Noise Emitting Equipment Included in Model

Equipment	Quantity
Air Compressor	4
Electrical Panel/Box	4
LACT Building	4
Fisher 4-inch ET Series Whisper I Trim Globe Control Valve	2
Separator	8
Bulk Separator	2
Three Phase Separator Burner	10
VOC Combustor	2

The results of the unmitigated production facility noise modeling are presented in Table 7-2 and Table 7-3. The locations in the tables correspond to the locations identified in Figure 7-2. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 7-3 and Figure 7-4 shows the Unmitigated Production Facility Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

The results of the unmitigated noise modeling indicate that the production operations will comply with the COGCC A-weighted and C-weighted noise level limits.

Table 7-2 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Production Facility
Location E	350 Feet North	50
Location F	350 Feet Northeast	53
Location G	350 Feet East	50
Location H	350 Feet Northwest	49
COGCC Noise Limit	**350 ft. from the working pad surface**	**60 Day / 55 Night**

*Location F is subject to adjusted allowable limits of 68 day / 61 night dBA for production

Table 7-3 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Production Facility
Location 1*	16757 County Road 25	50
Location 2	16127 County Road 85	50
Location 3	16135 County Road 25	43
Location 4**	16134 County Road 23	45
Location 5**	16716 County Road 23	45
Location 6**	11660 County Road 36	47
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**60**

*Location 1 is subject to adjusted allowable limits of 75 day/ 68 night dBC for production
**Location 4, 5, & 6 is subject to adjusted allowable limits of 75 day/ 70 night dBC for production

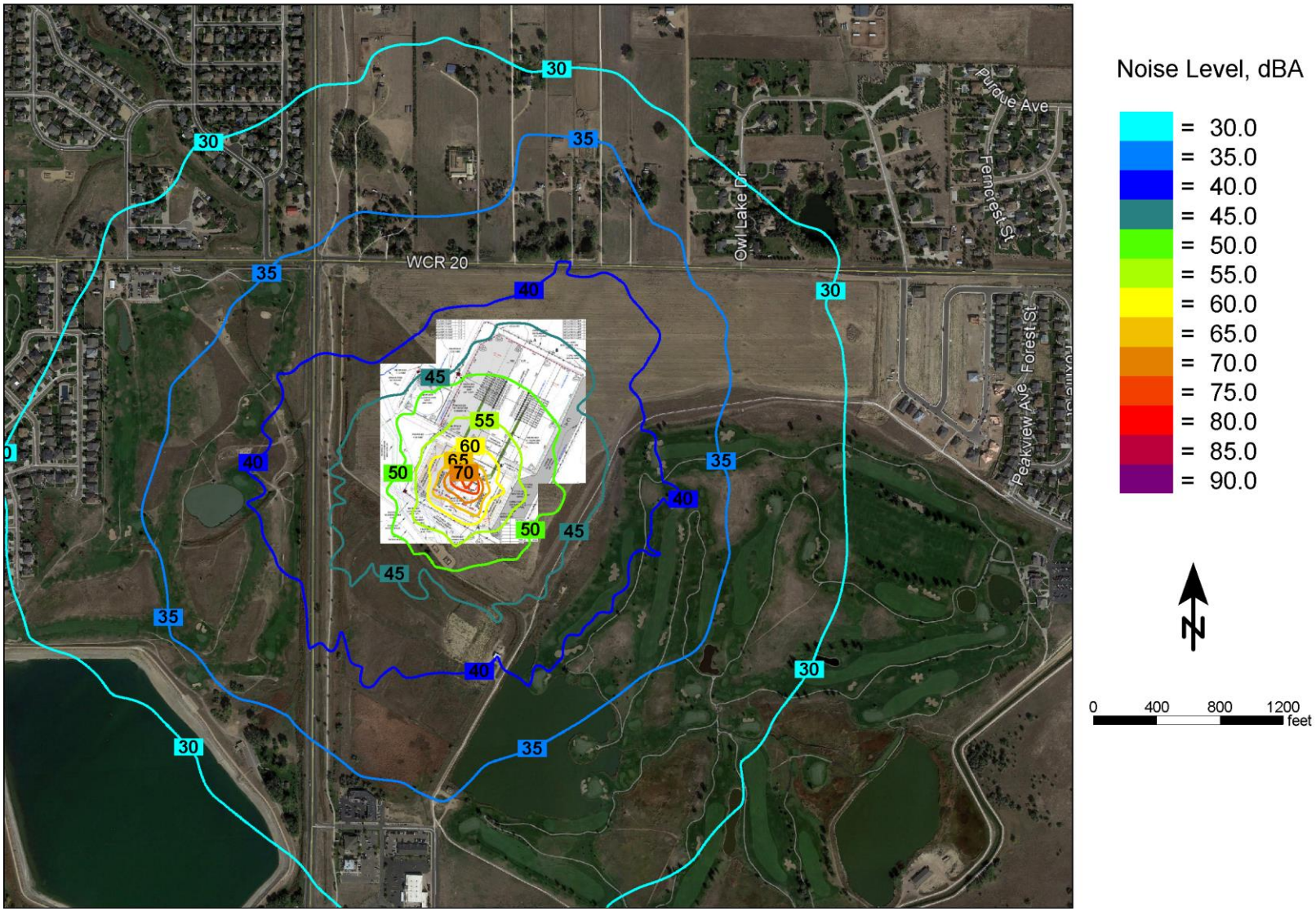


Figure 7-3 Production Facility Unmitigated Noise Contour Map (dBA)

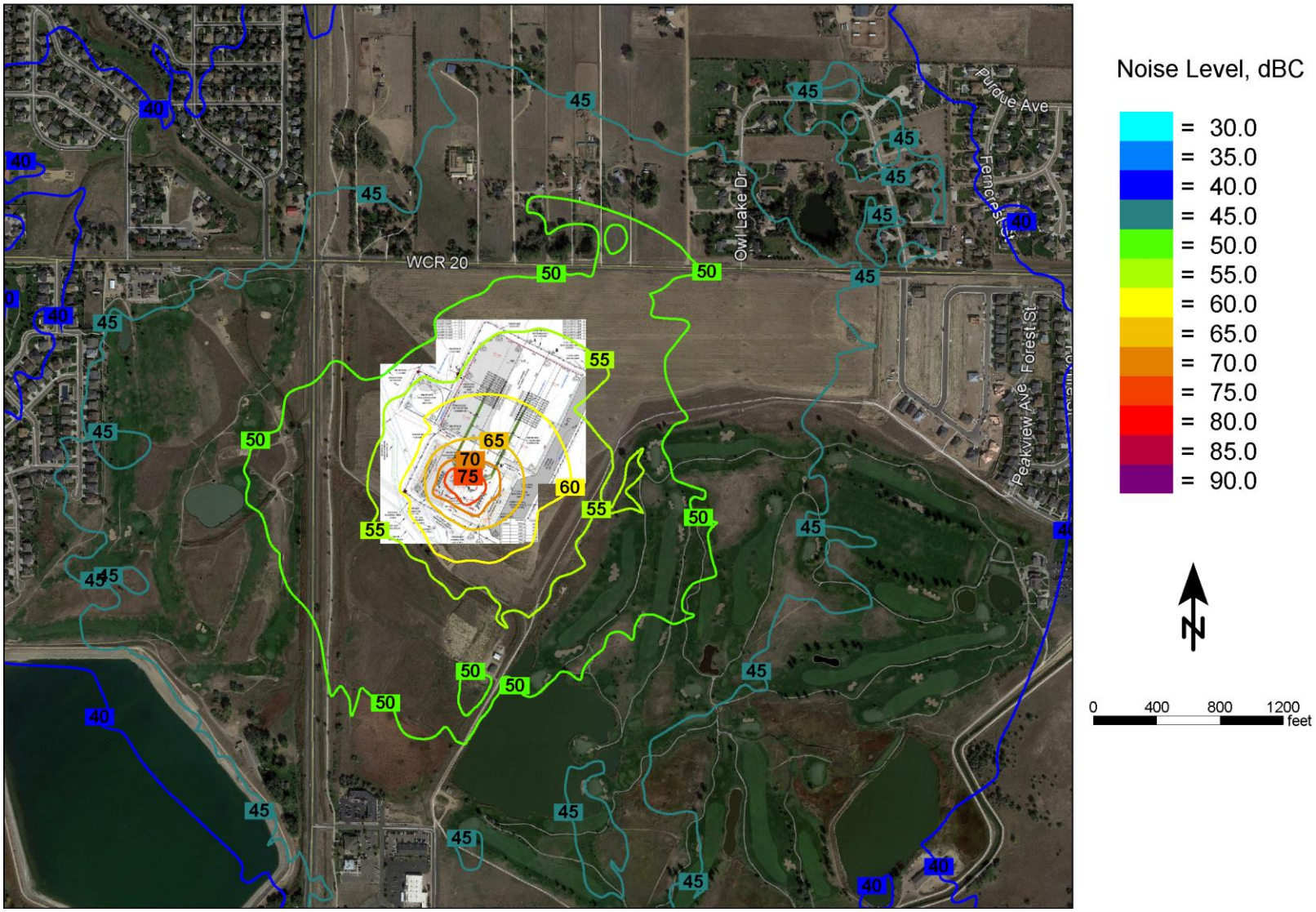


Figure 7-4 Production Facility Unmitigated Noise Contour Map (dBC)

8. Noise Points of Compliance and Continuous Noise Monitoring

8.1 Continuous Monitoring Procedure

The following continuous monitoring procedures are proposed to ensure compliance with the monitoring procedures outlined in COGCC Rule 423.c.(2) and the CDA with the Town of Firestone. To demonstrate compliance with COGCC and CDA noise regulations, pre-production activities and ongoing operations lasting longer than 24 consecutive hours will require continuous monitoring measurements from each noise point of compliance designated. According to Section 423. Noise (c), to demonstrate compliance with Tables 423-1 and 423-2 Operators will measure sound levels according to the following standards:

> (1) During pre-production activities and ongoing operations lasting longer than 24 consecutive hours such as drilling, completion, recompletion, Stimulation, and Well maintenance, in areas zoned residential or within 2,000 feet of a Building Unit, Operators will take continuous sound measurements from each noise point of compliance designated pursuant to Rule 423.a.(5).

Figure 8-1 shows an aerial view of the proposed pad with an approximate 2,000 ft. radius from the working pad surface. There are numerous Residential Building Units (RBU) with in the 2,000 ft. radius. Proposed noise points of compliance are detailed in Table 8-1. The noise points of compliance were selected to represent RBU's in multiple directions from the pad.

Residential Building Units (RBU) may be exempt to continuous monitoring due to rule 423.b.(5) if an agreement is made between the surface owner and operator and subsequently accepted by the COGCC.

Table 8-1 Proposed Continuous Monitoring Locations

Location	Description	Notes
Noise Point of Compliance 1	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 2	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 3	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 4	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted

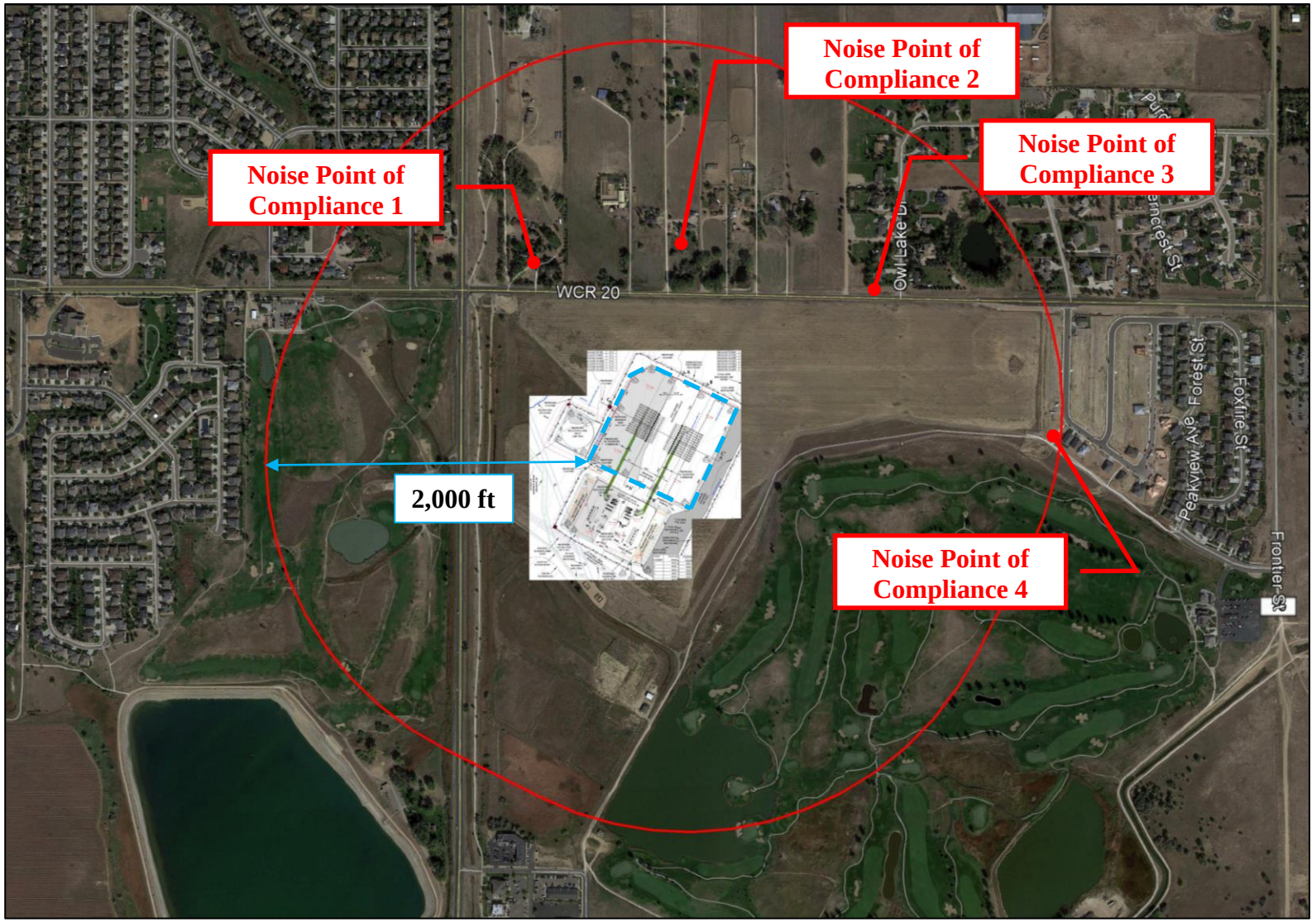


Figure 8-1 Proposed Continuous Monitoring Locations

Appendix A - Ambient Data

Table A-8-2 Recorded Hourly Average Ambient Sound Levels Location 1 (1-hr dBA L_{eq})

Location 1 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	55	69	2:00 PM	54	75
5:00 PM	58	75	3:00 PM	57	80
6:00 PM	59	74	4:00 PM	60	82
7:00 PM	58	71	5:00 PM	56	77
8:00 PM	57	68	6:00 PM	57	79
9:00 PM	56	66	7:00 PM	57	73
10:00 PM	53	62	8:00 PM	55	73
11:00 PM	50	59	9:00 PM	54	68
Fri 23-Apr	48	57	10:00 PM	54	68
1:00 AM	47	56	11:00 PM	51	62
2:00 AM	45	53	Sun 25-Apr	52	62
3:00 AM	46	54	1:00 AM	47	58
4:00 AM	51	60	2:00 AM	48	56
5:00 AM	57	65	3:00 AM	47	64
6:00 AM	60	68	4:00 AM	44	61
7:00 AM	59	69	5:00 AM	49	68
8:00 AM	56	71	6:00 AM	54	73
9:00 AM	55	69	7:00 AM	53	69
10:00 AM	56	78	8:00 AM	54	67
11:00 AM	54	74	9:00 AM	54	70
12:00 PM	54	73	10:00 AM	56	79
1:00 PM	58	82	11:00 AM	57	79
2:00 PM	65	89	12:00 PM	58	79
3:00 PM	68	91	1:00 PM	58	79
4:00 PM	76	95	2:00 PM	55	74
5:00 PM	73	92	3:00 PM	56	75
6:00 PM	64	82	4:00 PM	58	78
7:00 PM	59	79	5:00 PM	56	74
8:00 PM	56	78	6:00 PM	58	71
9:00 PM	53	70	7:00 PM	58	68
10:00 PM	53	64	8:00 PM	57	67
11:00 PM	52	61	9:00 PM	56	64
Sat 24-Apr	49	59	10:00 PM	54	62
1:00 AM	47	56	11:00 PM	50	62
2:00 AM	46	56	Mon 26-Apr	47	55
3:00 AM	45	56	1:00 AM	44	65
4:00 AM	47	57	2:00 AM	46	70
5:00 AM	49	61	3:00 AM	47	66
6:00 AM	51	72	4:00 AM	52	65
7:00 AM	57	71	5:00 AM	57	66
8:00 AM	61	67	6:00 AM	60	70
9:00 AM	56	68	7:00 AM	61	78
10:00 AM	56	69	8:00 AM	62	82
11:00 AM	55	70	9:00 AM	62	82
12:00 PM	55	72	10:00 AM	62	83
1:00 PM	54	72			

Table A-8-3 Recorded Hourly Average Ambient Sound Levels Location 2 (1-hr dBA L_{eq})

Location 2 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	63	73	2:00 PM	59	69
5:00 PM	63	77	3:00 PM	60	69
6:00 PM	62	75	4:00 PM	59	69
7:00 PM	59	68	5:00 PM	60	67
8:00 PM	59	66	6:00 PM	60	67
9:00 PM	56	63	7:00 PM	59	66
10:00 PM	55	62	8:00 PM	58	64
11:00 PM	53	59	9:00 PM	55	63
Fri 23-Apr	47	56	10:00 PM	56	63
1:00 AM	47	55	11:00 PM	53	58
2:00 AM	50	55	Sun 25-Apr	50	59
3:00 AM	47	54	1:00 AM	44	55
4:00 AM	54	60	2:00 AM	47	53
5:00 AM	60	66	3:00 AM	44	57
6:00 AM	63	70	4:00 AM	46	61
7:00 AM	64	71	5:00 AM	53	63
8:00 AM	63	73	6:00 AM	56	65
9:00 AM	61	68	7:00 AM	57	65
10:00 AM	62	69	8:00 AM	58	65
11:00 AM	61	69	9:00 AM	59	68
12:00 PM	62	70	10:00 AM	60	68
1:00 PM	62	72	11:00 AM	61	70
2:00 PM	61	70	12:00 PM	60	69
3:00 PM	62	73	1:00 PM	59	70
4:00 PM	71	86	2:00 PM	60	71
5:00 PM	64	88	3:00 PM	59	69
6:00 PM	61	76	4:00 PM	59	71
7:00 PM	59	68	5:00 PM	58	66
8:00 PM	57	65	6:00 PM	60	69
9:00 PM	56	64	7:00 PM	59	65
10:00 PM	55	65	8:00 PM	58	63
11:00 PM	54	63	9:00 PM	57	63
Sat 24-Apr	49	59	10:00 PM	54	62
1:00 AM	51	57	11:00 PM	51	63
2:00 AM	48	56	Mon 26-Apr	43	50
3:00 AM	49	61	1:00 AM	40	58
4:00 AM	49	57	2:00 AM	40	61
5:00 AM	56	64	3:00 AM	47	58
6:00 AM	59	66	4:00 AM	54	62
7:00 AM	61	68	5:00 AM	60	66
8:00 AM	62	69	6:00 AM	63	70
9:00 AM	62	71	7:00 AM	64	72
10:00 AM	64	71	8:00 AM	62	76
11:00 AM	63	71	9:00 AM	63	82
12:00 PM	62	70	10:00 AM	61	82
1:00 PM	61	69			

Table A-8-4 Recorded Hourly Average Ambient Sound Levels Location 3 (1-hr dBA L_{eq})

Location 3 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	48	64	2:00 PM	62	67
5:00 PM	49	73	3:00 PM	49	68
6:00 PM	49	71	4:00 PM	44	69
7:00 PM	49	67	5:00 PM	42	63
8:00 PM	46	61	6:00 PM	44	63
9:00 PM	43	62	7:00 PM	48	62
10:00 PM	42	56	8:00 PM	46	59
11:00 PM	40	57	9:00 PM	44	57
Fri 23-Apr	36	52	10:00 PM	45	57
1:00 AM	36	52	11:00 PM	43	54
2:00 AM	38	52	Sun 25-Apr	42	58
3:00 AM	36	52	1:00 AM	37	56
4:00 AM	42	54	2:00 AM	37	56
5:00 AM	48	58	3:00 AM	35	56
6:00 AM	50	61	4:00 AM	37	66
7:00 AM	52	63	5:00 AM	39	65
8:00 AM	50	64	6:00 AM	51	71
9:00 AM	46	62	7:00 AM	54	64
10:00 AM	48	66	8:00 AM	45	59
11:00 AM	46	63	9:00 AM	46	62
12:00 PM	46	64	10:00 AM	46	65
1:00 PM	47	65	11:00 AM	46	67
2:00 PM	49	71	12:00 PM	46	66
3:00 PM	51	74	1:00 PM	46	72
4:00 PM	66	84	2:00 PM	45	66
5:00 PM	60	86	3:00 PM	42	63
6:00 PM	49	72	4:00 PM	43	66
7:00 PM	47	66	5:00 PM	42	61
8:00 PM	42	66	6:00 PM	44	59
9:00 PM	42	57	7:00 PM	46	56
10:00 PM	44	56	8:00 PM	45	56
11:00 PM	44	56	9:00 PM	45	58
Sat 24-Apr	41	55	10:00 PM	42	56
1:00 AM	39	52	11:00 PM	34	57
2:00 AM	37	52	Mon 26-Apr	33	57
3:00 AM	38	55	1:00 AM	31	55
4:00 AM	37	52	2:00 AM	32	62
5:00 AM	43	57	3:00 AM	36	56
6:00 AM	43	61	4:00 AM	40	56
7:00 AM	44	61	5:00 AM	45	59
8:00 AM	64	69	6:00 AM	53	66
9:00 AM	62	69	7:00 AM	53	78
10:00 AM	66	69	8:00 AM	54	81
11:00 AM	48	63	9:00 AM	55	81
12:00 PM	63	66	10:00 AM	56	81
1:00 PM	66	69			

Table A-8-5 Recorded Hourly Average Ambient Sound Levels Location 4 (1-hr dBA L_{eq})

Location 4 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	43	62	2:00 PM	56	70
5:00 PM	48	70	3:00 PM	59	72
6:00 PM	56	72	4:00 PM	53	75
7:00 PM	52	69	5:00 PM	53	68
8:00 PM	46	64	6:00 PM	60	81
9:00 PM	45	65	7:00 PM	53	78
10:00 PM	43	61	8:00 PM	47	71
11:00 PM	40	56	9:00 PM	43	64
Fri 23-Apr	39	65	10:00 PM	44	67
1:00 AM	37	53	11:00 PM	43	64
2:00 AM	37	52	Sun 25-Apr	44	69
3:00 AM	38	53	1:00 AM	38	59
4:00 AM	41	55	2:00 AM	38	54
5:00 AM	52	59	3:00 AM	44	72
6:00 AM	60	63	4:00 AM	38	65
7:00 AM	58	63	5:00 AM	42	65
8:00 AM	58	66	6:00 AM	59	72
9:00 AM	51	70	7:00 AM	63	69
10:00 AM	59	77	8:00 AM	58	65
11:00 AM	61	71	9:00 AM	68	74
12:00 PM	61	69	10:00 AM	64	81
1:00 PM	58	86	11:00 AM	54	81
2:00 PM	61	86	12:00 PM	59	76
3:00 PM	61	89	1:00 PM	61	71
4:00 PM	69	96	2:00 PM	45	69
5:00 PM	69	95	3:00 PM	53	72
6:00 PM	65	82	4:00 PM	60	70
7:00 PM	60	76	5:00 PM	58	68
8:00 PM	42	69	6:00 PM	60	62
9:00 PM	39	61	7:00 PM	48	59
10:00 PM	44	57	8:00 PM	44	59
11:00 PM	44	56	9:00 PM	45	58
Sat 24-Apr	39	54	10:00 PM	40	58
1:00 AM	38	54	11:00 PM	37	56
2:00 AM	36	53	Mon 26-Apr	37	60
3:00 AM	35	53	1:00 AM	39	68
4:00 AM	36	53	2:00 AM	41	69
5:00 AM	41	67	3:00 AM	37	65
6:00 AM	55	68	4:00 AM	40	63
7:00 AM	63	66	5:00 AM	46	63
8:00 AM	63	67	6:00 AM	64	67
9:00 AM	67	71	7:00 AM	53	74
10:00 AM	58	66	8:00 AM	58	79
11:00 AM	58	63	9:00 AM	61	82
12:00 PM	63	65	10:00 AM	59	80
1:00 PM	45	64			

Section 13

Traffic Management Plan and Baseline Road Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Shayelyn Marshall
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, CO 80202

Arcadis U.S., Inc.
11001 W. 120th Avenue
Suite 200
Broomfield
Colorado 80021
Tel 303 544 0043
Fax 720 887 6051
www.arcadis.com

Subject:
Traffic Management Plan for McGavin Pad

ENVIRONMENT

Date:
December 16, 2021

Contact:
Steve Rice

Phone:
303.710.7537

Email:
Steve.Rice@arcadis.com

Our ref:
30057047

Dear Ms. Marshall:

Kerr McGee Oil and Gas Onshore LP (Kerr McGee) has plans to develop mineral leases within the town limits of Firestone, Colorado and has contracted Arcadis U.S., Inc. (Arcadis) to prepare this Traffic Management Plan (TMP) to summarize the guidelines Kerr McGee will adhere to during the construction and development of Oil & Gas well facilities, and associated infrastructure. The objective of this TMP is to provide the Town of Firestone with a summary of the traffic anticipated by the development, along with supplemental information to demonstrate Kerr McGee's intent to comply with the requirements of the Town of Firestone to limit traffic impacts.

DEVELOPMENT PLAN OVERVIEW

The work will include the McGavin Pad. The McGavin Pad will include 26 wells, approximately 25.63 acres of temporary disturbance, and approximately 7.08 acres of final permanent disturbance. The grading plan, which include a layout of the pad, is provided in **Attachment 1.** The proposed haul routes and truck turning movements for the McGavin Pad are presented in **Attachment 2**. The anticipated traffic associated with development of this facility has been summarized in trip generation tables included as **Attachment 3**.

MANAGEMENT OF ROAD IMPACT CONCERNS

A baseline road survey was completed for the McGavin Pad to aid in future assessment of road damage that may occur due to Kerr McGee development activities (**Attachment 4**). Results from the baseline survey indicated County Road (CR) 19 is in good condition from a ride quality standpoint and that the

roadway shows low to moderate rutting, transverse cracking, and fatigue cracking in certain areas. Portions of CR 19 were actively receiving a chip seal treatment, or roadway improvement, during the baseline study. CR 20 is in fair to mediocre condition. The roadway showed signed of low to moderate transverse and block cracking, with moderate longitudinal rutting.

Once Kerr McGee's interim reclamation activities are complete, Arcadis will conduct a follow-up survey to determine if, and where, damage attributable to the added truck traffic occurred. In the event roads are damaged and warrant repair, Kerr McGee will use the baseline and post-completion survey data to determine the nature and extent of damage attributable to their traffic, and work with Firestone to determine how they prefer to handle the repairs.

MANAGEMENT OF TRAFFIC OPERATIONS

Kerr McGee understands the importance of maintaining positive relations with all community stakeholders. Kerr McGee will conduct neighborhood meetings prior to development to help address community concerns as it relates to traffic. As part of their community outreach they will also provide information on how members of the public can raise issues or complaints about traffic directly to Kerr McGee for resolution. The proposed haul route included as **Attachment 2** was selected following review of potential constraints. During route planning it was determined that there are no anticipated conflicts with weight or height restrictions, travel through school zones, or conflicts with routes that are heavily used by residential commuters.

Arcadis also modeled truck movements at the proposed access location and has confirmed the anticipated development phase traffic can safely negotiate all the necessary right- and left-hand turning movements along this route. Some minor access point modifications at the Pad, specifically driveway widening will likely be required. Truck turning movements are included in **Attachment 2**.

Based on Arcadis' review of the proposed route, existing roadway speed limits, unobstructed sight distance, and the anticipated levels of development traffic, Arcadis does not anticipate that restrictions on when deliveries are made to the facility, or use of supplemental traffic controls (e.g., flagging, temporary signage) are warranted.

Kerr McGee does not anticipate, and Arcadis agrees, that their use of public roads to develop this facility will result in a need for an increase in roadway maintenance. Any dust associated with on-site activities and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the site to the extent practical given wind conditions. Additionally, improvements to the access roads will be made such that they are constructed of 100 linear feet of crushed stone and 100 linear feet of hard surface from the point of connection to the respective public road to help mitigate dust and mud concerns. Kerr McGee will apply water or a low magnesium chloride product to dirt roads as necessary. Kerr McGee will also inspect the access regularly and clean/remove any mud or dirt that gets tracked onto public roadways, as necessary.

Kerr McGee instructs all its contractors to adhere to all posted speed limits and traffic controls as a matter of policy. Policy compliance is reinforced through a combination of training, use and review of telematics by their carriers to monitor safe behaviors and investigate concerns, and through periodic audit and review meetings.

Sincerely,

Arcadis U.S., Inc.



Steve Rice
Project Manager

Enclosures:

Attachments

1 Grading Plans
2 Haul Routes and Truck Turning Movements
3 Estimated Trip Generation Data
4 Baseline Roadway Assessment Report

ATTACHMENT 1

Grading Plans

WELL NAME:	C/F
MCGAVIN 19-1HZ	F0.5
MCGAVIN 19-2HZ	F0.6
MCGAVIN 19-3HZ	F0.6
MCGAVIN 19-4HZ	F0.8
MCGAVIN 19-5HZ	F0.9
MCGAVIN 19-6HZ	F0.9
MCGAVIN 19-7HZ	F1.2
MCGAVIN 19-8HZ	F1.2
MCGAVIN 19-9HZ	F1.2
MCGAVIN 19-10HZ	F1.3
MCGAVIN 19-11HZ	F1.3
MCGAVIN 19-12HZ	F1.2
MCGAVIN 19-13HZ	F1.2

NOTE:
FLARE IS TO BE LOCATED A MINIMUM OF 100' FROM THE NEAREST PROPOSED WELL HEAD.

WELL NAME:	C/F
MCGAVIN 19-14HZ	C3.4
MCGAVIN 19-15HZ	C3.6
MCGAVIN 19-16HZ	C3.6
MCGAVIN 19-17HZ	C3.8
MCGAVIN 19-18HZ	C3.9
MCGAVIN 19-19HZ	C4.0
MCGAVIN 19-20HZ	C4.2
MCGAVIN 19-21HZ	C4.3
MCGAVIN 19-22HZ	C4.3
MCGAVIN 19-23HZ	C4.4
MCGAVIN 19-24HZ	C4.5
MCGAVIN 19-25HZ	C4.6
MCGAVIN 19-26HZ	C4.8

PROPOSED ACCESS ROAD
PROPOSED CULVERT
OPERATIONAL DISTURBANCE BOUNDARY
COAL MINE BOUNDARY 100' OFFSET
COAL MINE BOUNDARY
PROPOSED CULVERT
PROPOSED SOUND MITIGATION
PROPOSED SEDIMENT TRAP (20' X 20')
PROPOSED 50' FLOWLINE CORRIDOR
PROPOSED CULVERT
PROPOSED ACCESS ROAD
PROPOSED MCGAVIN 6-19HZ FACILITY
PROPOSED 50' FLOWLINE CORRIDOR
WORKING PAD SURFACE
TOPSOIL STOCKPILE (≈8' TALL)
FLAT GRADED ELEVATION = 4929.9'
EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SI)
MLVT AREA
1.5% SLOPE DIVERSION DITCH
(3:1 TO 5:1) TRANSITIONAL FILL SLOPE
3% SLOPE DIVERSION DITCH
TOPSOIL ±11"
GROUNDWATER ±4.0'
GROUNDWATER ±7.8'
GROUNDWATER ±7.1'
GROUNDWATER >8'
0.5% SLOPE
1% SLOPE
FILL
CUT
A
A'
B
B'
C
C'
4930'
4940'
133'
175'
160'
230'
250'
240'
235'
100'
75'
50'
340'
15'

NOTE:
1. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
2. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.
3. CENTER OF WELL PAD REFERENCED BELOW CORRESPONDS TO THE SURFACE LOCATION OF THE MCGAVIN 19-7HZ WELL.
4. FLAT GRADED AREA TO BE RECLAIMED DURING INTERIM RECLAMATION.

WELL PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

WELL PAD QUANTITIES AND DESIGN PARAMETERS

EXISTING GRADE @ CENTER OF WELL PAD = 4928.7'
FINISHED GRADE ELEVATION = 4929.9'
CUT SLOPES = 3:1
FILL SLOPES = 3:1; EXCEPT AS NOTED
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED WELL PAD SURFACE AREA = 10.17 ACRES
TOTAL WELL PAD AREA = 11.08 ACRES
OPERATIONAL DISTURBANCE AREA = 25.63 ACRES

WELL PAD QUANTITIES

TOTAL CUT FOR WELL PAD = 34,053 C.Y.
TOTAL FILL FOR WELL PAD = 34,053 C.Y.
TOPSOIL @ 11" DEPTH = 16,389 C.Y.
IMPORT MATERIAL = 0 C.Y.

WELL PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH
BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

WELL PAD - MCGAVIN 6-19HZ

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

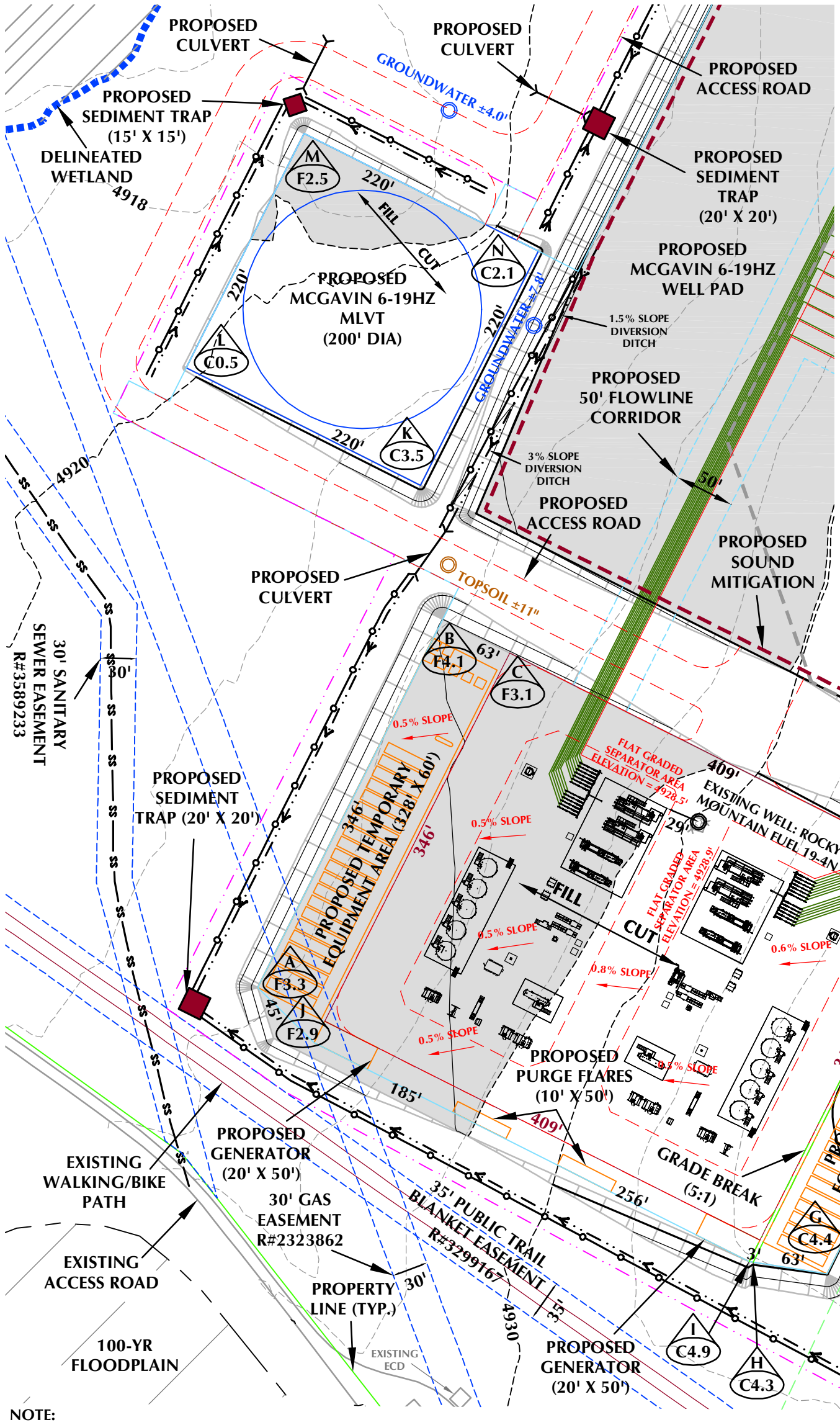
WELL PAD - GRADING PLAN
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ, MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ, MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ, MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ, MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ, MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ, MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100' | DATE: 6/25/2020 | SHEET NO: 1 1 OF 1
REVISED: SRS 12/16/21

K:\NAD\ARKO\2016\2016_105_MCGAVIN_T2N, R67W, SEC_19\DWG\MCGAVIN_NEW_OPTION 2_MASONRY_FENCE.DWG, 12/16/2021 12:25:09 PM, steven



MLVT PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

FINISHED GRADE ELEVATION = 4919.3'
CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED MLVT PAD AREA = 1.11 ACRES
TOTAL MLVT PAD AREA = 1.31 ACRES

MLVT PAD QUANTITIES

TOTAL CUT FOR MLVT PAD = 1,178 C.Y.
TOTAL FILL FOR MLVT PAD = 1,178 C.Y.
TOPSOIL @ 11" DEPTH = 1,939 C.Y.
IMPORT MATERIAL = 0 C.Y.

TEMPORARY EQUIPMENT PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED PAD AREA = 0.78 ACRES
TOTAL PAD AREA = 0.87 ACRES

PAD QUANTITIES

TOTAL CUT FOR PAD = 3,634 C.Y.
TOTAL FILL FOR PAD = 2,252 C.Y.
TOPSOIL @ 11" DEPTH = 1,283 C.Y.
EXCESS MATERIAL = 1,382 C.Y.

POINT NUMBER	EXISTING GRADE	FINISHED GRADE
A	4923.8	4927.1
B	4923.9	4928.0
C	4925.2	4928.3
D	4935.6	4930.0
E	4935.6	4930.6
F	4936.1	4930.8
G	4934.3	4929.9
H	4933.9	4929.6
I	4933.9	4929.0
J	4924.4	4927.3

NOTE:

1. TOTAL EARTHWORK QUANTITIES BETWEEN THE FACILITY PAD AND TEMPORARY EQUIPMENT PAD BALANCE (0 C.Y. OF IMPORT MATERIAL). COMBINING THE PADS REQUIRE A TOTAL CUT OF 12,139 C.Y. AND FILL OF 12,139 C.Y.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
3. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.

FACILITY PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

FACILITY PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED FACILITY PAD SURFACE AREA = 3.79 ACRES
TOTAL FACILITY PAD AREA = 4.45 ACRES
OPERATIONAL DISTURBANCE AREA = 25.63 ACRES

FACILITY PAD QUANTITIES

TOTAL CUT FOR FACILITY PAD = 8,422 C.Y.
TOTAL FILL FOR FACILITY PAD = 9,804 C.Y.
TOPSOIL @ 11" DEPTH = 6,584 C.Y.
IMPORT MATERIAL = 1,382 C.Y.

FACILITY PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH
BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

FACILITY PAD - MCGAVIN 6-19HZ

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

FACILITY PAD - GRADING PLAN
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ,
MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ,
MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ,
MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ,
MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ,
MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ,
MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

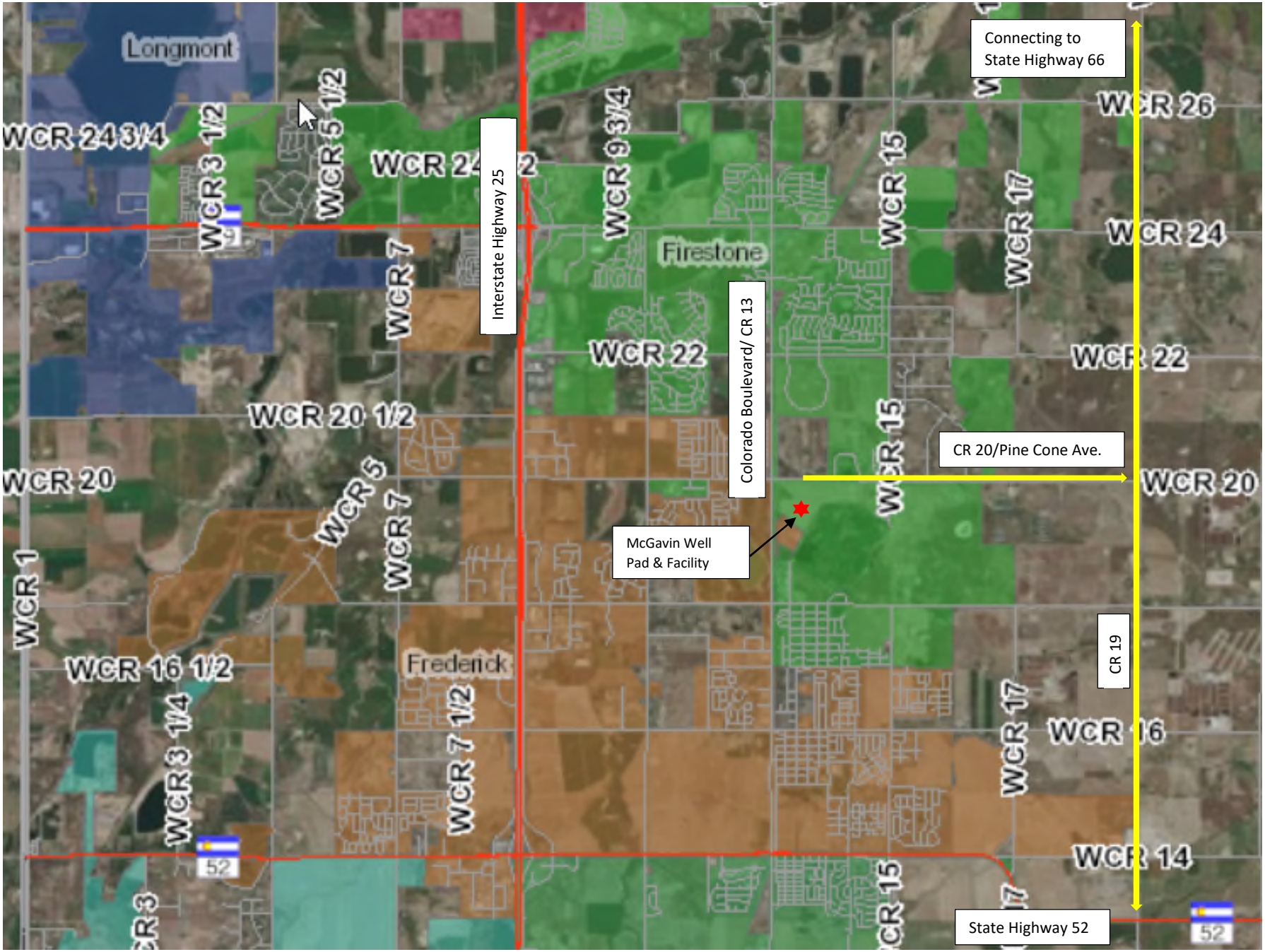
609 CONSULTING, LLC
LOVELAND OFFICE
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SCALE: 1"=100' | DATE: 6/25/2020 | SHEET NO: 1 1 OF 1
REVISED: HJL 12/16/21

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ATTACHMENT 2

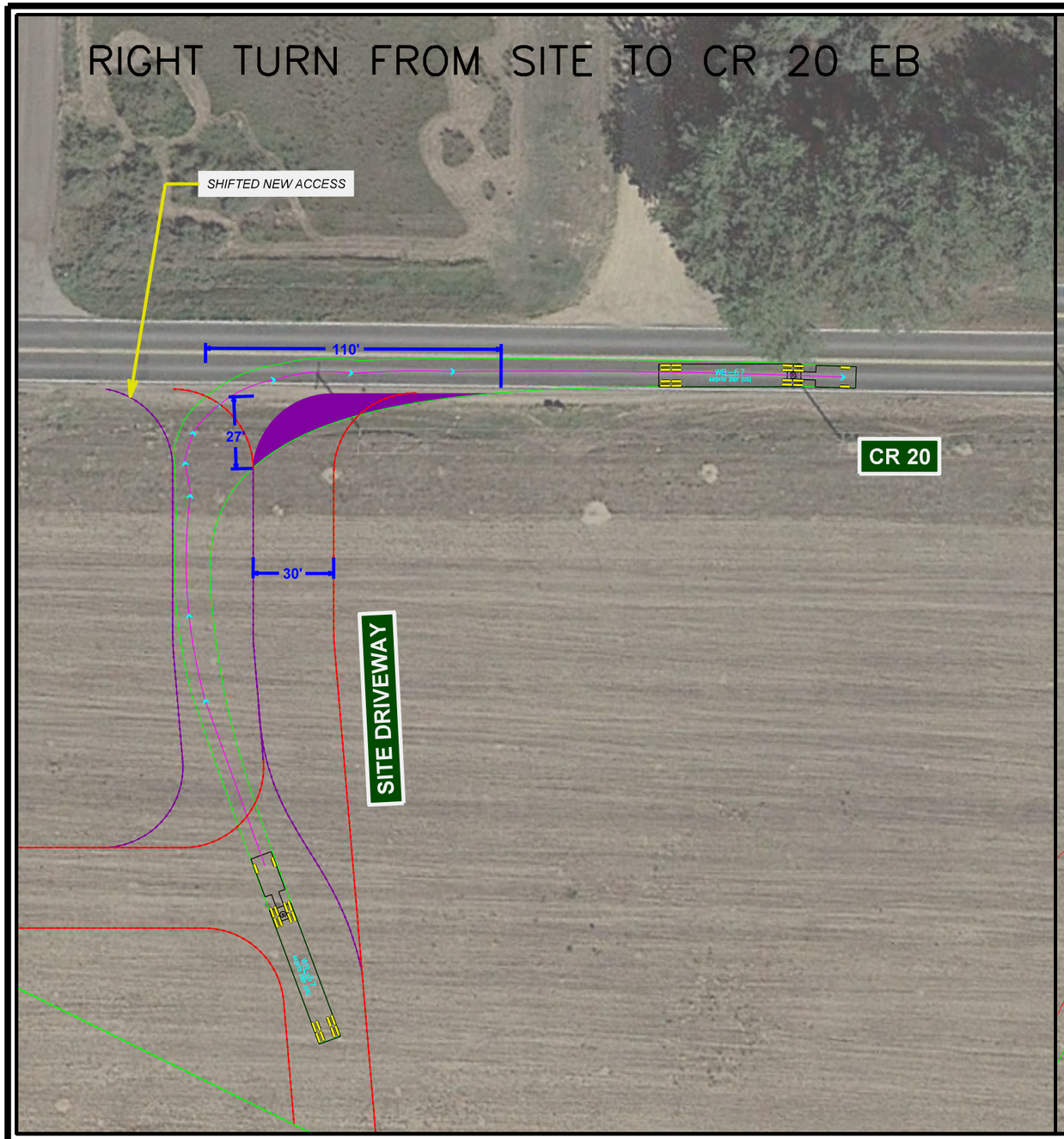
Haul Routes and Truck Turning Movements



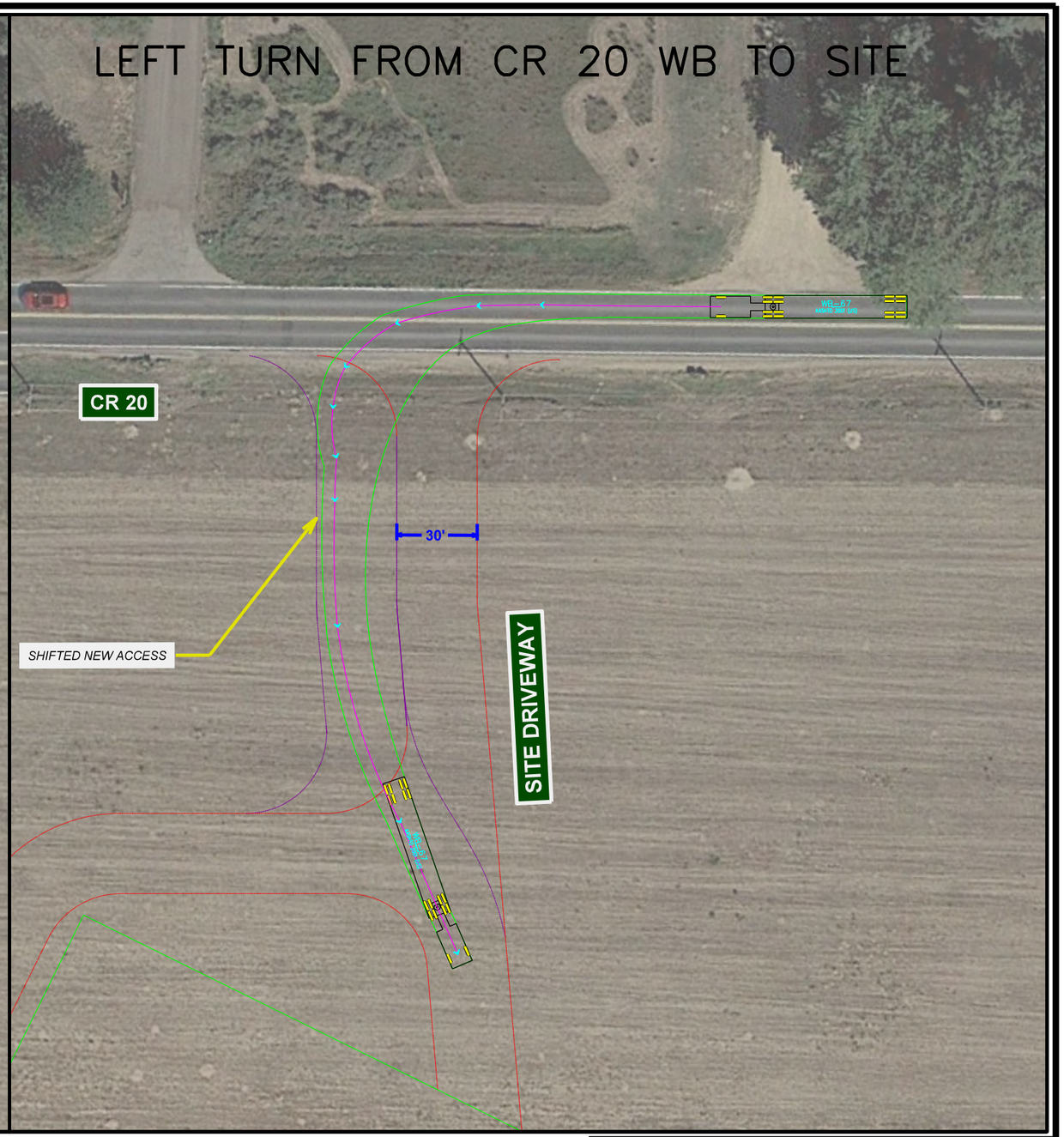
McGavin – Proposed Haul Routes

Firestone, Colorado

RIGHT TURN FROM SITE TO CR 20 EB



LEFT TURN FROM CR 20 WB TO SITE



LEGEND

PAVEMENT WIDENING FOR TRUCK TURNS

FIGURE 2 - TRUCKS ENTERING / EXITING MCGAVIN PAD
- RIGHT TURN FROM SITE TO CR 20 EB
- LEFT TURN FROM CR 20 WB TO SITE

N

0 50 100

GRAPHIC SCALE

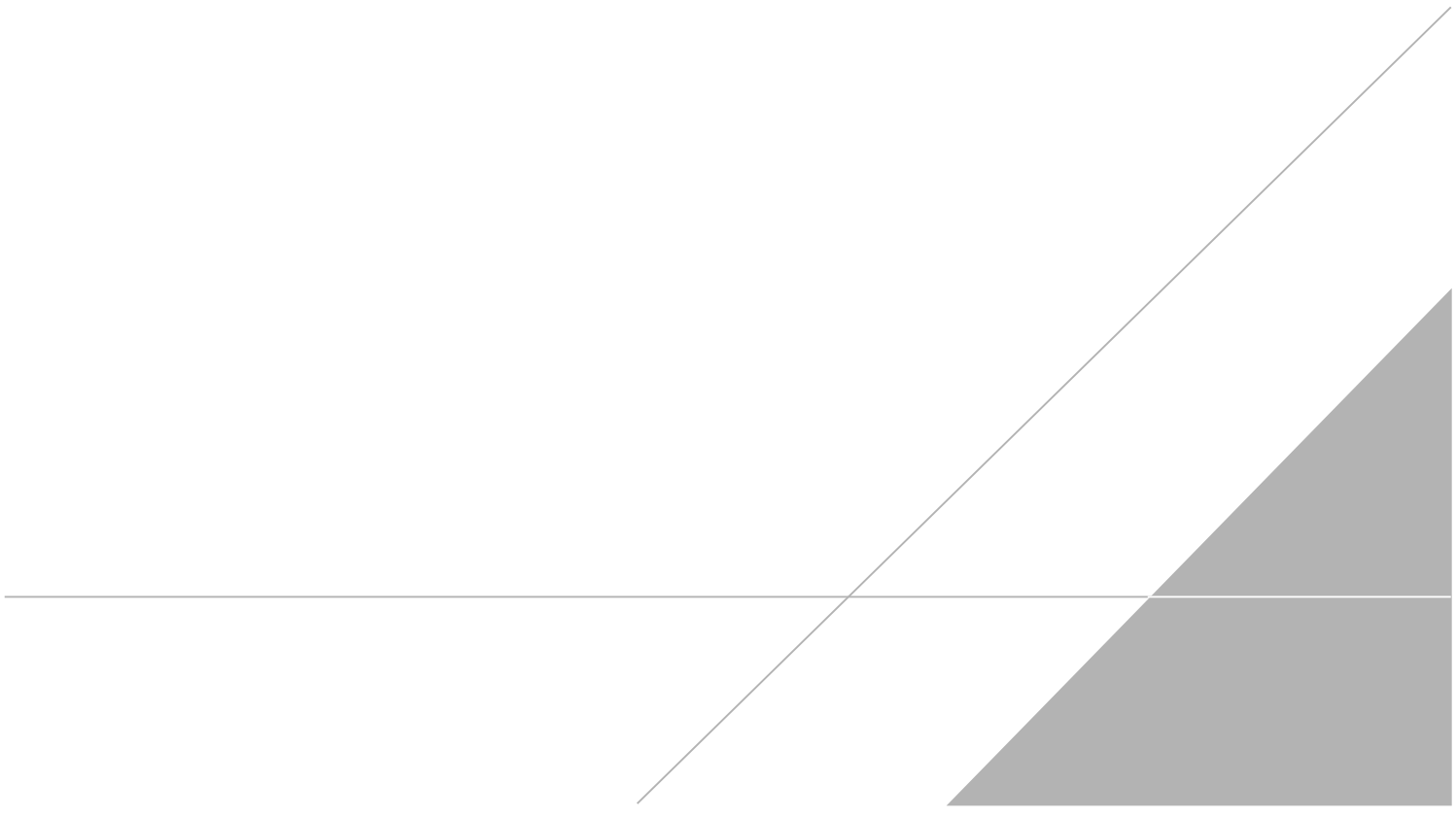
KERR MCGEE OIL AND GAS ONSHORE LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCK TURNING FIGURES

ARCADIS | FIGURE 2

ATTACHMENT 3

Estimated Trip Generation Data



MCGAVIN
Firestone, CO
Estimated Trip Generation Data
Site Preparation through Interim Reclamation

Phase of Development	Estimated Duration (days, max)[1]	Vehicle Type[2]	CDOT SHAC Equivalency Factor (PCE/Veh)[3]	Estimated Number of Veh/Day[4]		Average Daily Trips[5]		AM Peak Hour[6]						PM Peak Hour[6]						Total Trips	
								In		Out		Total		In		Out		Total			
				Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE
Site Preparation	30	Light Vehicle	1	3	3	6	6	*2*	*2*	*0*	*0*	**2**	**2**	*0*	*0*	*2*	*2*	**2**	**2**	176	176
		Single Unit	2	3	5	5	10	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	155	310
		Combo Unit	3	49	146	97	291	*5*	*15*	*5*	*15*	**10**	**30**	*5*	*15*	*5*	*15*	**10**	**30**	2,914	8,743
		Oversize Load	3	0	1	0	1	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	14	42
		Traffic Summary (Site Preparation):		**54**	**155**	**109**	**309**	*7*	*17*	*5*	*15*	**12**	**32**	*5*	*15*	*7*	*17*	**12**	**32**	**3,259**	**9,271**
Production Facility Construction	30	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	527	527
		Single Unit	2	2	4	4	9	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	130	260
		Combo Unit	3	9	27	18	54	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	543	1,629
		Oversize Load	3	1	2	1	4	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	41	123
		Traffic Summary (Production Facility Construction):		**21**	**42**	**41**	**85**	*7*	*11*	*3*	*7*	**10**	**18**	*3*	*7*	*7*	*11*	**10**	**18**	**1,241**	**2,539**
Surface Casing Preset	26	Light Vehicle	1	8	8	15	15	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	393	393
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	91	182
		Combo Unit	3	49	148	98	295	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,558	7,673
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Surface Casing Preset):		**59**	**159**	**117**	**317**	*9*	*16*	*5*	*12*	**14**	**28**	*5*	*12*	*9*	*16*	**14**	**28**	**3,042**	**8,249**
Surface Rig Mobilization	2	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	36	36
		Single Unit	2	11	22	22	44	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	44	88
		Combo Unit	3	176	528	352	1,056	*8*	*24*	*8*	*24*	**16**	**48**	*8*	*24*	*8*	*24*	**16**	**48**	704	2,112
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Mobilization):[7]		**198**	**564**	**395**	**1,127**	*15*	*34*	*11*	*30*	**26**	**64**	*11*	*30*	*15*	*34*	**26**	**64**	**790**	**2,254**
Sequential Drilling and Pad Regrade	215	Light Vehicle	1	25	25	50	50	*15*	*15*	*3*	*3*	**18**	**18**	*3*	*3*	*15*	*15*	**18**	**18**	10,823	10,823
		Single Unit	2	2	4	4	8	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	837	1,674
		Combo Unit	3	8	23	16	47	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	3,368	10,104
		Oversize Load	3	0	1	1	3	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	208	624
		Traffic Summary (Sequential Drilling and Pad Regrade):		**35**	**54**	**71**	**108**	*18*	*23*	*6*	*11*	**24**	**34**	*6*	*11*	*18*	*23*	**24**	**34**	**15,236**	**23,225**
Surface Rig Demobilization	2	Light Vehicle	1	27	27	54	54	*16*	*16*	*3*	*3*	**19**	**19**	*3*	*3*	*16*	*16*	**19**	**19**	108	108
		Single Unit	2	11	21	21	42	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	42	84
		Combo Unit	3	146	437	291	873	*7*	*21*	*7*	*21*	**14**	**42**	*7*	*21*	*7*	*21*	**14**	**42**	582	1,746
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Demobilization):[7]		**185**	**489**	**369**	**978**	*25*	*42*	*12*	*29*	**37**	**71**	*12*	*29*	*25*	*42*	**37**	**71**	**738**	**1,956**
Well Completions	138	Light Vehicle	1	57	57	114	114	*34*	*34*	*7*	*7*	**41**	**41**	*7*	*7*	*34*	*34*	**41**	**41**	15,732	15,732
		Single Unit	2	8	15	15	30	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	2,070	4,140
		Combo Unit	3	19	57	38	114	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	5,244	15,732
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Well Completions):		**84**	**129**	**167**	**258**	*36*	*39*	*9*	*12*	**45**	**51**	*9*	*12*	*36*	*39*	**45**	**51**	**23,046**	**35,604**
Reclamation	30	Light Vehicle	1	15	15	30	30	*9*	*9*	*2*	*2*	**11**	**11**	*2*	*2*	*9*	*9*	**11**	**11**	902	902
		Single Unit	2	19	37	37	75	*2*	*4*	*2*	*4*	**4**	**8**	*2*	*4*	*2*	*4*	**4**	**8**	1,125	2,249
		Combo Unit	3	35	105	70	209	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,095	6,284
		Oversize Load	3	0	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	16	48
		Traffic Summary (Reclamation):		**69**	**158**	**138**	**316**	*14*	*22*	*7*	*15*	**21**	**37**	*7*	*15*	*14*	*22*	**21**	**37**	**4,138**	**9,484**
										Max AM Peak Hour:		**45**	**71**				*Max PM Peak Hour:*		**45**	**71**		
																				Development Totals:		**51,490**	**92,582**

Abbreviations:

ADT	Average Daily Trips	lbs.	pounds	PCE	Passenger Car Equivalents
CDOT	Colorado Department of Trans	GVW	Gross Vehicle Weight	SHAC	State Highway Access Code
ft	feet	KMG	Kerr McGee Oil & Gas Onshore, LP	Veh	Vehicle

Notes:

1 Estimate of phase durations is based on anticipated development expectations for each phase based on previous schedules provided by Anadarko

2 Arcadis has categorized the trip data into the four unique Vehicle Types based on trip profile data provided by KMG which summarizes traffic based on these categories. Vehicle categories include the following: Light Vehicles (e.g. pickup trucks) have a GVW between 4,500 and 8,500 lbs. and measures < 20 ft long; Single Unit vehicles (e.g. 3-axle bobtail or dump truck) having a GVW between 10,000 and 20,000 lbs. and measuring between 20-40 ft long; Combo Unit vehicles (typically a semi and Trailer) having GVW between 50,000 and 70,000 lbs., measuring between 40 and 60 ft long; Oversize Loads (low boy equip trailers, wide loads) usually having GVW greater than 70,000 lbs., and measuring between 40 and 60 feet long.

3 CDOT SHAC assumes: passenger vehicle < 20ft, single unit truck from 20 to 40 ft, multiple unit truck > 40 ft; 1 Single Unit truck = 2 PCE, and 1 Combo Unit truck = 3 PCE.

4 Estimated number of vehicles per day is based on trip generation breakdown summary provided by KMG for other similarly sized facilities. These data were then scaled/adjusted to approximate trip generation traffic for specific Pad/Facility based on the number of wells that will be drilled.

5 Average Daily Trips number assumes all vehicles make a round trip (e.g., ADT = No. of Vehicles per day x 2) and that the total trips in and out levels/evens out on a daily basis.

6 AM peak hour and PM peak hour trips are estimated based on input from KMG experience with similar facility development projects. Light truck traffic is almost entirely associated with daily crew/worker trips to the site; Approximately 60% of the worker trips associated with shift changes will likely occur during the AM and PM peak hours. The larger vehicle (Single unit, Combo units, Oversize loads), daily truck traffic will occur uniformly over the course of a 12 hour work day for the Site Preparation and Reclamation phases. Larger vehicle traffic (Single unit, Combo units, Oversize loads) during the remaining phases (e.g., casing preset, rig mobe/demobe, sequential drilling, and completions) will be spread uniformly over a 24 hour period.

7 Rig mobilization and demobilization will generally occur while temporary traffic controls are in place

ATTACHMENT 4

Baseline Roadway Assessment Report

ARCADIS Design & Consultancy for natural and built assets

Kerr McGee Oil and Gas Onshore LP

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 19 & COUNTY ROAD 20

McGavin Well Pad

Town of Firestone

Weld County, Colorado

July 23, 2020

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 19 AND COUNTY ROAD 20

McGavin Well Pad

Town of Firestone, Weld County, Colorado



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Date:

July 23, 2020

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4 Conclusions and Recommendations 4

TABLES

Table 1. Road Distress: Type and Severity

Table 2. Baseline Ride Quality Data for County Road 19

Table 3. Baseline Ride Quality Data for County Road 20

FIGURES

Figure 1. Proposed Trucking Route

Figure 2. Baseline Roadway Assessment of Proposed Trucking Routes South/Westbound Lanes

Figure 3. Baseline Roadway Assessment of Proposed Trucking Routes North/Eastbound Lanes

APPENDICES

A: HSP Charts (on DVD)

B: Visual Assessment Photographic Log

ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis U.S., Inc.
Blvd	Boulevard
CDOT	Colorado Department of Transportation
CR	County Road
Firestone	City of Firestone
FHWA	Federal Highway Administration
HSP	High Speed Profiler
Hwy	Highway
in/mi	inches per mile
IRI	International Roughness Index
Kerr McGee	Kerr McGee Oil and Gas Onshore LP
MRI	Mean Roughness Index

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) completed a baseline road assessment on behalf of Kerr McGee Oil and Gas Onshore LP (Kerr McGee) to document the current condition of select roadways maintained by both the Town of Firestone (Firestone) and Weld County, within Weld County, Colorado. The purpose of the assessment was to document baseline roadway conditions prior to planned oil and gas development activities by Kerr McGee. The assessed road segments will be used to access areas designated for new construction, operation, and production at a proposed well pad site (McGavin Well Pad) within the town limit of Firestone. The facility will utilize roadways within Firestone for access.

The proposed trucking routes that will be utilized by Kerr McGee for facility access include portions of County Roads 19 and 20; the full length of roadways assessed include:

- 3 miles (6 lane miles) of County Road 20, between Colorado Blvd and County Road 19
- 8.6 miles (17.2 lane miles) of County Road 19, between Hwy 52 and Hwy 66

Sections of these roadways which will not be utilized by Kerr McGee but were assessed will serve as a comparison for roadway deterioration should a follow-up assessment be performed. Specific routes utilized for each well pad location are shown on **Figure 1.**

This report documents findings from a baseline roadway assessment conducted prior to use by Kerr McGee. After interim reclamation, Kerr McGee will conduct a follow-up assessment to evaluate the nature and extent of any impacts to this road that may be attributable to construction traffic. Those findings will be documented, as appropriate, in a subsequent report.

2 ASSESSMENT OVERVIEW

The baseline roadway assessment included two separate elements. First, a high-speed profiler (HSP) was used to measure and map relative smoothness of the roadway. Following collection of the surface roughness data, Arcadis conducted a visual inspection to qualify the nature of any pavement distresses and the potential causes of any roughness anomalies. The roadway assessment and documentation efforts were completed under the supervision of an Arcadis Professional Engineer. Further discussion of how the data were collected to support this assessment is provided below.

- To provide a quantitative measure of pavement conditions, the roadway was profiled utilizing the HSP, equipped with a laser scanner, to measure smoothness of the pavement. Scans were collected on July 14, 2020 of both the right and left wheel paths, for both lanes of traffic, along the entire truck hauling route. The profiler system was calibrated, and scanner data were collected, stored, and analyzed in accordance with Colorado Department of Transportation's (CDOT's) standard practice for HSP systems (Colorado Procedure 78-14). Applicable output files from the profiling system software (viewable in Google Earth) are provided as **Appendix A** on the attached DVD. In addition, all roadway surfaces were photo-logged at 50-foot intervals in both directions to provide additional details of baseline roadway conditions. Electronic copies of the photos and output files accompany this report as **Appendix A**.

- On July 20 and 22, 2020, Arcadis conducted a visual inspection to further assess roadway conditions, including any potential issues related to drainage or utility crossings. Photographic logs depicting key areas of concern and typical roadway conditions observed during the baseline inspection are attached as **Appendix B**. Roadway distress observations were documented and qualitatively classified using U.S. Department of Transportation guidelines and terminology[1]. **Table 1** summarizes the distress types and severity standards used to classify roadway distress during the visual assessment.

3 BASELINE DETERMINATIONS

This section summarizes the key findings and observations from the baseline assessment. The assessment included analysis of the data collected (as described in **Section 2**), as well as (1) review of findings from the HSP; and (2) observations from the visual assessment and inspection. Collectively, these data were used to prepare a summary of roadway conditions for each road segment.

3.1 High-Speed Profiling

The HSP scan was performed to record roughness and imperfections along the roadway surface. The HSP uses a line laser system to measure the ride quality of asphalt pavement, concrete pavement, and can also be used on gravel roads. The HSP system provides a high-resolution measurement of surface displacement along each wheel path over a longitudinal distance and is able to provide data output in one of several frequently used indices. These baseline results can later be compared to the final, post-completion assessment to provide a quantitative measure of roadway deterioration that occurred following the baseline survey. Baseline results of this profiling are provided in **Appendix A** and summarized on **Figures 2** and **3.** Additionally, the scanner data output, including International Roughness Index (IRI) and Mean Roughness Index (MRI) data for each lane segment, is summarized in **Tables 2 through 4**. Additional data was collected beyond to the east and west to serve as comparison of roadway deterioration beyond the segments utilized by Kerr McGee.

The IRI and MRI are measures of road smoothness, reported in units of inches per mile (in/mi). The IRI is a scale for roughness based on simulated response of a generic motor vehicle along a single wheel path of the road surface. The IRI value is determined by obtaining a suitably accurate measurement of the profile of the road, processing it through an algorithm that simulates a reference vehicle's (e.g., passenger car) response to the roughness inputs, while accounting for the suspension travel over time and distance. These indices are typically derived for one tenth of mile segments of roadway. The MRI is like IRI and is simply the calculated mean of the IRI from both wheel paths.

[1] Miller and Bellinger, 2003. "*Distress Identification Manual for the Long-Term Pavement Performance Program.*" U.S. Department of Transportation, Federal Highway Administration, Office of Infrastructure Research and Development; Publication No. FHWA-RD-031. June 2003. Fourth Edition.

In general terms, the lower the IRI or MRI, the smoother the road. For context, the Federal Highway Administration (FHWA) has established recommended IRI (or MRI) threshold values for highways and rural roadways. According to FHWA guidelines, roadways with IRI or MRI values:

- Less than 60 in/mi are considered to be in very good condition;
- Between 60 and 94 in/mi are considered to be in good condition;
- Between 95 and 119 in/mi are considered to be in fair condition;
- Between 120 and 170 in/mi are considered to be in mediocre condition; and
- Greater than 170 in/mi are considered to be in poor condition.

Typically, for asphalt or concrete paved roads, IRI values less than 170 in/mi (very good to mediocre conditions) are considered acceptable from a ride quality perspective. Road segments with IRI values greater than 170 in/mi are deemed less acceptable and often warrant further evaluation for repair or reconstruction.

3.2 Visual Assessment

The roadway visual assessment was completed using the guidelines provided in the US Department of Transportation, Distress Identification Manual to identify and further document and qualify roadway distress within the survey area. All documentation was done by walking the roadway and classifying typical roadway distress based on type and severity. Detailed photos and descriptions of the distress included in **Appendix B** document the findings of the visual assessment.

3.2.1 County Road 19

The portion of County Road 19 assessed was in the midst of being chip sealed at the time the visual survey was completed. The portion of roadway Kerr McGee intends to use runs approximately 8.5 miles between Hwy 52 and Hwy 66. For this roadway portion the overall ride quality was in good condition. Areas that were recently chip sealed showed minimal to no wear or deterioration. Areas that had yet to be chip sealed displayed low to moderate rutting, transverse cracking, and fatigue cracking.

Based on the FHWA recommended standards, the southbound lane of County Road 19 MRI values indicated that about 2 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 20 percent in fair-to-mediocre (95-170 in/mi) and 78 percent of the southbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire southbound segment was 83 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the southbound segment of County Road 19 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that approximately one percent of the roadway in the northbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 23 percent in fair-to-mediocre (95-170 in/mi) and 76 percent of the northbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire northbound segment was 85 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the northbound segment of County Road 19 and are depicted on **Figure 3.**

3.2.2 County Road 20

The portion of County Road 20 assessed runs from County Road 19 to Colorado Blvd, and is asphalt surfaced. This portion of roadway had low to moderate transverse and block cracking, with moderate longitudinal rutting. Overall ride quality was in fair to mediocre condition.

Based on the FHWA recommended standards, the westbound lane of County Road 20 MRI values indicated that 23 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 50 percent in fair-to-mediocre (95-170 in/mi) and 27 percent of the westbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire westbound segment was 134 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the westbound segment of County Road 20 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that 7 percent of the roadway in the eastbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 63 percent in fair-to-mediocre (95-170 in/mi) and 30 percent of the eastbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire eastbound segment was 109 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the eastbound segment of County Road 20 and are depicted on **Figure 3.**

4 CONCLUSIONS AND RECOMMENDATIONS

The baseline road assessment is intended to provide documentation of current road conditions prior to the development activities planned by Kerr McGee. It was observed that County Road 19 is in good shape, while County Road 20 is in fair condition.

Kerr McGee will conduct a follow-up survey of these roadways once their interim reclamation activities are substantively complete. The follow up survey should include a visual assessment of the roads and an evaluation of ride quality using the HSP scanner. The assessment and HSP scan can then be compared to these baseline observations to identify roadway segments that may have been adversely impacted or distressed by construction traffic.

In the interim, Arcadis also recommends that Kerr McGee's construction foreman periodically inspect and monitor the condition of these roadways during the construction period. If, based on the monitoring, it is determined that interim repairs or further distress mitigation efforts are warranted, mitigation efforts (e.g., routing/filling cracks, pothole repairs) should be discussed with Arcadis, Firestone's Engineers, and performed as necessary to prevent significant or accelerated deterioration of these roadways.

TABLES



Table 1
Road Distress: Type and Severity

Distress Type	Distress Description	Severity Levels
Block Cracking	A pattern of cracks that turns pavement into approximately rectangle pieces, ranging from 0.1 m^2 (square meter) to 10 m^2.	Low - Cracks with a mean width ≤ 6 millimeters (mm). Moderate - Cracks with a mean width greater than (>) 6 mm and less than or equal to (≤) 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to low severity random cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to high-severity random cracking.
Fatigue Cracking	Occurs in areas subject to repeated traffic loading (wheel paths). Can be a series of interconnecting cracks in early stages of development. Develops into many-sided, sharp, angled pieces, usually less than 0.3 m. Often referred to as 'chicken wire' or 'alligator' cracking in later stages.	Low - An area of cracks with no or only few connecting cracks; cracks are not spalled or sealed. Moderate - An area of interconnecting cracks forming a complete pattern; may be slightly spalled, and cracks may be sealed. High - An area of interconnecting cracks forming a complete pattern; pieces may move when subject to traffic.
Longitudinal Cracking	Cracks predominantly parallel to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 mm and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low-severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to moderate- to high-severity random cracking.
Transverse Cracking	Cracks predominantly perpendicular to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 m and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent moderate- to high-severity random cracking.
Rutting	A rut is a longitudinal surface depression in the wheel path. It may be associated with transverse displacement.	Not applicable (N/A). Severity levels can be defined by categorizing the measurements collected.

Table 2

Baseline Ride Quality Data for County Road 19

Southbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	123.2	146.3	135
2	528	1056	528	89.0	77.6	83
3	1056	1584	528	96.0	70.2	83
4	1584	2112	528	75.1	63.9	70
5	2112	2640	528	72.4	71.6	72
6	2640	3168	528	68.2	64.5	66
7	3168	3696	528	73.7	70.3	72
8	3696	4224	528	69.1	79.1	74
9	4224	4752	528	62.6	77.0	70
10	4752	5280	528	77.6	112.4	95
11	5280	5808	528	49.8	58.8	54
12	5808	6336	528	62.1	74.4	68
13	6336	6864	528	67.1	85.3	76
14	6864	7392	528	58.1	82.1	70
15	7392	7920	528	58.1	86.3	72
16	7920	8448	528	56.0	69.1	63
17	8448	8976	528	67.7	80.2	74
18	8976	9504	528	64.5	72.8	69
19	9504	10032	528	57.2	58.0	58
20	10032	10560	528	120.5	143.0	132
21	10560	11088	528	94.9	116.9	106
22	11088	11616	528	80.4	101.8	91
23	11616	12144	528	96.3	115.8	106
24	12144	12672	528	105.4	124.4	115
25	12672	13200	528	79.3	80.0	80
26	13200	13728	528	94.4	141.7	118
27	13728	14256	528	80.5	95.5	88
28	14256	14784	528	85.5	109.0	97
29	14784	15312	528	85.1	114.2	100
30	15312	15840	528	90.7	124.8	108
31	15840	16368	528	136.6	163.2	150
32	16368	16896	528	57.2	57.6	57
33	16896	17424	528	50.3	60.9	56
34	17424	17952	528	59.2	55.9	58
35	17952	18480	528	71.1	86.4	79
36	18480	19008	528	63.1	77.1	70
37	19008	19536	528	56.0	67.8	62
38	19536	20064	528	46.8	67.7	57
39	20064	20592	528	55.3	62.1	59
40	20592	21120	528	48.9	52.4	51
41	21120	21648	528	62.8	70.5	67
42	21648	22176	528	48.9	57.1	53
43	22176	22704	528	51.0	60.2	56
44	22704	23232	528	50.3	68.0	59
45	23232	23760	528	45.1	52.5	49
46	23760	24288	528	68.6	73.9	71
47	24288	24816	528	54.9	64.8	60
48	24816	25344	528	61.9	81.5	72

Table 2

Baseline Ride Quality Data for County Road 19

49	25344	25872	528	68.7	71.1	70
50	25872	26400	528	59.9	76.7	68
51	26400	26928	528	147.3	138.5	143
52	26928	27456	528	68.8	75.1	72
53	27456	27984	528	76.4	72.7	75
54	27984	28512	528	68.3	62.2	65
55	28512	29040	528	70.7	70.2	70
56	29040	29568	528	62.8	80.4	72
57	29568	30096	528	62.4	72.9	68
58	30096	30624	528	100.5	106.3	103
59	30624	31152	528	88.5	118.3	103
60	31152	31680	528	63.4	60.8	62
61	31680	32208	528	72.4	85.5	79
62	32208	32736	528	59.4	81.3	70
63	32736	33264	528	72.7	91.0	82
64	33264	33792	528	92.5	105.1	99
65	33792	34320	528	64.9	98.8	82
66	34320	34848	528	71.8	84.0	78
67	34848	35376	528	63.4	70.6	67
68	35376	35904	528	60.9	71.6	66
69	35904	36432	528	72.5	74.7	74
70	36432	36960	528	86.2	85.0	86
71	36960	37488	528	104.7	111.2	108
72	37488	38016	528	64.7	77.1	71
73	38016	38544	528	66.2	76.0	71
74	38544	39072	528	80.8	87.8	84
75	39072	39600	528	73.0	95.7	84
76	39600	40128	528	80.3	95.9	88
77	40128	40656	528	79.3	120.5	100
78	40656	41184	528	75.6	106.6	91
79	41184	41712	528	84.0	108.5	96
80	41712	42240	528	70.8	80.9	76
81	42240	42768	528	88.9	102.3	96
82	42768	43296	528	67.9	69.2	69
83	43296	43824	528	63.2	94.9	79
84	43824	44352	528	69.4	112.1	91
85	44352	44880	528	75.0	97.6	86
86	44880	45194.8	315	601.3	571.8	587
			Overall Averages:	**77**	**90**	**83**

Northbound				IRI		MRI
Leg	**Start Location (inches)**	**Stop Location (inches)**	**Distance (inches)**	**Left Wheel (inches/mile)**	**Right Wheel (inches/mile)**	**Baseline (inches/mile)**
1	0	528	528	137.8	161.1	149
2	528	1056	528	80.4	104.8	93
3	1056	1584	528	71.4	74.6	73
4	1584	2112	528	79.3	100.7	90
5	2112	2640	528	81.3	76.7	79
6	2640	3168	528	115.5	105.0	110
7	3168	3696	528	80.7	97.2	89
8	3696	4224	528	78.8	89.3	84
9	4224	4752	528	84.4	77.4	81

Table 2

Baseline Ride Quality Data for County Road 19

10	4752	5280	528	82.6	100.7	92
11	5280	5808	528	68.0	92.5	80
12	5808	6336	528	84.1	102.2	93
13	6336	6864	528	80.1	79.1	80
14	6864	7392	528	85.4	84.6	85
15	7392	7920	528	101.1	130.7	116
16	7920	8448	528	74.3	87.8	81
17	8448	8976	528	70.5	94.2	82
18	8976	9504	528	65.0	69.0	67
19	9504	10032	528	71.7	71.5	72
20	10032	10560	528	66.4	64.2	65
21	10560	11088	528	82.9	86.7	85
22	11088	11616	528	107.9	114.3	111
23	11616	12144	528	83.9	107.1	95
24	12144	12672	528	74.4	103.1	89
25	12672	13200	528	79.5	114.4	97
26	13200	13728	528	82.6	101.4	92
27	13728	14256	528	79.1	82.2	81
28	14256	14784	528	108.4	113.9	111
29	14784	15312	528	79.9	79.4	80
30	15312	15840	528	87.1	108.0	98
31	15840	16368	528	118.7	146.8	133
32	16368	16896	528	97.5	100.0	99
33	16896	17424	528	90.7	138.8	115
34	17424	17952	528	75.7	84.0	80
35	17952	18480	528	76.5	69.6	73
36	18480	19008	528	167.0	168.1	168
37	19008	19536	528	102.2	74.6	88
38	19536	20064	528	87.4	65.9	77
39	20064	20592	528	85.8	63.1	74
40	20592	21120	528	93.3	75.9	85
41	21120	21648	528	94.9	71.1	83
42	21648	22176	528	90.2	58.3	74
43	22176	22704	528	74.1	66.3	70
44	22704	23232	528	117.9	65.9	92
45	23232	23760	528	118.5	73.8	96
46	23760	24288	528	93.8	86.0	90
47	24288	24816	528	84.4	54.9	70
48	24816	25344	528	66.7	59.3	63
49	25344	25872	528	58.5	59.5	59
50	25872	26400	528	62.6	76.4	70
51	26400	26928	528	85.8	90.4	88
52	26928	27456	528	89.8	84.5	87
53	27456	27984	528	69.4	56.7	63
54	27984	28512	528	64.4	62.6	64
55	28512	29040	528	77.6	68.8	73
56	29040	29568	528	128.5	157.2	143
57	29568	30096	528	77.4	84.7	81
58	30096	30624	528	69.8	78.7	74
59	30624	31152	528	86.4	90.4	88
60	31152	31680	528	88.3	114.8	102
61	31680	32208	528	95.2	106.3	101
62	32208	32736	528	103.0	93.7	98

Table 2

Baseline Ride Quality Data for County Road 19

63	32736	33264	528	108.8	119.4	114
64	33264	33792	528	83.2	102.4	93
65	33792	34320	528	101.7	108.2	105
66	34320	34848	528	111.9	99.1	106
67	34848	35376	528	69.0	78.9	74
68	35376	35904	528	79.9	87.9	84
69	35904	36432	528	68.3	64.4	66
70	36432	36960	528	47.4	50.9	49
71	36960	37488	528	58.8	67.6	63
72	37488	38016	528	43.4	51.5	47
73	38016	38544	528	57.7	63.1	60
74	38544	39072	528	53.3	60.8	57
75	39072	39600	528	61.5	69.0	65
76	39600	40128	528	60.7	77.3	69
77	40128	40656	528	53.2	63.0	58
78	40656	41184	528	66.7	77.0	72
79	41184	41712	528	54.3	62.2	58
80	41712	42240	528	67.1	73.5	70
81	42240	42768	528	66.4	69.4	68
82	42768	43296	528	51.8	54.1	53
83	43296	43824	528	59.9	65.1	63
84	43824	44352	528	59.4	80.1	70
85	44352	44880	528	67.4	96.6	82
86	44880	45140.6	261	215.2	259.3	237
			Overall Averages:	**83**	**88**	**85**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The southbound route began at GPS location 40.2038265215873 N 104.885933164921 W and ended at GPS location 40.0807181466162 N 104.886453600556 W. The northbound route began at GPS location 40.0800714961111 N 104.886415832222 W and ended at GPS location 40.2031560818519 N 104.885884058287 W.

Table 3

Baseline Ride Quality Data for County Road 20

Westbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	98.8	92.3	96
2	528	1056	528	65.3	67.5	66
3	1056	1584	528	64.1	63.9	64
4	1584	2112	528	95.7	96.7	96
5	2112	2640	528	62.3	52.1	57
6	2640	3168	528	78.0	65	72
7	3168	3696	528	83.0	96.1	90
8	3696	4224	528	76.2	56.7	66
9	4224	4752	528	87.0	62.7	75
10	4752	5280	528	79.3	69.3	74
11	5280	5808	528	148.2	141.6	145
12	5808	6336	528	201.5	237.4	219
13	6336	6864	528	166.9	136.6	152
14	6864	7392	528	171.1	175.5	173
15	7392	7920	528	127.7	167.2	147
16	7920	8448	528	147.5	123.2	135
17	8448	8976	528	125.3	125.4	125
18	8976	9504	528	144.8	116.6	131
19	9504	10032	528	167.2	155.8	161
20	10032	10560	528	161.2	238.1	200
21	10560	11088	528	176.5	219	198
22	11088	11616	528	157.8	197.1	177
23	11616	12144	528	131.7	134.4	133
24	12144	12672	528	146.0	132.7	139
25	12672	13200	528	154.3	128.7	142
26	13200	13728	528	159.6	176	168
27	13728	14256	528	134.8	201.8	168
28	14256	14784	528	116.9	163.9	140
29	14784	15312	528	149.7	243	196
30	15312	15514.9	203	320.0	319.3	320
			Overall Averages:	**129**	**138**	**134**

Eastbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	183.8	250.4	217
2	528	1056	528	118.0	186.0	152
3	1056	1584	528	96.1	127.7	112
4	1584	2112	528	124.1	134.3	129
5	2112	2640	528	131.7	108.8	120
6	2640	3168	528	107.6	84.6	96
7	3168	3696	528	92.8	112.3	103
8	3696	4224	528	121.6	113.7	118
9	4224	4752	528	100.7	133.6	117
10	4752	5280	528	133.7	180.2	157
11	5280	5808	528	133.7	116.9	125
12	5808	6336	528	119.7	89.7	105

Table 3

Baseline Ride Quality Data for County Road 20

13	6336	6864	528	119.5	83.2	101
14	6864	7392	528	120.1	88.4	104
15	7392	7920	528	109.5	128.8	119
16	7920	8448	528	147.9	133.6	141
17	8448	8976	528	142.1	135.9	139
18	8976	9504	528	203.7	208.7	206
19	9504	10032	528	170.6	161.3	166
20	10032	10560	528	106.3	143.2	125
21	10560	11088	528	56.0	55.8	56
22	11088	11616	528	46.8	57.7	52
23	11616	12144	528	55.0	68.5	62
24	12144	12672	528	49.5	57.6	54
25	12672	13200	528	48.3	47.7	48
26	13200	13728	528	49.3	64.2	57
27	13728	14256	528	52.8	70.3	62
28	14256	14784	528	52.7	60.0	56
29	14784	15312	528	61.6	64.7	63
30	15312	15579.1	267	128.2	120.9	125
			Overall Averages:	**106**	**113**	**109**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

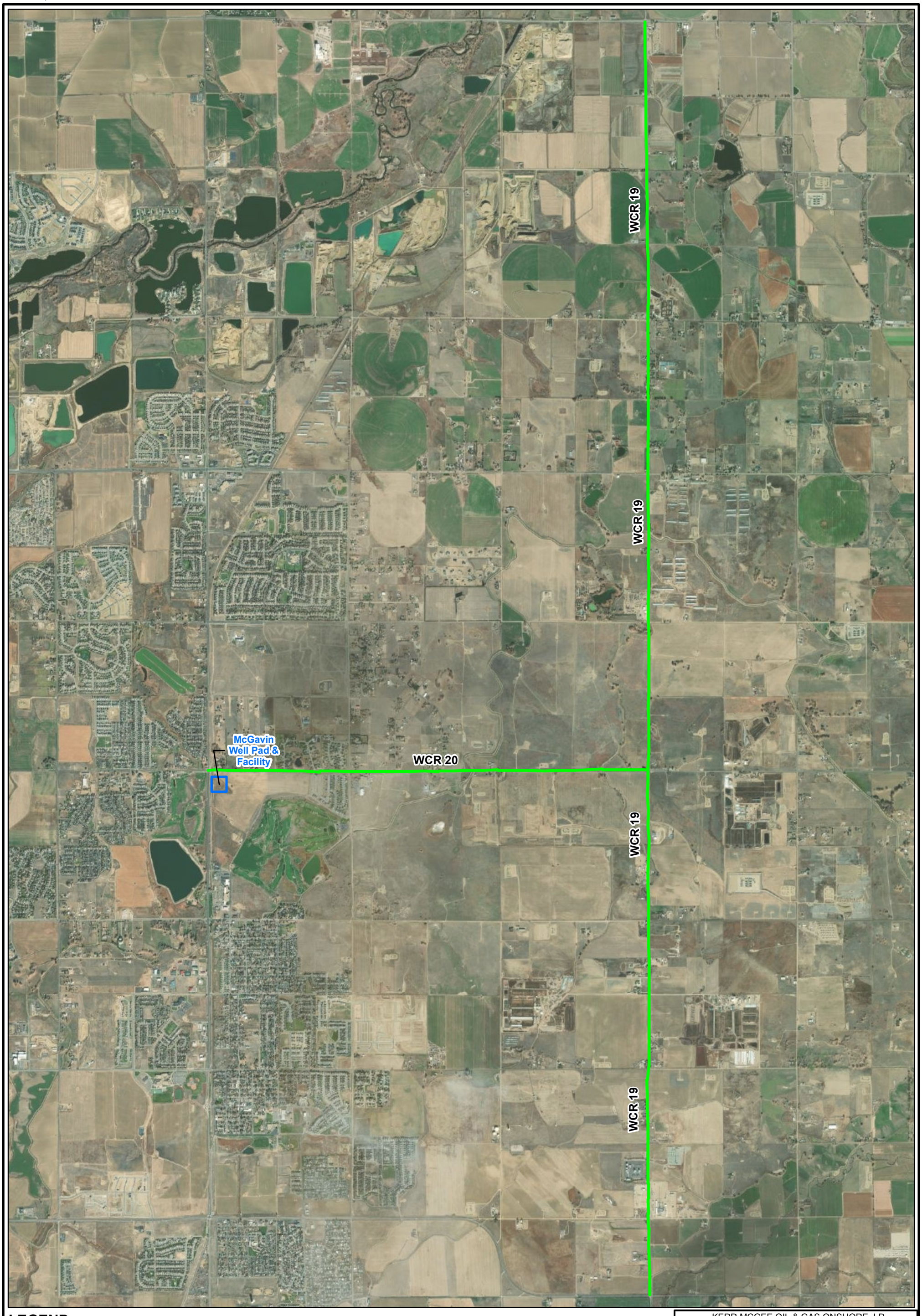
Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The westhbound route began at GPS location 40.1310865937374 N 104.886272024848 W and ended at GPS location 40.1314218750327 N 104.941010064575 W. The eastbound route began at GPS location 40.1313771766667 N 104.941839932222 W and ended at GPS location 40.1310726773611 N 104.887145734514 W.

FIGURES

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LEGEND

- Trucking Route
- Access Road
- Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

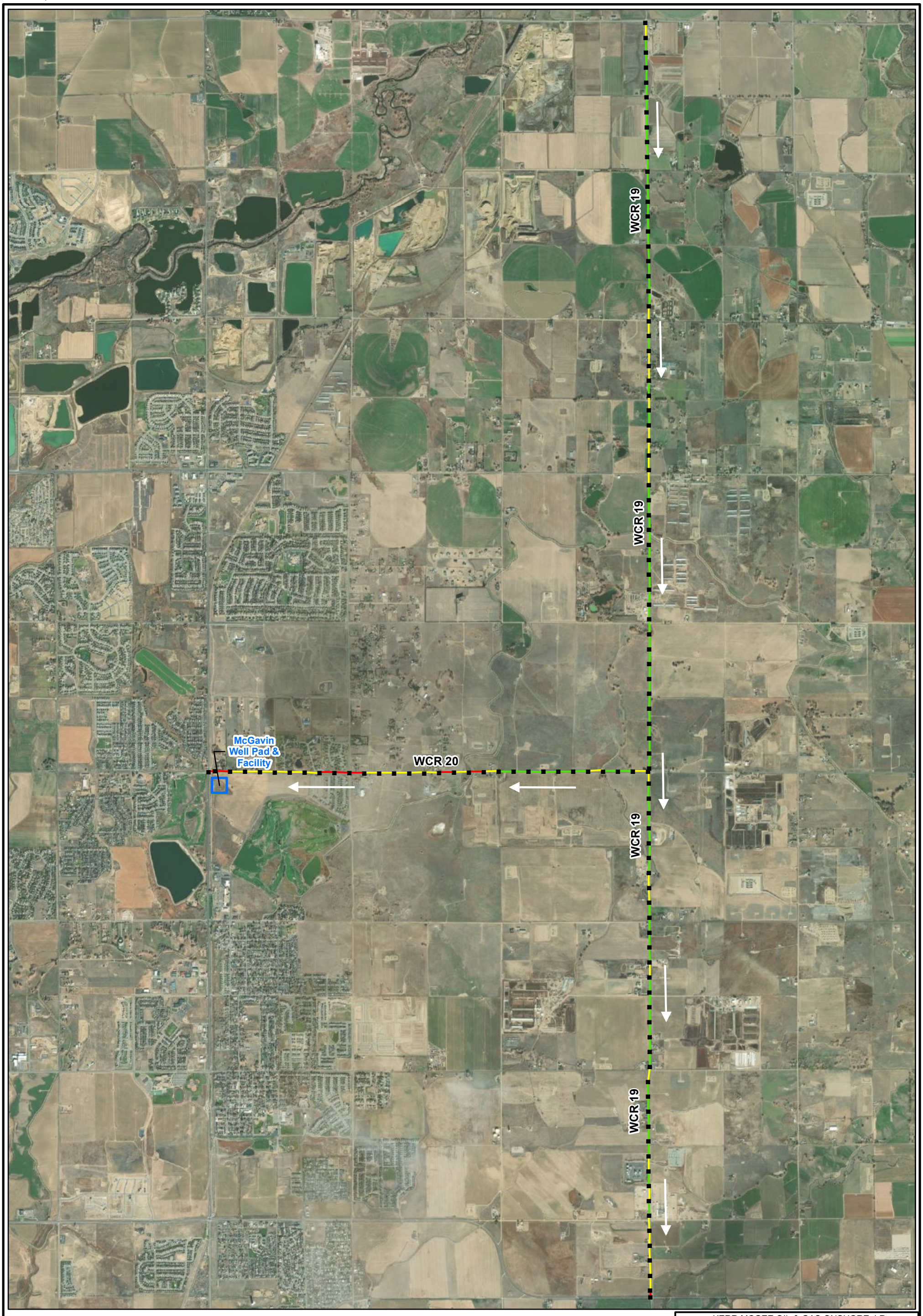
TRUCKING ROUTE
WELD COUNTY ROADS 19 AND 20

ARCADIS

FIGURE
1

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
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LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

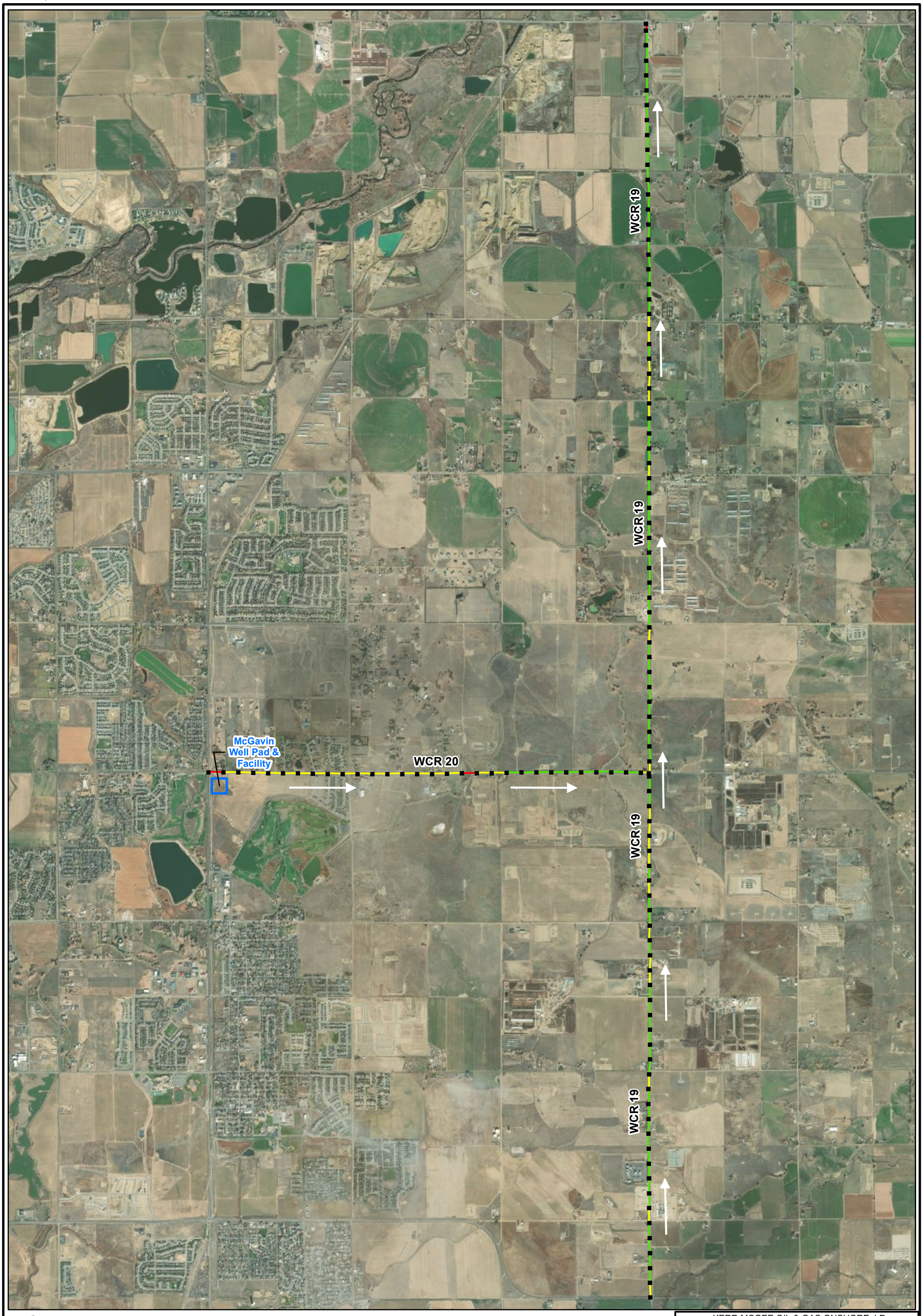
ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 19 AND 20 SOUTH/WESTBOUND

ARCADIS

FIGURE
2

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
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12/13/2021, 4:42:36 PM



LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 19 AND 20 NORTH/EASTBOUND

ARCADIS

FIGURE
3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX A

HSP Charts (on DVD)

APPENDIX B

Visual Assessment Photographic Log

Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	9:59:40 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.2033372524287	Longitude	-104.88592954
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:00:47 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.2035102919943	Longitude	-104.88595845
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:04:05 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.195439346691	Longitude	-104.88589878
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:05:35 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1926557692914	Longitude	-104.88584477
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:07:25 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1847935416447	Longitude	-104.88580319
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:10:16 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.1747943941366	Longitude	-104.88575508
Primary Distress:	Fatigue (Alligator) Cracking	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:09:01 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1750818809408	Longitude	-104.88554018
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:	Fatigue (Alligator) Cracking	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:12:58 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1671455216539	Longitude	-104.88585588
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:15 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1597934500299	Longitude	-104.88595731
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:53 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1597814141739	Longitude	-104.88590627
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:20:11 AM	Section:	Mile 3.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1525085552292	Longitude	-104.88601847
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:05 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1456340336325	Longitude	-104.88612623
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:46 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1452690824332	Longitude	-104.88604164
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:24:33 AM	Section:	Mile 4.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1366233153063	Longitude	-104.88609123
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:09 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1317873269072	Longitude	-104.88607846
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:53 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1309659491344	Longitude	-104.88615778
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:29:26 AM	Section:	Mile 5.6
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1308417098263	Longitude	-104.88616857
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:32:15 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1164490931005	Longitude	-104.88631309
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:33:08 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1166034760774	Longitude	-104.88625442
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:35:39 AM	Section:	Mile 6.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1145219424268	Longitude	-104.88618993
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:05 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1085079818709	Longitude	-104.88627954
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:55 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1018067201925	Longitude	-104.88645202
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:42:07 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1017782490729	Longitude	-104.88645283
Primary Distress:	Transverse Cracking	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:43:20 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.0874621404114	Longitude	-104.88654459
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:46:29 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.0873702162933	Longitude	-104.88652399
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:48:47 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.0802392466538	Longitude	-104.88660283
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:53:23 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1311074148566	Longitude	-104.88660206
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:55:25 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.131125	Longitude	-104.886592
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:57:48 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1311787422972	Longitude	-104.90522115
Primary Distress:	Rutting	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:56:59 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1311957954733	Longitude	-104.90180907
Primary Distress:	Block Cracking	Severity:	Low
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:58:45 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1311447831801	Longitude	-104.90523483
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:00:26 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1311571663148	Longitude	-104.90521007
Primary Distress:	Block Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:02:55 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1313342184852	Longitude	-104.9255581
Primary Distress:	Block Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:05:11 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1312192624291	Longitude	-104.92853809
Primary Distress:	Block Cracking	Severity:	Moderate
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:07:12 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1314830018651	Longitude	-104.94152958
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:07:48 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1314669380746	Longitude	-104.94138273
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:08:12 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.1314665029247	Longitude	-104.94140519
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Arcadis U.S., Inc.

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Section 14

Reclamation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado



Kerr-McGee Oil & Gas Onshore LP

Interim Reclamation Plan

MCGAVIN 6-19HZ PAD

Firestone, CO

June 2021

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4.0 INSPECTION AND MAINTENANCE PROCEDURES....3
4.1 Inspections....3
4.2 Maintenance....3

APPENDICES

Appendix A Seed Mix
Appendix B Grading Plan for Production Phase

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has developed this site-specific Interim Reclamation Plan to establish proper planning and execution for reclamation of the land within areas that are affected by oil and gas location construction and operations, but no longer in use by production operations. When all wells on a pad are completed and turned over to production, the drilling footprint will be reduced, and areas not needed for production will be restored and re-vegetated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) Series 1000 Reclamation Rules and consistent with the requirements of Rule 1003. Interim Reclamation. Reference shall also be made to Rules 304.c(14) Topsoil Protection Plan and 304.c(15) Stormwater Management Plan within this process.

Soil and aggregate mix used to build a compacted drilling pad will be removed. All segregated soil horizons removed from the disturbance area shall be replaced to their original relative positions and contour based on final land use and shall be tilled adequately to alleviate compaction and re-establish a proper seedbed. Final contour, irrigation, and landscape construction, including plantings and perennial seeding, will occur in the first favorable season. The area shall be treated as necessary to prevent invasion of undesirable species and noxious weeds as practicable. The site will be stabilized, inspected, and maintained to control erosion.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	McGavin 6-19HZ Well Pad and Facility
Location:	Sec 19, T2N, Range 67W, Firestone, Colorado
Total Area of Project:	25.63 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is winter wheat, land use is agriculture
Soil Type(s):	47- Olney fine sandy loam, 1-3% slopes, 72- Vona loamy sand, 0-3% slopes and 4- Aquolls and Aquepts, flooded
Operator ID:	47120
Reclamation Manager/Contact:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation 720-929-6317

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

1) Surface Owner Consultation and Timing: KMOG is the surface owner and interim reclamation shall occur approximately no later than 10/30/2023 after conclusion of subsequent operations. If soil conditions are not conducive due to weather conditions, a Sundry Notice Form 4 shall be submitted, and reclamation commenced as soon as conditions allow and as practicable.
2) Recontouring, Compaction Relief and Topsoil Redistribution: Refer to the Topsoil Protection Plan to address site specific requirements.
3) Soil Preparation: Equipment to be cleaned from soil or debris prior to mobilizing and commencing soil preparation operations between properties.
    a) Compaction Alleviation: After topsoil redistribution, the interim reclamation area shall be cross ripped to a depth of eighteen inches with an agricultural ripper/subsoiler; however, this depth may be adjusted in rocky or shallow soils. Chiseling/ripping will be performed at the minimum depth of topsoil. Cultipacking or disking may be required to reduce soil clod size. Ripping with construction style shanks, for the purpose of surface ridge roughness as a stormwater BMP, is only allowed to a six-inch depth.
    b) Leveling: All areas will be leveled and graded to drain properly and blend to the adjacent undisturbed land.
    c) Soil Amendments: Necessary amendments will be determined by soil analysis completed during Topsoil Protection Plan Site Investigation, land use, site conditions at time of interim reclamation, and surface owner consultation.
    d) Seedbed Preparation: Incorporate soil amendments by disking, harrowing or cultipacking and to provide a seedbed that is firm and friable, and properly crimp straw mulch material.
    e) Surface Rock Removal: Surface rocks that interfere with agricultural operations, seeding equipment or future mowing operations will be removed.
4) Seeding: Seed mix is considered based on consultations with NRCS, CPW, and Surface Owner; also, by soil type, land use, adjacent reference area vegetation and in accordance with Rule 1202.a.6. Seeding shall not occur in windy conditions or when the soil is frozen or wet. Equipment to be cleaned from previous mixes, soil, or debris, prior to mobilizing and commencing seeding operations between properties. Seed shall be applied using appropriate equipment that can place the specified seed at the specified rate and depth included as Appendix A.
5) Mulching: Due to location being in cropland, mulch will not be applied.
6) Implement Post-Construction Stormwater Control Measures: Additional erosion control measures and materials should include consideration of land use, surface owner grazing practices, and potential damage to materials. Refer to a site-specific stormwater management plan prior to implementation.
7) Weed control: Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act.
    a) Weed control measures shall be conducted in consultation with the Surface Owner and County Weed Management Specialist(s) based on site specific conditions. Kerr-McGee will monitor and control noxious weeds until achieving reclamation threshold for release within

reclaimed disturbance areas, including monitoring to measure success of treatments. Weed control measures employed may include mowing or removal and herbicide treatment during the appropriate growing season. During drilling, production, and reclamation operations, all disturbed areas shall be kept reasonably free of noxious weeds and undesirable species.

4.0 INSPECTION AND MAINTENANCE PROCEDURES

4.1 Inspections

Post-construction stormwater inspections will be conducted in accordance with COGCC Rules 1002.f and 1003.e, to document the status of the location, maintenance needs, effectiveness of stormwater control measures, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Reclamation Contact and conducted by their designated representative(s). Inspection forms will document current conditions, including evidence of or potential for off-site erosion, additional control measures that are needed, or repair and maintenance issues.

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection.

4.2 Maintenance

For maintenance items discovered, proposed repairs or upgrades to stormwater control measures, and reclamation areas will be documented and coordinated with production crews. Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for items requiring ground disturbance / earthwork.

APPENDIX A

Seed Mix

FORM 2B INTERIM RECLAMATION PLAN
(Appendix A): Seed Mix

Project/Site Name	Location	Existing Vegetation	Operator ID
MCGAVIN 6-19HZ Well Pad and Facility	T 2N: 67W Sec 19	Winter wheat, agricultural field	47120

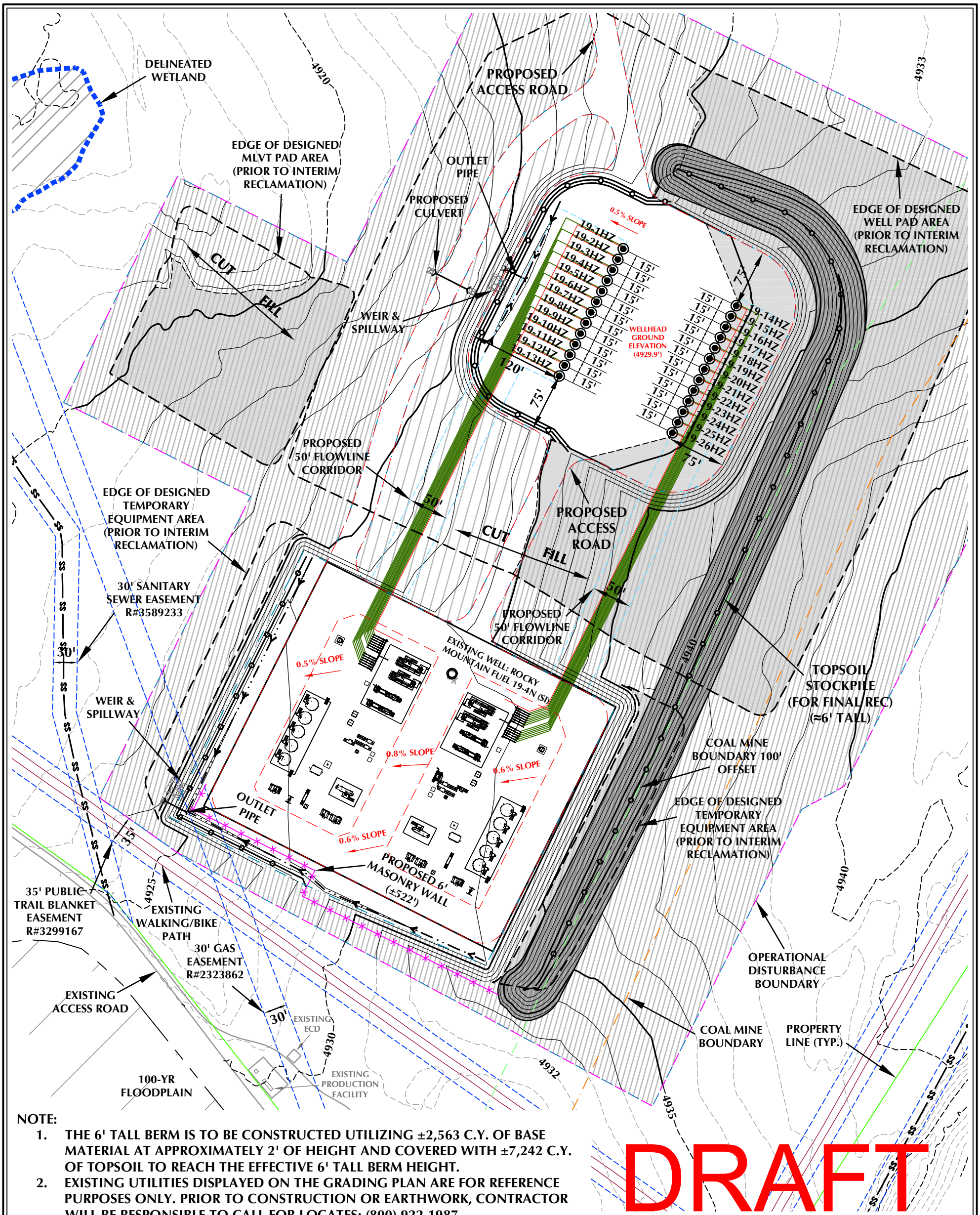
Landowner Requested Seed Mix

Crop Location

Due to the existing agricultural nature of the surrounding land to the proposed project, reclamation will be done to meet the requirements of Rule 1003.e.1. Segregated soil horizons will be replaced to their relative positions and contour, compaction alleviated, and proper preparation of the seed bed will occur.

APPENDIX B

Production Phase Grading Plan



NOTE:

1. THE 6' TALL BERM IS TO BE CONSTRUCTED UTILIZING ±2,563 C.Y. OF BASE MATERIAL AT APPROXIMATELY 2' OF HEIGHT AND COVERED WITH ±7,242 C.Y. OF TOPSOIL TO REACH THE EFFECTIVE 6' TALL BERM HEIGHT.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987

DRAFT

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

PAD - MCGAVIN 6-19HZ INTERIM RECLAMATION SUMMARY

QUANTITIES AND DESIGN PARAMETERS

SHRINKAGE FACTOR = 1.00
SWELL FACTOR = 1.00
TOTAL DISTURBANCE AREA = 25.63 ACRES
AREA RECLAIMED DURING
INTERIM RECLAMATION = 18.34 ACRES
TOTAL WELL PAD AREA AFTER
INTERIM RECLAMATION = 3.50 ACRES
TOTAL FACILITY PAD AREA AFTER
INTERIM RECLAMATION = 3.79 ACRES

WELL/FACILITY PAD QUANTITIES

TOTAL CUT = 22,082 C.Y.
TOTAL FILL = 22,082 C.Y.
TOTAL EXPORT = 0 C.Y.
TOPSOIL @ 11" DEPTH
FROM WELL PAD = 16,389 C.Y.
TOPSOIL @ 11" DEPTH FROM
FACILITY/MLVT/TEMP EQUIPMENT PADS = 9,806 C.Y.
TOTAL TOPSOIL = 26,195 C.Y.
TOPSOIL USED FOR INTERIM REC = 18,953 C.Y.
TOPSOIL STORED FOR FINAL REC = 7,242 C.Y.
LAND USE = CROPLAND

LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION
- EXISTING CONTOURS (1' INTERVAL)
- PROPOSED CONTOURS (1' INTERVAL)
- EXISTING PIPELINE
- PROPOSED FLOWLINE
- EXISTING FENCE
- RECLAMATION AREA
- DIVERSION DITCH
- BERM

HORIZONTAL 0 60' 120' 1" = 120'

1' CONTOURS

PAD - MCGAVIN 6-19HZ

PAD - INTERIM RECLAMATION
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ,
MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ,
MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ,
MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ,
MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ,
MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ,
MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=120'	DATE:10/14/2020	SHEET NO:
REVISED:	HJL 10/11/21	1 1 OF 1

K:\AN\ADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\MCGAVIN_NEW_OPTION 2_MASONRY_FENCE.DWG, 10/11/2021 10:43:03 AM, steven

Section 15

Community Consultation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Community Consultation Plan

McGavin 6-19HZ and Columbine 4-29HZ Well Pads

DESCRIPTION OF AREA

The McGavin Working Pad Surface (WPS) is owned by the applicant and is located in the Town of Firestone, adjacent to the Town of Frederick. The McGavin pad is located south of Pine Cone Ave (CR 20) and east of Colorado Blvd (CR 13).

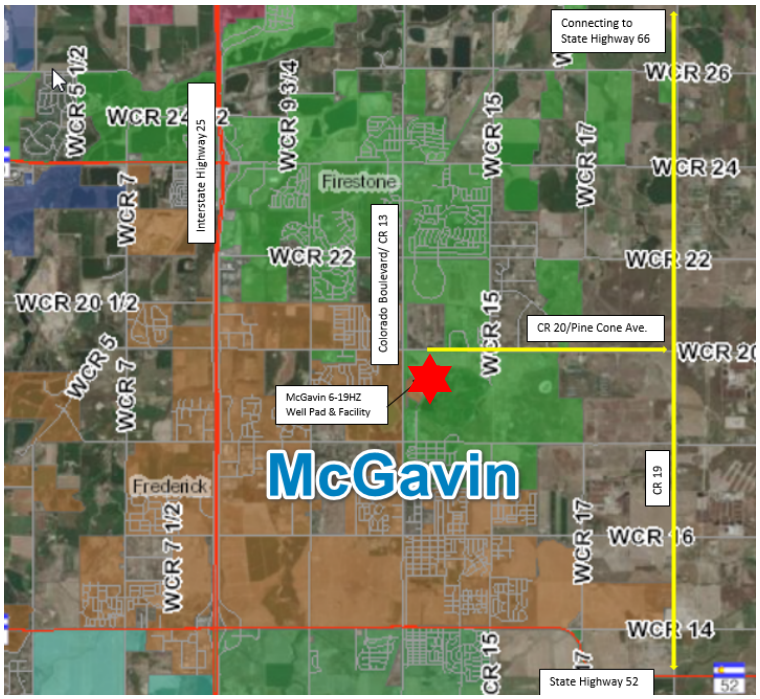


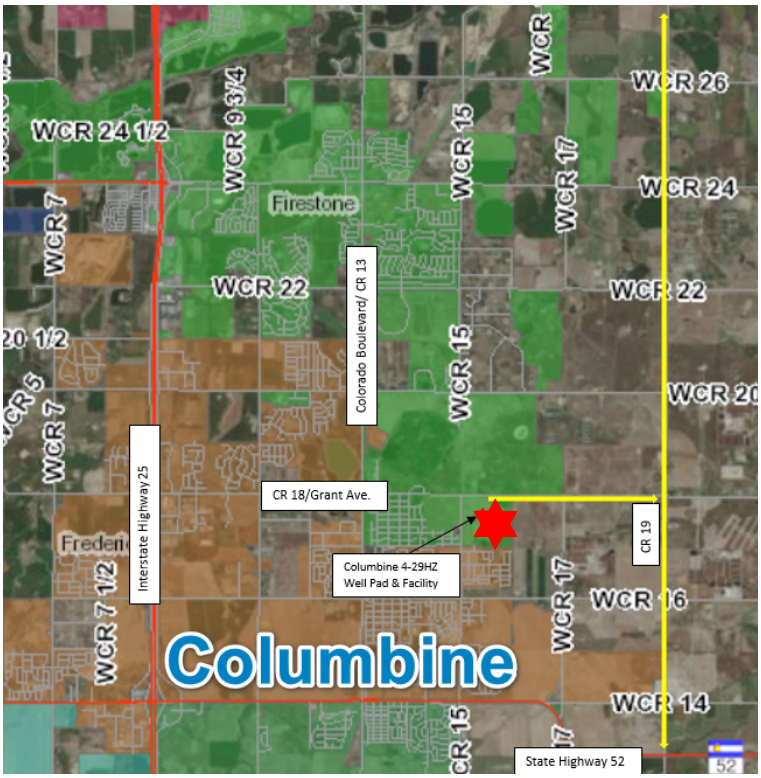
The Columbine WPS is also owned by the applicant and is located southeast of the McGavin pad near the intersection of Grant Ave (CR 18) and Frontier Street (CR 15).



PROPOSED OPERATIONAL HAUL ROUTES

Both the McGavin and Columbine locations will utilize CR 19 connecting to State Hwy 66 to the north and State Hwy 52 to the south. The McGavin location will be accessed via Pine Cone Ave (CR 20) and the Columbine location via Grant Ave (CR 18).

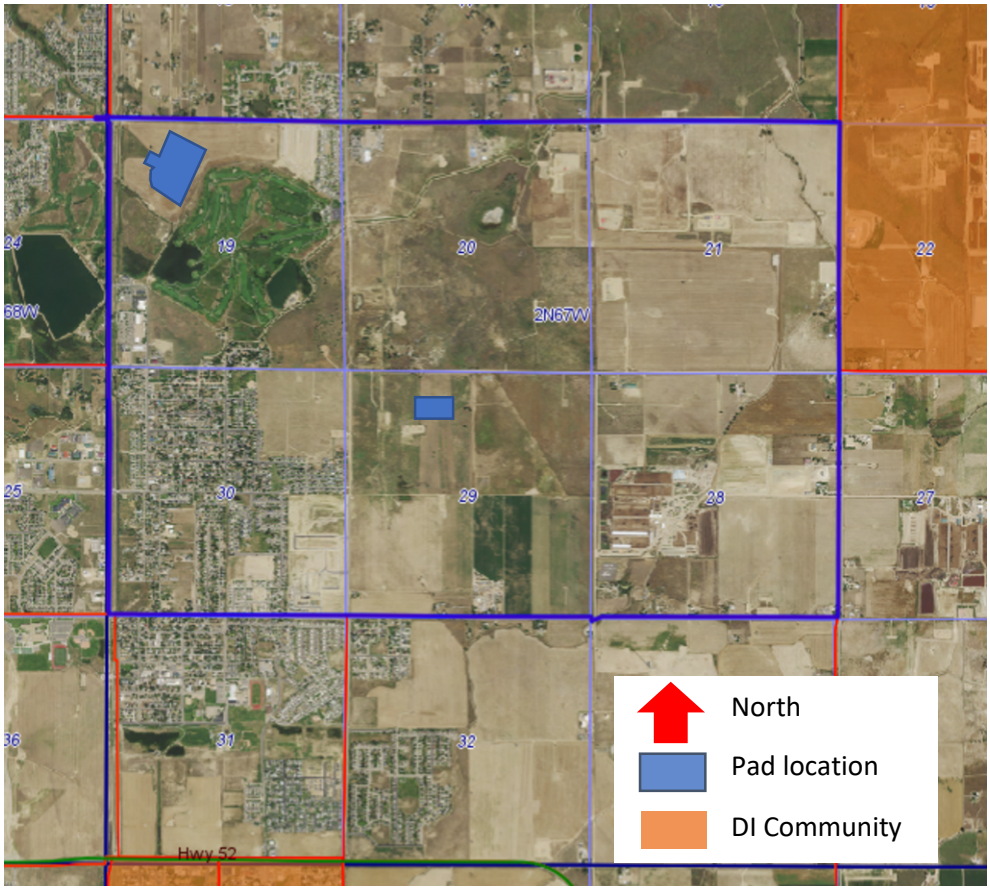




BLOCK GROUP DEMOGRAPHICS

Both the McGavin and Columbine locations fall within the same census block group and are approximately 1.5 miles east of the nearest disproportionally impacted community.

Block Group ID : 081230020161
Block Group Minority Population: 24.6 %
Linguistic Isolation: 1%
Median Household Income: $61,602



PLANNED COMMUNITY CONSULTATION

Because the area is not linguistically isolated (1%), we will send all notices and communications in English. However, we will provide translation services as requested. Our team will be available during daytime and evening hours via the Colorado Response Line and email.

We will consider owners and tenant's suggested mitigation measures and concerns related to public health, safety, welfare.

<u>Previous Communication:</u>

- In July 2020 we invited the neighborhood to a virtual community meeting to discuss the proposed projects. Out of the approximately 130 owners and residents that were invited only two registered to attend and three other residents contacted us after the scheduled meeting date. We contacted each of those residents and engaged and continue to engage with them individually.

Throughout Permitting:

- We will engage with owners and tenants within 2,000' of the WPS and within 300' of the property boundary and invite them to a virtual community meeting to learn more about the proposed projects. The community meeting will provide the owners and tenants with the following information:
    - A description and map of the physical siting of the proposed locations, including legal descriptions
    - A description, proposed timeline, and expected duration of different operations that are planned which include construction, drilling, completions, production, and reclamation
    - The number and orientation of wells, types of equipment, and other on- and off-location infrastructure related to planned operations
    - A description of each stage of operations along with a description of our best management practices to mitigate potential impacts including noise, vibration, light, odor, dust, traffic, and visual
    - Contact information for our Stakeholder Relations team, the Town of Firestone and the COGCC.
- After the first virtual community meeting, we will offer to meet with individuals and groups that have additional questions about the projects
- We will engage with homebuilders and provide information for them to provide to potential homebuyers about the proposed projects including and how to contact us
- Send the Completeness Determination Notice as described in COGCC Rule 303.e
- Complete any additional consultation as required under COGCC Rule 309.c
- Continue to engage with all owners and tenants within 2,000 feet of the WPS and within 300' of the property boundary prior to local and state public hearings

Prior to and after commencement of operations:

- Continue to engage with stakeholders to provide development updates and to answer questions or discuss concerns
- Send all required COGCC notices
- In addition to required notices, we frequently send courtesy notices to owners and tenants to ensure they have the most up to date information about our operations
- Throughout the lifecycle of the wells our Stakeholder Relations team is available to assist the community and can be reached at 866.248.9577 or ColoradoStakeholder@oxy.com Monday through Friday. Our 24-hour Integrated Operations Center can also be reached at 970.515.1500.

Section 16

Final Development Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE MCGAVIN 6-19HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

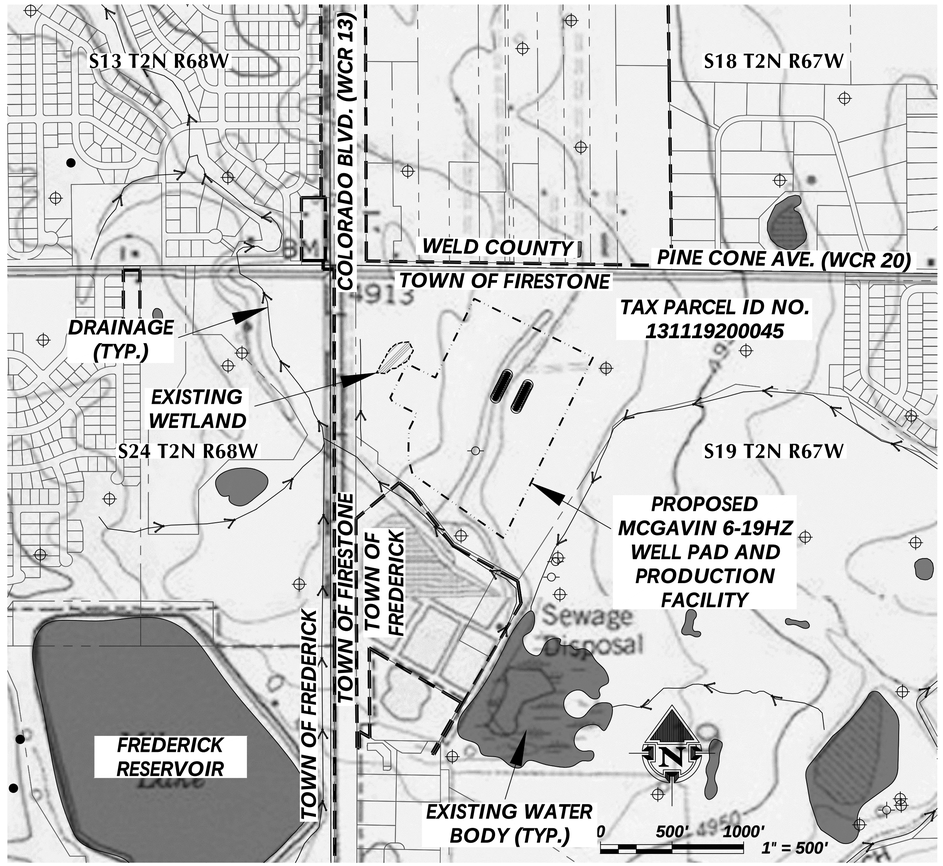
_____ MAYOR

ATTEST_____ TOWN CLERK

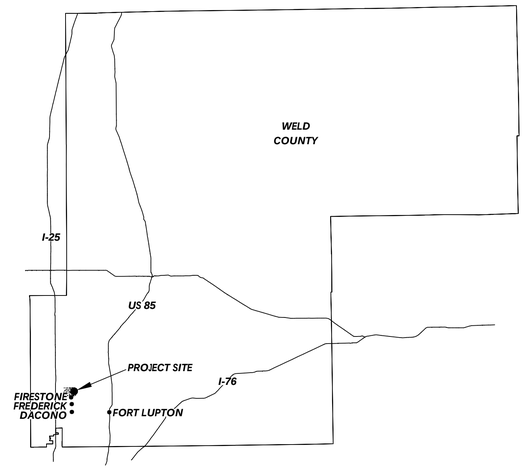
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- ***CONSTRUCTION LIMITS OF DISTURBANCE***
- ***PROPOSED WELL***
- ***EXISTING WELL (PRODUCING)***
- ***EXISTING WELL (PLUG & ABANDONED)***
- ***EXISTING WELL (SHUT IN)***
- ***EXISTING WELL (DRY AND ABANDONED)***
- ***EXISTING WELL (TEMPORARILY ABANDONED)***
- ***TOWN LIMITS***
- ***WATER BODY***
- ***PROPERTY LINE***
- ***EXISTING DITCH / STREAM***

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-014 / FDP21-014

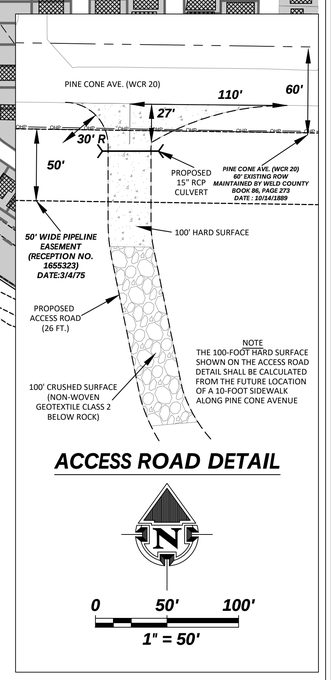
SCALE:	1" = 500'	SHEET:	FDP-1
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_6-19HZ_FDP_COVER.dwg, 12/13/2021 10:08:02 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

SUBDIVISION: NONAME CREEK WEST
SUBDIVISION: NO NAME CREEK ESTATES
S13 T2N R68W
OWNER: FALK GREGORY A & VELUSCEK STEVEN (WELD COUNTY PARCEL I.D. 131313000059) ZONING: FREDERICK
SUBDIVISION: CANSANO RANCH
OWNER: TOWN OF FIRESTONE (WELD COUNTY PARCEL I.D. 131118000060) ZONING: FIRESTONE
OWNER: DUSO PEGGY DIVING TRUST (WELD COUNTY PARCEL I.D. 131118300009) ZONING: AG-A
OWNER: TYMOCZKO DARRELL R & TYMOCZKO NOLA M (WELD COUNTY PARCEL I.D. 131118000057) ZONING: AG-A
OWNER: KNUDSON ANITA R (WELD COUNTY PARCEL I.D. 131118300016) ZONING: AG-A
OWNER: KNUDSON FAMILY TRUST (WELD COUNTY PARCEL I.D. 131118300019) ZONING: AG-A
OWNER: OCONNOR DANIEL J & OCONNOR NICOLE L (WELD COUNTY PARCEL I.D. 131118300072) ZONING: AG-A
OWNER: KANE JOHN ARTHUR & KANE TRACY LEIGH (WELD COUNTY PARCEL I.D. 131118300071) ZONING: AG-A
OWNER: LAM CRAIG A & (WELD COUNTY PARCEL I.D. 131118300013) ZONING: AG-A
OWNER: GRAY JENNIFER L & GRAY DANIEL P (WELD COUNTY PARCEL I.D. 131118300011) ZONING: AG-A
OWNER: DVORAK KATHERINE M (WELD COUNTY PARCEL I.D. 131118300014) ZONING: AG-A
OWNER: ALDERFER LOWELL M & ALDERFER BETTY L (WELD COUNTY PARCEL I.D. 131118000035) ZONING: AG-A
WELD COUNTY
TOWN OF FIRESTONE
PINE CONE AVE. (WCR 20)
SUBDIVISION: OWL LAKE ESTATES SUB
S18 T2N R67W
PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK HEIGHTS
SUBDIVISION: LAWSON SUB
OWNER: PETRAS TIMOTHY (WELD COUNTY PARCEL I.D. 131324000064) ZONING: AG-A
OWNER: CLEVER LARRY C & CLEVER SUSAN K (WELD COUNTY PARCEL I.D. 131313000048) ZONING: AG-A
CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01
DRAINAGE (TYP.)
EXISTING WATER BODY
COLORADO BLVD. (WCR 13)
COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK
SUBDIVISION: MOORE FARM
EXISTING WATER BODY (BELLA ROSA POND)
S24 T2N R68W
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324411017) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000054) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000050) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000028) ZONING: FREDERICK
EXISTING WATER BODY (FREDERICK RESERVOIR)
100-YEAR FLOODPLAIN
TOWN OF FREDERICK
TOWN OF FIRESTONE
TOWN OF FREDERICK
OWNER: BEILAND KATHRYN & BEILAND KEVIN D (WELD COUNTY PARCEL I.D. 131118300076) ZONING: AG-A
APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93
30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08
SEE ACCESS ROAD DETAIL
OWNER: YEAGER JUDITH E (WELD COUNTY PARCEL I.D. 131118300066) ZONING: AG-A
PROPOSED ACCESS ROAD
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)
16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01
OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE
EXISTING FACILITY
30' WIDE PIPELINE EASEMENT (RECEPTION NO. 2238664) DATE: 1/17/91
50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75
VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08
EXISTING ACCESS ROAD
COAL MINE BOUNDARY
EXISTING WETLANDS
PROPOSED MLVT
PROPOSED MCGAVIN 6-19HZ WELL PAD
TEMPORARY EQUIPMENT AREA (328' X 60')
EXISTING WALKING/BIKE PATH
PROPOSED MCGAVIN 6-19HZ FACILITY PAD
TEMPORARY EQUIPMENT AREA (150' X 60')
35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05
EXISTING FACILITY
SUBDIVISION: ST. VRAIN SANITATION DISTRICT MINOR SUBDIVISION 1
OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK
100-YEAR FLOODPLAIN
OWNER: ST VRAIN SANITATION DISTRICT (WELD COUNTY PARCEL I.D. 131119209002) ZONING: FREDERICK
S19 T2N R67W
EXISTING WATER BODY
EXISTING WATER BODY
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK FG



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- SS — EXISTING SANITARY SEWER LINE
- EPL — ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE***

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
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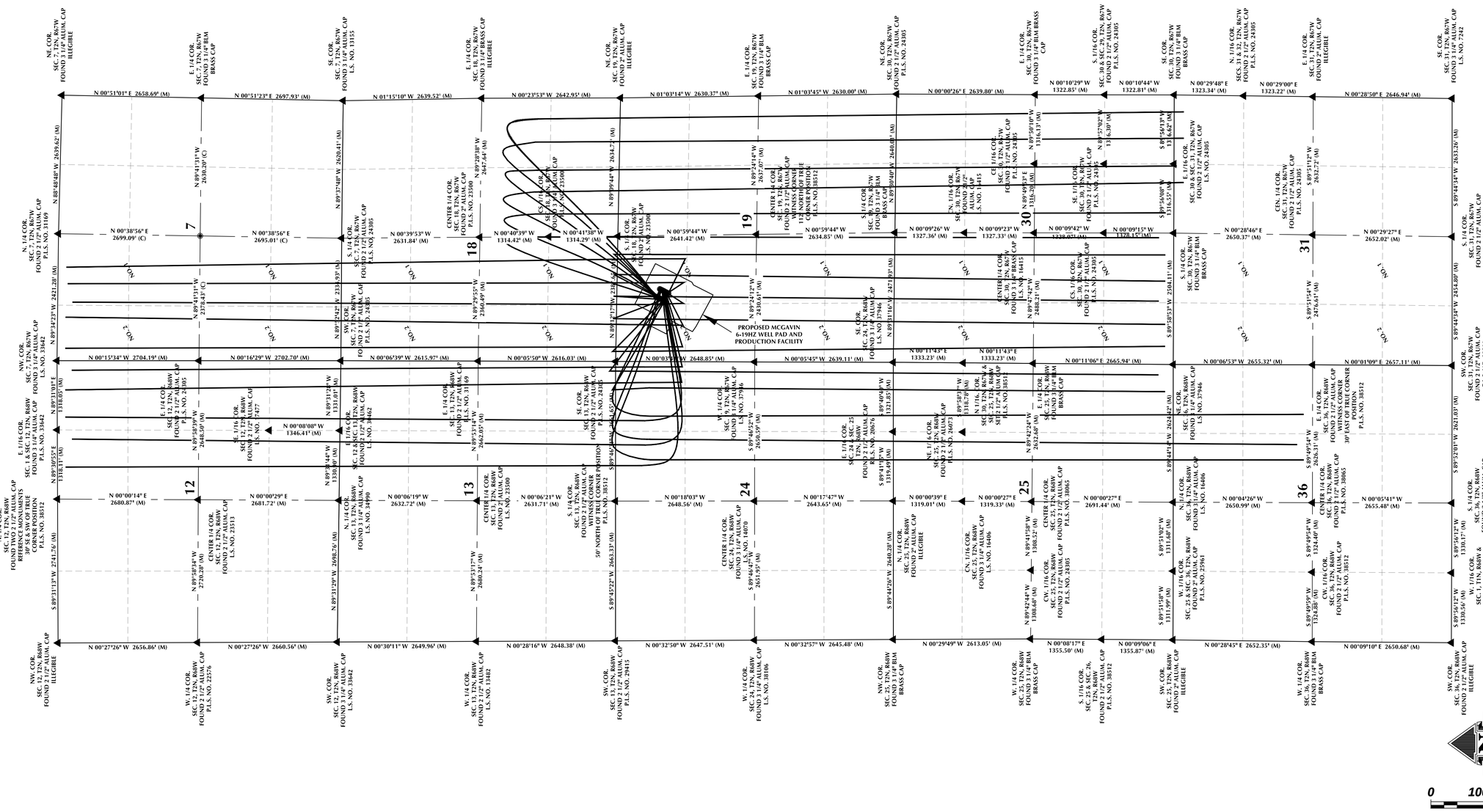
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-014 / FDP21-014

SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.
2. ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972362 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.

GENERAL NOTES:
- ORIGINAL DOCUMENT SIZE: 24" x 36"
- SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-014 / FDP21-014

SCALE:	1" = 1000'	PAGE:	FDP-3
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_8-19HZ_FDP_COVER.dwg, 12/13/2021 10:07:26 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

S18 T2N R67W

S24 T2N R68W

S19 T2N R67W

WELD COUNTY

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

COLORADO BLVD. (WCR 13)

TOWN OF FREDERICK

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

SEDIMENT TRAP

PROPOSED SOUND WALL

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

PROPOSED MLVT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 19-1HZ
MCGAVIN 19-2HZ
MCGAVIN 19-3HZ
MCGAVIN 19-4HZ
MCGAVIN 19-5HZ
MCGAVIN 19-6HZ
MCGAVIN 19-7HZ
MCGAVIN 19-8HZ
MCGAVIN 19-9HZ
MCGAVIN 19-10HZ
MCGAVIN 19-11HZ
MCGAVIN 19-12HZ
MCGAVIN 19-13HZ

MCGAVIN 19-14HZ
MCGAVIN 19-15HZ
MCGAVIN 19-16HZ
MCGAVIN 19-17HZ
MCGAVIN 19-18HZ
MCGAVIN 19-19HZ
MCGAVIN 19-20HZ
MCGAVIN 19-21HZ
MCGAVIN 19-22HZ
MCGAVIN 19-23HZ
MCGAVIN 19-24HZ
MCGAVIN 19-25HZ
MCGAVIN 19-26HZ

50' FLOWLINE CORRIDOR

TOPSOIL STOCKPILE

PROPOSED CULVERT

EXISTING WALKING/BIKE PATH

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 328021

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N, (DJ) API: 05-123-34478, TOTAL MEASURED DEPTH: 9240'

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

SEDIMENT TRAP

TEMPORARY EQUIPMENT AREA (328' X 60') & (350' X 60')
(TEMPORARY TANKS - 44)
(TEMPORARY ECDs - 13)
(TEMPORARY PROPANE TANK - 2)

TEMPORARY GENERATOR (50' x 20')

TEMPORARY PURGE GAS AREA (10' x 30')

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666, TOTAL MEASURED DEPTH: 5026'

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318, TOTAL MEASURED DEPTH: 5094'

COAL MINE BOUNDARY

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 1311190000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

4910'

4915

4920

4925

4930

4935

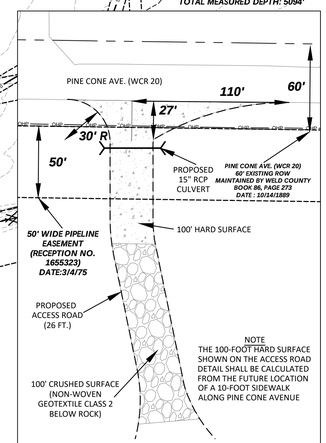
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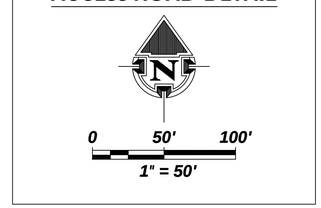
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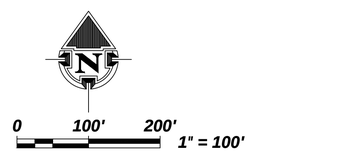
4950

4930'

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- PROPOSED SLOPE PROTECTION
- DIVERSION DITCH

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

609 CONSULTING, LLC

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
CONSTRUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\SWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/14/2021 1:27:14 PM, daey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

WELD COUNTY

S18 T2N R67W

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

COLORADO BLVD. (WCR 13)

STORMWATER STORAGE BERM

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED CULVERT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 18-1HZ
MCGAVIN 18-2HZ
MCGAVIN 18-3HZ
MCGAVIN 18-4HZ
MCGAVIN 18-5HZ
MCGAVIN 18-6HZ
MCGAVIN 18-7HZ
MCGAVIN 18-8HZ
MCGAVIN 18-9HZ
MCGAVIN 18-10HZ
MCGAVIN 18-11HZ
MCGAVIN 18-12HZ
MCGAVIN 18-13HZ

MCGAVIN 18-14HZ
MCGAVIN 18-15HZ
MCGAVIN 18-16HZ
MCGAVIN 18-17HZ
MCGAVIN 18-18HZ
MCGAVIN 18-19HZ
MCGAVIN 18-20HZ
MCGAVIN 18-21HZ
MCGAVIN 18-22HZ
MCGAVIN 18-23HZ
MCGAVIN 18-24HZ
MCGAVIN 18-25HZ
MCGAVIN 18-26HZ

OFF-SITE FLOW DEFLECTION

STORMWATER STORAGE BERM

50'

50' FLOWLINE CORRIDOR

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNW COGCC LOCATION NUMBER: 320821

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SU) API: 05-123-24478, TOTAL MEASURED DEPTH: 9249'

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

SEE VISUAL MITIGATION BERM CROSS SECTION ON FDP-7

WEIR & SPILLWAY

OUTLET PIPE

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

EXISTING WALKING/BIKE PATH

S24 T2N R68W

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

TOWN OF FREDERICK

TOWN OF FIRESTONE

TOWN OF FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

SEE MASONRY WALL DETAIL ON FDP-7

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

COAL MINE BOUNDARY

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666 TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318 TOTAL MEASURED DEPTH: 5094'

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

S19 T2N R67W

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

4910'

4920

4925

4930

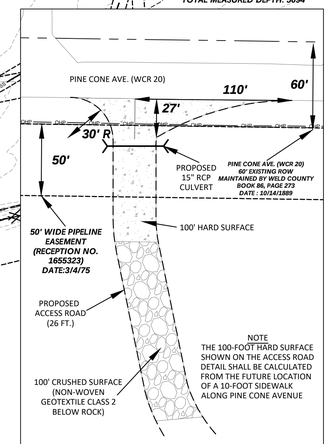
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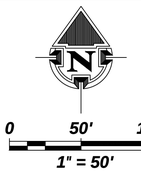
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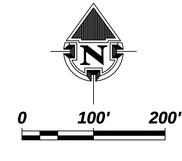
4945

4950

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EPL — EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- (PS) PROPOSED PERMANENT SEEDING
- MASONRY WALL
- DIVERSION DITCH

GENERAL NOTES:

- *ORIGINAL DOCUMENT SIZE: 24" x 36"*
- *SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6*

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
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SHERIDAN OFFICE
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Kerr-McGee Oil & Gas Onshore L.P.
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Denver, Colorado 80202

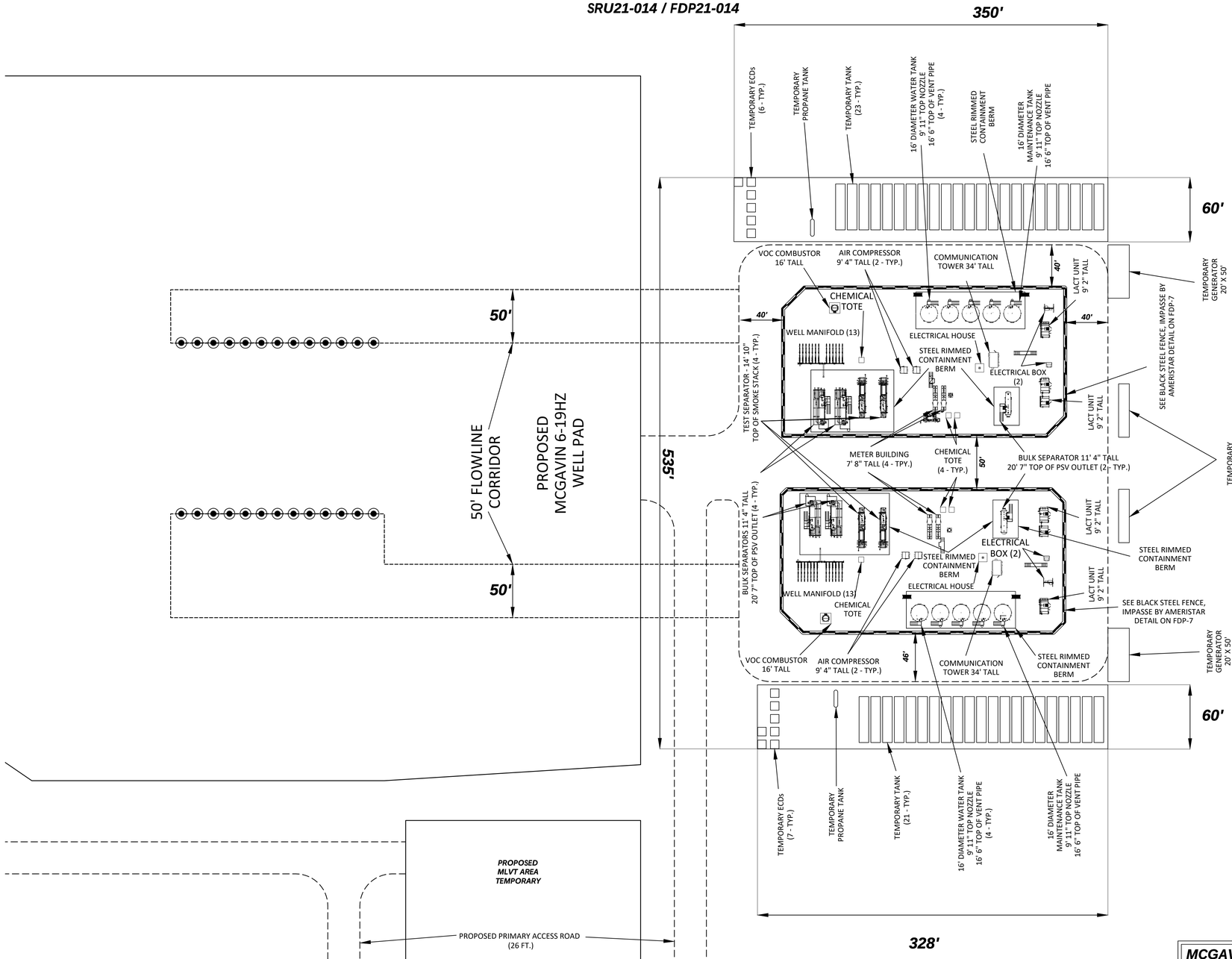
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



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GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC

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Phone 307-674-0609

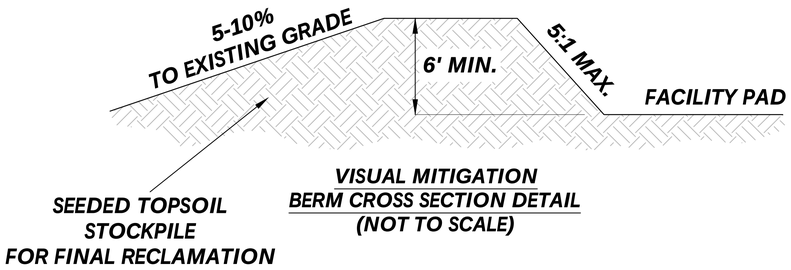
Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-014 / FDP21-014

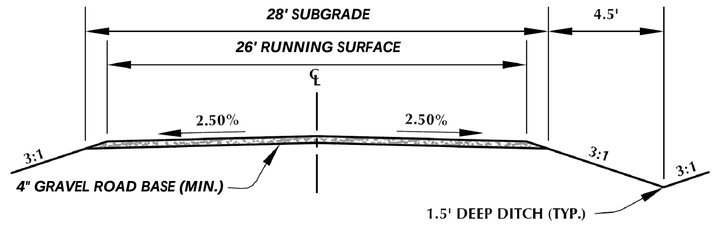
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SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

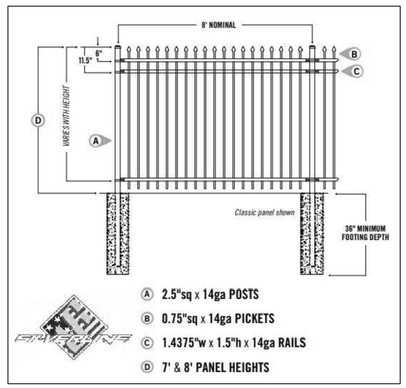
Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



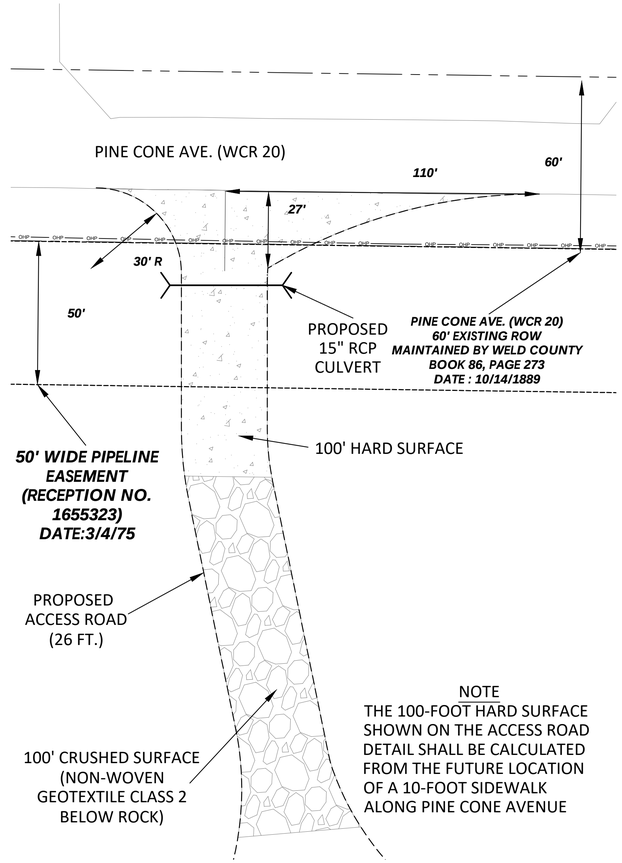
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



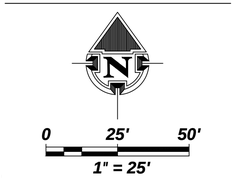
TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



TYPICAL MASONRY WALL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE MCGAVIN 6-19HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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6706 North Franklin Avenue
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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-014 / FDP21-014

SCALE:	VARIOUS	SHEET:	FDP-7
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-014 / FDP21-014

NW. COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
P.L.S. NO. 24305

N. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2" ALUM. CAP
L.S. NO. 23500

N 89°12'17" W 2387.65'
(N. LINE OF THE NW1/4 OF SECTION 19)

N 89°09'45" W 927.97'
N 89°09'45" W 282.70'
N 83°43'12" W 316.62'

60' PINE CONE AVE. (WCR 20)

PINE CONE AVE. (WCR 20)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

SEE ACCESS ROAD DETAIL

N 83°09'44" W 279.51'
N 83°30'43" W 243.86'

50' WIDE PIPELINE EASEMENT
(RECEPTION NO. 1655323)
DATE: 3/4/75
GRID TIE TO CENTERLINE

CL OF PIPELINE ROW
(RECEPTION NO. 2843044)
DATE: 4/25/01

50'
30'

30' WIDE SANITARY SEWER
LINE EASEMENT
(RECEPTION NO. 3589233 &
3593372)
DATE: 11/12/08 & 12/5/08

N 71°43'21" W 1157.86'

APPROXIMATE LOCATION
OF 30' WIDE PIPELINE
ROW EASEMENT
(RECEPTION NO. 2857509
& 2323862)
DATE: 6/14/01 & 3/3/93

SEE GRID TIE
DETAIL ON FDP-9

S 63°17'59" E 1160.00'

N 26°42'01" E 479.00'

S 63°17'59" E 240.00'

N 26°42'01" E 179.26'

N 63°17'59" W 384.57'

N 26°42'01" E 437.37'

PROPOSED
MCGAVIN 6-19HZ
WELL PAD

PROPOSED
MCGAVIN 6-19HZ
FACILITY PAD

EXISTING WELL:
ROCKY MOUNTAIN FUEL 19-4H,
(SI), API: 05-123-16476,
TOTAL MEASURED DEPTH: 8248'

N 63°17'59" W 128.00'

N 0°03'41" W 2648.85'
(W. LINE OF THE NW1/4 OF SECTION 19)

COLORADO BLVD. (WCR 13)

35' WIDE PUBLIC TRAIL
(RECEPTION NO. 3299167)
DATE: 6/30/05
GRID TIE TO CENTERLINE

60'

COLORADO BLVD. (WCR 13)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

S 58°16'24" W 1184.18'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA),
API: 05-123-08665,
TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH DRAINAGE
EASEMENT
(RECEPTION NO. 3106304 & 3316421)
DATE: 9/15/03 & 8/24/05

N 35°32'29" E 880.04'
N 34°43'39" E 882.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA),
API: 05-123-08666,
TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY
MOUNTAIN FUEL CO D 12, (PA),
API: 05-123-10318,
TOTAL MEASURED DEPTH: 5094'

16.5'

16.5' WIDE
UTILITY EASEMENT
(RECEPTION NO. 2857509)
DATE: 6/14/01

VARYING WIDTH SANITARY
SEWER LINE EASEMENT
(RECEPTION NO. 3586220)
DATE: 10/27/08

30'

30' WIDE
PIPELINE EASEMENT
(RECEPTION NO. 2238664)
DATE: 1/17/91
GRID TIE TO CENTERLINE

S 0°03'41" E 2648.85'
(E. LINE OF THE NW1/4 OF SECTION 19)
N 00°59'44" W 2641.42'

S 5°56'20" W 740.00'

S 43°13'14" E 2315.64'

S 44°47'25" W 61.65'

S 35°52'40" W 724.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-3 JI,
(PA), API: 05-123-20218,
TOTAL MEASURED DEPTH: 8440'

EXISTING WELL: ROCKY MTN FUEL V 19-5JI, (SI),
API: 05-123-20217,
TOTAL MEASURED DEPTH: 8358'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-6JI, (SI),
API: 05-123-19583,
TOTAL MEASURED DEPTH: 8100'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 13,
(PA), API: 05-123-10317,
TOTAL MEASURED DEPTH: 5076'

S 53°17'52" E 1050.43'
S 54°59'08" E 1048.17'
S 60°56'59" E 1011.11'
S 65°38'39" E 907.33'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 5, (PA),
API: 05-123-08531,
TOTAL MEASURED DEPTH: 8095'

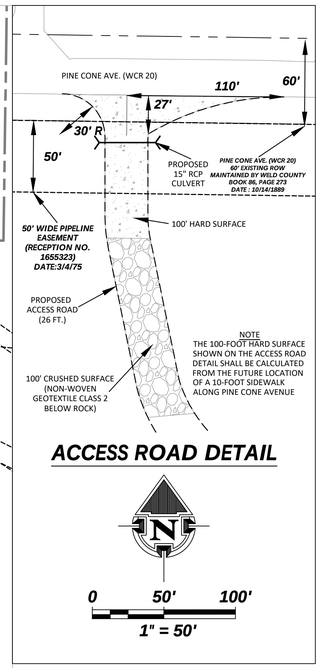
S 68°37'02" W 1175.60'

W. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 3 1/4" ALUM. CAP
L.S. NO. 37946

(S. LINE OF THE NW1/4 OF SECTION 19)
N 89°24'12" W 2430.61'

CENTER 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
WITNESS CORNER
112' NORTH OF TRUE CORNER POSITION
P.L.S. NO. 38512

0 150' 300'
1" = 150'



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

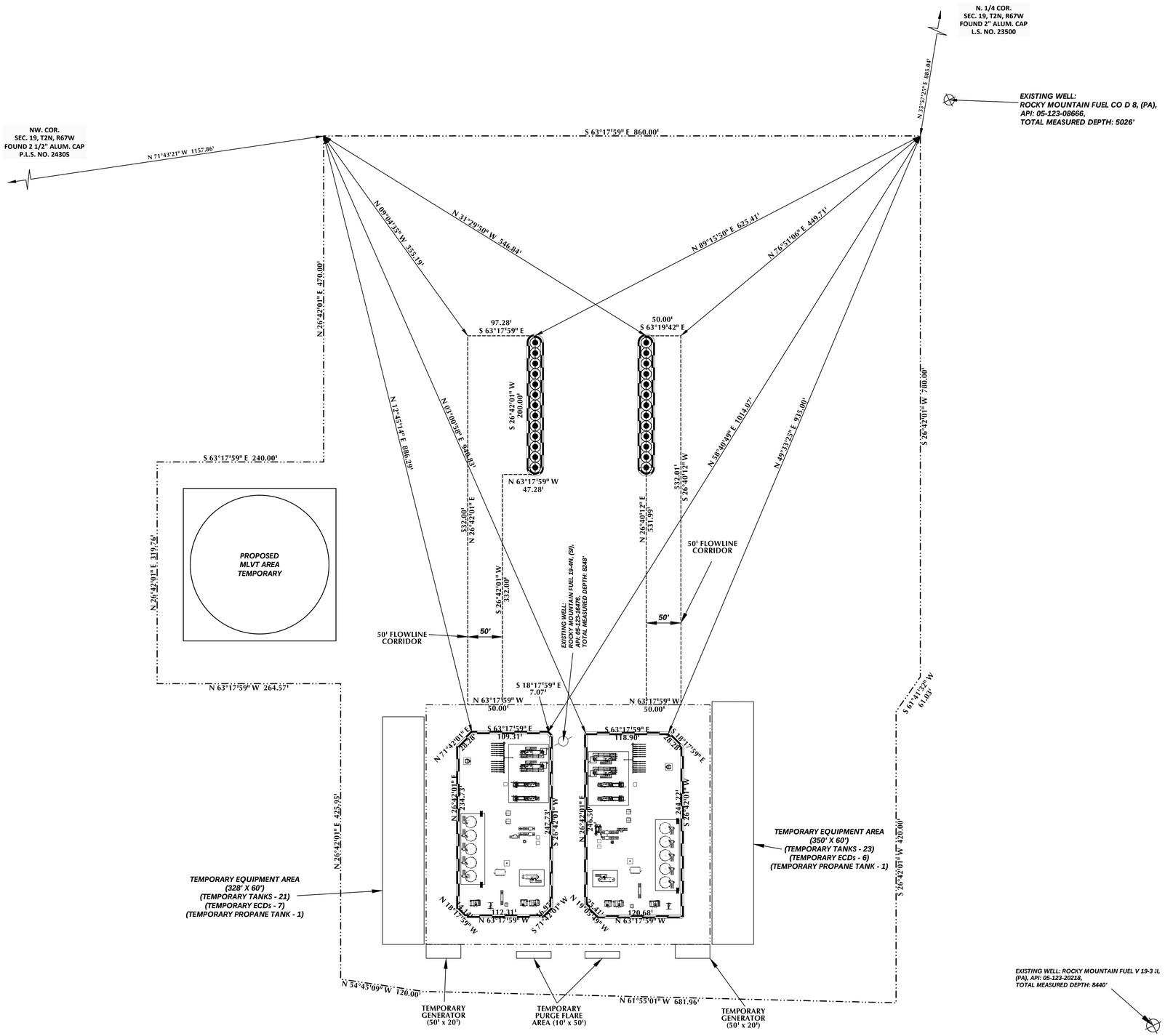
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-014 / FDP21-014

SCALE:	1" = 150'	SHEET:	FDP-8
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/14/2021 1:25:46 PM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-014 / FDP21-014

SCALE:	1" = 75'	SHEET:	FDP-9
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/13/2021 10:11:19 AM, casey

Section 17

Alta Survey

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19,

T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO

EXCEPTIONS PER TITLE COMMITMENT,
COMMITMENT NUMBER 515-F0489354-171-MSK AMENDMENT NO. 4:

8. Reservation of all minerals, including but not limited to coal, oil and gas as well as the right of ingress and egress, by the grantor, it's successors in interest and assigns upon and across said lands for the purposes of prospecting for, mining, treating, processing, taking and transporting any and all minerals and for the construction of plants, houses, buildings, offices, dumps, roads, power lines, pipelines, and other structures incidental to such operations as contained in instrument from the Rocky Mountain Fuel Company recorded December 6, 1946 in Book 1193 at Page 66. NOT PLOTTABLE.

9. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

   Granted to: Dennis Sullivan and R.B. Sullivan
   Purpose: Ditch purposes
   Recording Date: March 28, 1908
   Recording No: Book 278 at Page 140. NOT PLOTTABLE.

   NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

10. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: American Telephone and Telegraph Company
    Purpose: Communication facilities and appurtenances
    Recording Date: April 25, 1941
    Recording No: Book 1078 at Page 78. NOT PLOTTABLE.

11. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Andrew Dier and William A. Dier
    Purpose: Pipeline purposes
    Recording Date: May 12, 1958
    Recording No: Book 1502 at Page 484. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

12. An oil and gas lease for the term therein provided with certain covenants, conditions and provisions, together with easements, if any, as set forth therein, and any and all assignments thereof or interests therein.

    Recording Date: March 31, 1970
    Recording No: Reception No. 544576. NOT PLOTTABLE.

13. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Panhandle Eastern Pipe Line Company
    Purpose: Pipeline purposes and appurtenances
    Recording Date: March 4, 1975
    Recording No: Reception No. 1655323. PLOTTED HEREON.

14. Terms, conditions, provisions, agreements and obligations contained in the Surface Damage Agreement as set forth below:

    Recording Date: August 18, 1975
    Recording No.: Reception No. 1667440
    Amendment(s) of said instrument

    Recording Date: April 10, 1981
    Recording No.: Reception No. 1854858. NOT PLOTTABLE

15. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: The Mountain States Telephone and Telegraph Company
    Purpose: Communication facilities and appurtenances
    Recording Date: December 6, 1976
    Recording No: Reception No. 1705164. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

16. Terms, conditions, provisions, agreements and obligations contained in the Surface Damage Agreement as set forth below:

    Recording Date: June 6, 1978
    Recording No.: Reception No. 155703. NOT PLOTTABLE.

17. Order for Inclusion Within the Central Weld County Water District recorded August 27, 1979 as Reception No. 1801424. NOT PLOTTABLE.

18. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Amoco Production Company
    Purpose: Pipeline purposes and appurtenances
    Recording Date: January 17, 1991
    Recording No: Reception No. 2238664. PLOTTED HEREON.

19. Terms, conditions, provisions, agreements and obligations contained in the Line Extension and Cost Recovery Agreement as set forth below:

    Recording Date: October 5, 1998
    Recording No.: Reception No. 2644871. NOT PLOTTABLE.

20. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: United Power, Inc.
    Purpose: Electric facilities and appurtenances
    Recording Date: November 12, 1996
    Recording No: Reception No. 2520129. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

21. All matters located on the Land as set forth on the Land Survey Plat recorded May 7, 1999 as Reception No. 2692422, or to the extent pertaining to the land. PLOTTED HEREON.

22. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: United Power, Inc.
    Purpose: Electric facilities and appurtenances
    Recording Date: June 30, 2000
    Recording No: Reception No. 2777912. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

23. Terms, conditions, provisions, agreements and obligations contained in the Memorandum of Surface Use Agreement as set forth below:

    Recording Date: March 20, 2001
    Recording No.: Reception No. 2833735. NOT PLOTTABLE.

24. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Duke Energy Field Services, LP
    Purpose: Pipeline purposes and appurtenances
    Recording Date: April 25, 2001
    Recording No: Reception No. 2843044. PLOTTED HEREON.

25. Terms, conditions, provisions, agreements and obligations contained in the Outline Development Plan as set forth below:

    Recording Date: June 15, 2001
    Recording No.: Reception No. 2857773. NOT PLOTTABLE.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

26. All matters located on the Land as set forth on the ALTA/ACSM Land Title Survey dated March 9, 2001, prepared by Albers, Drexel & Pohly, Inc., recorded June 14, 2001 as Reception No. 2857509, or to the extent pertaining to the Land. PLOTTED HEREON.

27. Terms, conditions, provisions, agreements and obligations contained in the Surface Water Drainage Easement Agreement as set forth below:

    Recording Date: September 15, 2003
    Recording No.: Reception No. 3106304. EASEMENT LIES ADJACENT TO PROPERTY. PLOTTED HEREON.

28. Terms, conditions, provisions, agreements and obligations contained in the Golf Course Waiver, Disclaimer and Easement as set forth below:

    Recording Date: September 15, 2003
    Recording No.: Reception No. 3106305. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

29. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Town of Firestone
    Purpose: Public trail purposes and appurtenances
    Recording Date: June 30, 2005
    Recording No: Reception No. 3299167. PLOTTED HEREON.

30. Terms, conditions, provisions, agreements and obligations contained in the Surface Water Drainage Easement Agreement as set forth below:

    Recording Date: August 24, 2005
    Recording No.: Reception No. 3316421. EASEMENT LIES ADJACENT TO PROPERTY. PLOTTED HEREON.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

31. Terms, conditions, provisions, agreements and obligations contained in the Golf Course Waiver, Disclaimer and Easement as set forth below:

    Recording Date: August 24, 2005
    Recording No.: Reception No. 3316422. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

32. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Weld County Tri-Area Sanitation District
    Purpose: Sanitary sewer line purposes and appurtenances
    Recording Date: October 27, 2008
    Recording No: Reception No. 3586220. PLOTTED HEREON.

33. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: St. Vrain Sanitation District
    Purpose: Sanitary sewer line purposes and appurtenances
    Recording Date: November 12, 2008
    Recording No: Reception No. 3589233; and
    Recording Date: December 5, 2008
    Recording No: Reception No. 3593372. PLOTTED HEREON.

34. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein , as granted in a document:

    Granted to: Summerfield Holdings, LLC
    Purpose: Temporary construction and roadway purposes
    Recording Date: March 14, 2013
    Recording No: Reception No. 3917081. PLOTTED HEREON.

35. All matters located on the Land as set forth on the ALTA/ACSM Land Title Survey dated February 12, 2013, prepared by Power Surveying Company, Inc., recorded_____, 20_ as Reception No._____, or to the extent pertaining to the Land. NOT PLOTTABLE.

36. INTENTIONALLY DELETED.

37. Terms, conditions, provisions, agreements and obligations contained in the Memorandum of Option Agreement recorded January 3, 2000 as Reception No. 2741821 and Option Agreement recorded June 13, 2000 as Reception No. 2774527; as amended by Amendment to Option Agreement recorded January 31, 2003 as Reception No. 3029223 and as amended by that Amendment to Option Agreement recorded December 3, 2003 as Reception No. 3131950. NOT PLOTTABLE.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER UPON RECORDATION OF ITEM j. LISTED HEREIN SCHEDULE B-SECTION 1 (REQUIREMENTS)

38. Right of Way and rights incidental thereto for County Roads 30 feet on either side of Section and Township lines as established by the Board of County Commissioners for Weld County, as set forth in a document:

    Recording Date: October 14, 1889
    Recording No: Book 86, Page 273. PLOTTED HEREON.

39. The following Notices concerning underground facilities have been filed with the Weld County Clerk and Recorder. These statements are general and do not necessarily give notice of underground facilities within the Land:

    Mountain Bell Telephone Company, recorded October I, 1981, in Book 949 at Reception No. 1870705. NOT PLOTTABLE.

    Union Rural Electric Association, Inc., recorded October 5, 1981, in Book 949, at Reception No. 1871004. NOT PLOTTABLE.

    Public Service Company of Colorado, recorded November 9, 1981, in Book 952 at Reception No. 1874084. NOT PLOTTABLE.

    Colorado Interstate Gas Company, recorded August 31, 1984, in Book 1041 at Reception No. 1979784. NOT PLOTTABLE.

    Western Gas Supply Company, recorded April 2, 1985, in Book 1063 at Reception No. 2004300. NOT PLOTTABLE.

    Associated Natural Gas, Inc., recorded April 23, 1986, in Book 1110 at Reception No. 2050953. NOT PLOTTABLE.

    Panhandle Eastern Pipe Line Company, recorded June 26, 1986, in Book 1117 at Reception No. 2058722. NOT PLOTTABLE.

    Associated Natural Gas, Inc., recorded April 10, 1989, in Book 1229 at Reception No. 2175917. NOT PLOTTABLE.

    United Power, Inc., formerly Union Rural Electric Association, Inc., recorded January 24, 1991, in Book 1288 at Reception No. 2239296. NOT PLOTTABLE.

DESCRIPTION PER TITLE REPORT

A tract of land located in the N1/2 of Section 19, T2N, R67W of the 6th P.M., Town of Firestone, County of Weld, State of Colorado, described as follows:

Beginning at the N1/4 Corner of said Section 19, from which the Northwest Corner of said Section 19 bears S89°59'35"W, 2387.90 feet (Basis of Bearing); thence S89°59'35"W, 2208.09 feet along the North Line of the NW1/4 of said Section 19 to the Easterly Right-of-Way Line of the Former Union Pacific Railroad conveyed to the Union Pacific Railroad Company as described in Warranty Deed recorded June 13, 1910, in Book 320 at Page 187 of the records of Weld County, Colorado;

Thence S00°52'37"E, 1207.59 feet along the Easterly Right-of-Way Line of said Former Union Pacific Railroad to a point from which the Northwest Corner of that tract of land conveyed to The Weld County Tri-Area Sanitation District as described in Court Decree recorded May 31, 1968, in Book 595 as Reception No. 1517031 of the records of Weld County, Colorado, Bears S00°52'37"E, 583.37 feet along the Easterly Right-of-Way Line of said Former Union Pacific Railroad , said point also being an angle point of parcel A of Saddleback Golf Course conveyed to Coal Ridge Management, Inc. as described in Bargain and Sale Deed recorded December 13, 2000, as Reception No. 2813046 of the records of Weld County, Colorado;

The following courses and distances are along the Northerly Line of said Parcel A of Saddleback Golf Course:
Thence S55°09'54"E, 197.36 feet;

Thence S00°00'00"E, 80.00 feet;

Thence S55°09' 54"E, 304.22 feet;

Thence S38°52'55"E, 467.85 feet;

Thence S61°32'37"E, 523.03 feet;

Thence N31°50'07"E, 967.17 feet to the most Southerly Corner of Parcel C of Saddleback Golf Course described at said Reception No. 2813046;

The following courses and distances are along the Westerly Line of said Parcel C of Saddleback Golf Course;
Thence N29°13'07"E, 143.45 feet;

Thence N12°17'39"E, 107.46 feet;

Thence N36°03'32"E, 33.42 feet;

Thence N54°06'01 "E, 105.25 feet to an angle point of said Parcel A of Saddleback Golf Course, and being the most Westerly Corner of Parcel D of Saddleback Golf Course as described at said Reception No. 2813046;

The following courses and distances are along the Northerly line of said Parcel D of Saddleback Golf Course;
Thence N54°06'01 "E, 75.01 feet;

Thence N80°33'53" E, 314.32 feet to the Northerly Line of said Parcel A of Saddleback Golf Course;

The following courses and distances are along the Northerly Line of said Parcel A of Saddleback Golf Course;
Thence N75°33'24"E, 209.97 feet;

Thence N64°35'44"E, 227.29 feet;

Thence S84°37'34"E, 653.85 feet;

Thence leaving the Northerly Line of said Parcel A of Saddleback Golf Course, N00°00'00"W, 212.37 feet; Thence N89°09'11 "E, 100.01 feet; Thence N00°00'00"W, 648.43 feet to a Point on the North Line of the NE1/4 Corner of said Section 19;

Thence N89°58'18"W, 1214.05 feet along the North Line of the NE1/4 of said Section 19 to the N1/4 Corner of said Section 19 and the Point of Beginning.

DESCRIPTION PER SURVEY

A portion of the North One-half (N1/2) of Section 19, T2N, R67W of the 6th P.M., Town of Firestone, County of Weld, State of Colorado, described as follows:

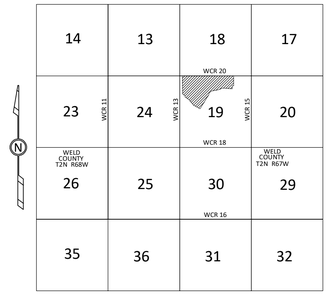
Beginning at the North One-quarter (N1/4) Corner of said Section 19, being marked by a 2" aluminum cap, L.S. No. 23500 and proceeding along the North line of the Northeast One-quarter (NE1/4) of said Section 19, S89°09'44"E, 1214.26 feet;

Thence departing said North line, S00°48'30"W, 648.70 feet;
Thence N89°53'59"W, 99.72 feet;
Thence S00°57'56"W, 212.27 feet to a point on the northerly boundary of Saddleback Golf Club LLC.;
Thence along said northerly boundary the following 15 courses:

N83°49'58"W, 653.60 feet;
S65°24'04"W, 227.35 feet;
S76°22'12"W, 209.87 feet;
S81°22'36"W, 314.32 feet;
S54°57'34"W, 75.00 feet;
S54°55'49"W, 105.31 feet;
S36°58'54"W, 33.38 feet;
S13°06'45"W, 107.46 feet;
S29°58'20"W, 143.59 feet;
S32°38'41"W, 967.17 feet;
N60°43'52"W, 522.95 feet;
N38°04'14"W, 467.95 feet;
N54°21'53"W, 304.17 feet;
N00°40'52"E, 80.16 feet;
N54°20'19"W, 197.24 feet;

Thence departing said north line, N00°05'32"W, 1207.35 feet to a point on the North line of the Northwest One-quarter (NW1/4) of said Section 19;
Thence along the North line of said Northwest One-quarter, S89°12'17"E, 2208.49 feet to the Point of Beginning.

Said parcel contains 103.89 acres (4,525,304 square feet).



LOCATION MAP

Notes:

1. Easements and exceptions shown hereon are based on Fidelity National Title Company, Commitment Number: 515-F0489354-171-MSK, Amendment No. 4, with an effective date of September 1, 2015, at 7:00 a.m. and Fidelity National Title Insurance Company Endorsement with an effective date of June 8, 2021.
2. Bearings are based on the North line of the Northwest 1/4 as being S89°12'17"E. Monumented as shown.
3. Basis of bearing derived from Colorado Coordinate System NAD83, North Zone.
4. This parcel contains 4,525,304 square feet or 103.89 acres, more or less.
5. Utilities shown hereon are those which were visible on the surface of the ground and were located with paint and flags at the date of the survey.
6. Oil and gas well names and data taken from COGCC website.
7. Distances are U.S. Survey Foot.
8. Address: Vacant Land, Firestone, CO 80504.
9. Adjoiner property owner information taken from Weld County, Colorado GIS map server.
10. According to Colorado state law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date on the certification shown hereon.
11. There are no buildings on the property.

Surveyor's Certificate

To: Town of Firestone.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 3, 4, 7(a), 8, and 11 of Table A thereof. The field work was completed on June 29, 2021.

COLORADO LICENSED
RANDALL K. FRENCH
38512
PROFESSIONAL LAND SURVEYOR
10/18/2021

Randall K. French

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

ALTA/NSPS LAND TITLE SURVEY
A PORTION OF THE NORTH 1/2
OF SECTION 19, T2N, R67W, 6TH P.M.,
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

REVISIONS:
10/18/21 - ADD WELL INFORMATION

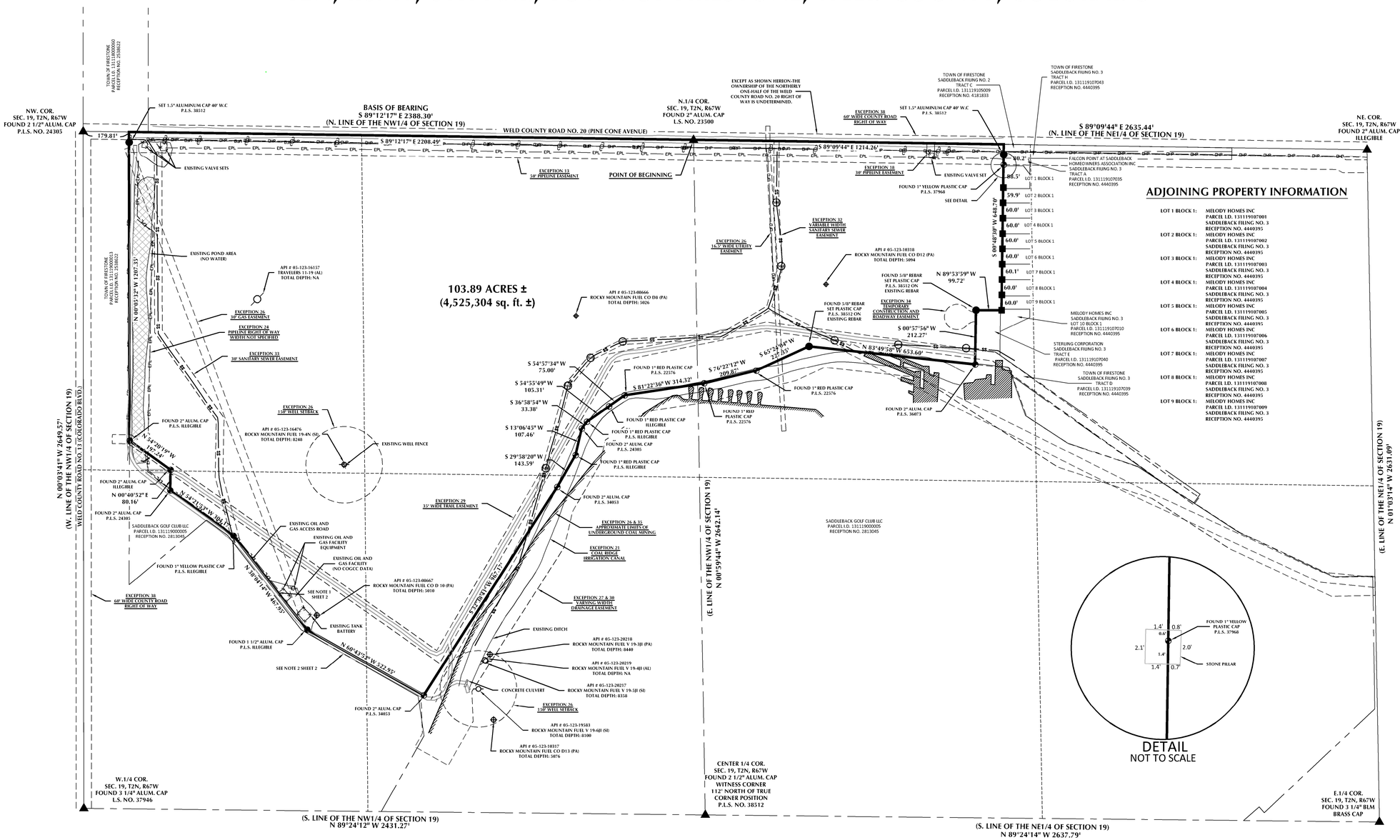
609 CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY: RZP
CHECKED BY: RKF
DATE: 6/29/2021
JOB: 16-105
SHEET NO: 1 OF 2

K:\ANDADRO\2016\2016_105_NGSAVIN_T2N_R67W_SEC_19\DWG\ALTA\NGSAVIN_ALTA.dwg, 10/19/2021 10:52:19 AM, samuel

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19, T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO



LEGEND:

- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- PROPERTY LINE
- EDGE OF DIRT ROAD
- EXISTING PIPELINE
- EXISTING EASEMENT
- FENCE
- UNDERGROUND FIBER OPTIC LINE
- OVERHEAD POWER LINE
- EXISTING PIPELINE
- POWER POLE
- ABANDONED OIL/GAS WELL LOCATION (AL)
- SHUT IN OIL/GAS WELL (SI)
- PLUGGED & ABANDONED OIL/GAS WELL (PA)
- MANHOLE
- FOUND SECTION CORNER MONUMENT AS INDICATED
- GRAVEL/DIRT
- POND AREA
- FOUND PROPERTY CORNER AS NOTED
- SET 5/8" REBAR WITH PINK PLASTIC CAP, P.L.S. NO. 38512
- FOUND 1" RED PLASTIC CAP P.L.S. 29040 ON PROPERTY LINE

Notes:

1. FENCE CORNER IS ± 0.16' NORTHEASTERLY OF PROPERTY LINE
2. GOLF CART PATH MEANDERS ACROSS PROPERTY LINE AT MULTIPLE LOCATIONS.

COLORADO LICENSED RANDALL K. FRENCH 38512 10/18/2021 PROFESSIONAL LAND SURVEYOR

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

SCALE: 1" = 200'

REVISIONS:
10/18/21 - ADD WELL INFORMATION

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19, T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO

CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY: RZP
CHECKED BY: RKF
DATE: 6/29/2021
JOB: 16-105
SHEET NO. 2 OF 2

K:\ANDARKO\2016\2016_105_NCOG\VIN_T2N_R67W_SEC_19\DWG\ALTA\NCGAVIN_ALTA.dwg, 10/19/2021 10:51:33 AM, samuel

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COOPERATIVE DEVELOPMENT PLAN AGREEMENT

This Cooperative Development Plan Agreement ("Agreement") is made and entered into this 14th day of April, 2021 (the "Effective Date"), by and between the Town of Firestone, a Colorado municipal corporation ("Firestone" or "Town"), whose address is 151 Grant Ave, P.O. Box 100, Firestone, Colorado 80520, Kerr-McGee Oil & Gas Onshore LP ("Kerr-McGee"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202, and Anadarko E&P Onshore LLC, a Delaware limited liability company ("AEP"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202. Kerr-McGee, AEP, and Firestone or Town may be referred to individually as a "Party" or collectively as the "Parties."

BACKGROUND

Firestone and Kerr-McGee recognize the importance of the public health, safety and welfare, as well as the environment and wildlife resources to Colorado's economy and culture, including the citizens of Firestone. The Parties also recognize that responsible and orderly development of oil and gas resources in the Town must be consistent with and subject to Firestone's land use authority and general police powers to protect the health, safety, and welfare of the Town's residents, including the protection of the environment and wildlife resources, to prevent waste in the production and utilization of oil and gas, and to avoid or minimize any adverse impacts to public health, safety and welfare and the environment associated with oil and gas development. To achieve such mutual objectives in a cooperative manner, Firestone and Kerr-McGee enter into this Agreement to accomplish the following:

1. To site new well pads and associated facilities and rights-of-way that Kerr-McGee plans to develop within Firestone at locations that will protect public health, safety, and welfare and the environment by avoiding impacts associated with oil and gas operations and minimizing and mitigating the extent and severity of those impacts that cannot be avoided, consistent with Firestone's land use authority and general police powers;

2. To further minimize and mitigate the unavoidable impacts and other land use effects associated with this type of development, by developing oil and gas operational standards needed for responsible development, including requirements for odor mitigation, noise mitigation, lighting installation, road maintenance, and landscape restoration that supplement state environmental requirements in an efficient and cost-effective manner, all to benefit the Town and its residents; and

NOW THEREFORE, the Parties agree as follows:

ARTICLE I. GENERAL PROVISIONS

1. Intent to Supplement State Rules and Regulations. The Parties recognize that pursuant to the Colorado Oil and Gas Conservation Act, Colo. Rev. Stat. § 34-60-101 et seq., as amended, the Colorado Oil and Gas Conservation Commission ("COGCC") regulates the development and

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production of oil and gas resources in Colorado, and the Act authorizes the COGCC to adopt statewide rules and regulations, which the COGCC has done. The Operational Standards developed jointly by the Parties and identified in this Agreement are not intended to abrogate, repeal or impair any state rules and regulations, but instead are intended to supplement any existing or future state rules and regulations. The Parties acknowledge that the Operational Standards set forth herein are subject to future rulemaking by the COGCC; thus, in the event of a conflict or overlap between any Operational Standards set forth herein and any existing or future rule or regulation promulgated by the COGCC, whichever standard, rule, or regulation imposes the more stringent restriction shall prevail, and Kerr-McGee shall abide by the more stringent restriction.

2. **Exercise of Local Land Use Authority**. The Parties further recognize that Firestone, through its land-use authority and general police powers, can regulate various aspects of oil and gas operations in a reasonable manner as specified in C.R.S. § 29-20-104(1)(h)(I)-(IV) and to protect and minimize adverse impacts to public health, safety and welfare and the environment. Furthermore, the Parties recognize that to implement the powers and authority granted in C.R.S. § 29-20-104(1)(h), Firestone has the authority to inspect facilities, impose fines for leaks, spills and emissions, and impose fees to cover the costs of permitting and regulating oil and gas operations within its boundaries, in accordance with C.R.S. § 29-20-104(2). Provided, however, the Town will comply with any and all written or oral safety requirements when entering Kerr-McGee facilities, including, but not limited to, complying with the use of personal protective equipment and complying with necessary distance restrictions. Finally, the Parties also recognize that Kerr-McGee must apply for, and obtain approval from, Firestone for siting oil and gas surface locations before it can obtain approval for, an Application for Permit to Drill or Spacing Unit Applications, as set forth in C.R.S. § 34-60-106(f)(I)(A).

3. **Applicability.** This Agreement and the Operational Standards will apply to all new wells that Kerr-McGee drills on the Identified Well Pads during the Term of this Agreement. This Agreement will not apply to any wells for which Kerr-McGee is not the operator.

4. **Term.** This Agreement shall commence on the Effective Date, and shall expire four (4) years from the Effective Date ("Term"). The Term may be extended by mutual written agreement of the Parties.

5. **Effect of Termination on Special Use Permit Approval.** Termination of this Agreement by either Party shall in no way affect or limit either Parties' legal or equitable remedies it may have under the Code (defined below) or at law or in equity. In the event this Agreement expires or is otherwise terminated, such expiration or termination shall not prevent any operations and/or development of the Identified Well Pads and well(s) that were previously permitted or otherwise approved by the Town prior to the expiration or termination of this Agreement, nor shall expiration or termination of this Agreement exempt such operations and/or development of the Identified Well Pads, new wells drilled at the Identified Well Pads during the Term of this Agreement, or previously approved wells from any applicable Town development review regulations and processes. Additionally, such expiration or termination shall in no way affect or limit the Town's right in the future to refuse to grant a special use permit, or suspend any special use permit for oil and gas wells requested by or granted to Kerr-McGee pursuant to the Code. Nothing in this Agreement shall be construed as granting or creating any statutory vested development rights at the Identified Well Pads.

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6. **Drilling and Development Schedule.** In consultation with Firestone, Kerr-McGee has developed a Drilling and Development Schedule that includes: McGavin and Columbine well pad sites (the "Identified Well Pads"); and (ii) the operational standards that will apply to such development. The operational standards are listed in Exhibit A ("Operational Standards"), and the Identified Well Pads are depicted in the Cooperative Development Area and Land Contribution Map attached as Exhibit B. Kerr-McGee will not drill more than thirty-three (33) wells total from the two identified well pad sites collectively.

ARTICLE II. APPROVAL PROCESS, OPERATIONS, AND CONSIDERATION

1. **Special Review Use and Final Development Plan Submission Requirements.** For each new oil and gas well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will follow the requirements, procedures, and application elements outlined in Section 7.11, Special Review Use and Section 7.10, Final Development Plan of the Firestone Development Code (the "Code"), as amended, for special review use and final development plan approvals. The Town's Board of Trustees will review the applications using the criteria outlined in Section 7.11 and Section 7.10 of the Code, as amended. If Section 7.11 and Section 7.10 of the Code are amended and any such ordinance amending Section 7.11 and Section 7.10 of the Code is legally pending on the date of a special review use and final development plan application submissions, Kerr-McGee will comply with the amended requirements and procedures for its operations established in such ordinance. The Town recognizes that time is of the essence with respect to approval of special review use and final development plans, and will use its best efforts to process Kerr-McGee's applications submitted pursuant to this Article II, Section 1 in a prompt and timely manner. To that end, the Town agrees that staff review of the applications will take no longer than ninety (90) calendar days after the Town determines the application is complete.

2. **Incorporation of Operational Standards as Conditions of Special Review Use and Final Development Plan.** Each application for special review use and final development plan approval for an oil and gas well that Kerr-McGee submits shall include, as part of the application elements required under the Code, the Operational Standards set forth on Exhibit A, and each special review use and final development plan granted by the Town shall contain the Operational Standards as conditions of operations for such special review use and final development plan.

3. **Kerr-McGee's Operations.** For each new well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will operate such well in compliance with the Operational Standards as set forth in Exhibit A, the Code, as amended, and any other conditions or requirements of the special review use and final development plan approvals issued by the Town for such well.

4. **Kerr-McGee's Contributions.** To minimize and mitigate potential impacts from the Identified Well Pads and associated wells, and to otherwise foster future development opportunities for the Town, AEP, on behalf of Kerr-McGee, shall make contributions to the Town as follows:

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a. Land Contribution.

(i) Within sixty days of Kerr-McGee receiving all necessary local and state permits, approvals, and all necessary easements, Anadarko E&P Onshore LLC ("AEP or Grantor") shall convey to the Town by special warranty deed good, marketable, title (the "Interest"), but specifically reserving and excluding any mineral interest, to approximately seventy-eight (78) acres of real property generally located at the southwest corner of Grant Avenue and Frontier Street and west of the Columbine well pad site ("Grant and Frontier Parcel"), as depicted on Exhibit B (. The Parties agree that the Town may obtain title insurance for the Interest at its own cost, expense, and risk.

The Interest. The Interest includes all of AEP's rights, title and interest, if any, in and to all appurtenances thereto, including but not limited to any fences, buildings, landscaping, and other improvements now located thereon, including all fixtures of a permanent nature, but specifically excluding any fixtures used for or associated with oil and natural gas development, if any, but shall specifically exclude any and all interests or ownership of AEP in any and all minerals in place or under the entirety of the Grant and Frontier Parcel ("Mineral Interest"). The Parties acknowledge and agree that the Mineral Interest shall be reserved to the Grantor in the deed of conveyance executed by AEP and delivered to the Town. The Interest shall also include all of AEP's right, title and interest, if any, in and to all strips and gores of land lying between the Interest and adjoining property or streets, roads or highways, open or proposed. Finally, the Interest shall include all surface and subsurface water and water rights, ditches and ditch rights, ponds and pond rights, springs and spring rights, wells and well rights, whether decreed or not, if any, attached or appurtenant to or used in connection with the Grant and Frontier Parcel and owned by AEP and any title, interest, or right that AEP may have to convey water to the Grant and Frontier Parcel.

Title and Taxes. AEP shall deliver to the Town a special warranty deed, in the form set forth on Exhibit C, attached hereto, duly executed and acknowledged by an authorized corporate representative or officer, sufficient to convey good and marketable title to the Grant and Frontier Parcel to the Town, but reserving to AEP the Mineral Interest described above, free and clear of all liens, tenancies and encumbrances except only those permitted exceptions mutually agreed upon by the parties. Neither Kerr-McGee nor AEP shall not, after the Effective Date hereof, sell, convey, option or contract to do any of the foregoing or otherwise convey, abandon, relinquish, cloud or encumber title to the Grant and Frontier Parcel or any part thereof or contract to do any of the foregoing in a manner which would survive delivery of the special warranty deed. AEP shall be responsible for all real and personal property taxes on the Grant and Frontier Parcel, prorated to the date of

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delivery of the special warranty deed based on the most recent assessed valuations and mill levy available, which proration shall be deemed a final settlement between the parties.

(ii) AEP hereby agrees to grant to the Town a right of first refusal to acquire approximately fifteen (15) acres of real property generally located at the southeast corner of Colorado Boulevard and Pine Cone Avenue and west of the McGavin Well Pad (the "Pine Cone Parcel") as generally depicted on Exhibit B, subject to the terms and conditions specified herein.

Right of First Refusal. For a period of five years from the date of execution of this Agreement, AEP will not sell the Pine Cone Parcel, or any part thereof, without first offering it to the Town for purchase. The right of first refusal granted to the Town shall be honored by AEP and exercised in the following manner:

(1) If, during the period of the right of First Refusal, AEP receives a third-party offer to purchase or otherwise acquire title to the Pine Cone Parcel, or any part thereof, any contract which may be entered into between AEP and such purchaser shall specifically provide that the transaction shall be subject to the right of first refusal set forth in this Agreement.

(2) In the event that AEP enters into such contract with a third-party purchaser, the Town shall have the prior right to purchase and acquire title to the Pine Cone Parcel, or the portion thereof described in such contract, upon the same terms and conditions as therein provided or, at the Town's option, for cash.

(3) AEP shall submit to the Town a term sheet, containing the same terms and conditions as the purchase and sale contract with the third-party purchaser. If, after the receipt of such documents, the Town shall fail to exercise the Town 's right of first refusal by signing and returning to AEP within thirty (30) days of receipt, a signed copy of a contract, together with the earnest money payment therein provided, AEP shall have the right to conclude the proposed sale and conveyance on the same terms and conditions, and no other, as in a contract reflective of the term sheet with the bona fide third-party purchaser.

(4) The Town's failure to exercise the Town's right of first refusal, or the Town 's written disclaimer of such right, shall be deemed a waiver and cancellation of such right of first refusal if the proposed sale and conveyance to the same bona fide third party purchaser is consummated. If the proposed sale and conveyance to the same bona fide third-party purchaser is not consummated, the right of first refusal herein set forth shall not be deemed waived or cancelled, but shall remain in full force and effect.

(5) If any offer made by AEP according to the terms and conditions herein stated is rejected or is allowed to expire without acceptance by

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the Town, the Town agrees, within 10 days after receipt of a written request from AEP, to give to AEP or to any third person AEP shall designate, a written statement properly signed and acknowledged in recordable form that: i) an offer has been made by AEP in accordance with the terms and conditions of this Agreement, together with disclosure of the offering price and the terms and conditions of a proposed sale; ii) said offer has been rejected by the Town or has been allowed to expire; and AEP or any designated third person may rely upon such statement by the Town as evidence of the submission and rejection or expiration of a valid offer made to the Town pursuant to and in accordance with this Agreement.

(6) This right of first refusal shall apply to all transactions involving a conveyance of title to the Pine Cone Parcel, or any portion thereof, including but not limited to a purchase, an exchange, or any other transfer of an interest in the Pine Cone Parcel for consideration, other than a lease of no more than three years' duration.

Exempt Transfers. The parties agree that a transfer of the Pine Cone Parcel, or any portion thereof, shall be made only after compliance with all of the provisions of this Agreement, except that the following transfers shall be exempt from the terms and conditions of this Agreement to the extent herein provided and subject to all the other terms and conditions of this Agreement:

(1) A transfer to one or more corporations, partnerships, limited liability companies, trusts, or other entities in which AEP or AEP's heirs, successors, or assigns have sufficient control to be able to cause said entities at any time to transfer the Pine Cone Parcel or portion thereof to the Town and fulfill the other obligations of AEP under the terms and conditions of this Agreement; further, AEP's covenants that during the existence of this Agreement, AEP or AEP's heirs, successors, or assigns will continue to retain sufficient control of said entities to be able to cause said entities to transfer the Pine Cone Parcel or portion thereof, as aforesaid, and to fulfill all of AEP's obligations under this Agreement; and all certificates evidencing ownership of said entities shall be issued bearing a notation thereon that the transfer thereof is restricted and subject to the terms and conditions of this Agreement.

(2) A transfer by foreclosure or deed in lieu of foreclosure to any bona fide mortgagee or deed of trust beneficiary holding a first or second lien on the Pine Cone Parcel, provided that any subsequent sale and conveyance of the Pine Cone Parcel or any part thereof by such lien or shall be restricted and subject to the terms and conditions of this Agreement.

(3) If an exempt transfer is made, the transferee(s) shall be bound by all the covenants, terms, and conditions of this Agreement to the same extent as AEP.

Term. All rights and interests herein created and set forth in this Agreement shall

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remain in existence and shall constitute a valid encumbrance upon the Pine Cone Parcel for a term of five (5) years, commencing on the Effective Date; except that the same shall be extinguished by the occurrence of any one or more of the following events:

(1) a sale of the entire Pine Cone Parcel to the Town pursuant to the exercise of the right of first refusal, as herein provided, and upon compliance by AEP with all of the terms and conditions of this Agreement; or

(2) a sale of the entire Pine Cone Parcel to any person other than the Town or those persons mentioned in exempt transfers above pursuant to and upon compliance by AEP with all of the terms and conditions of this Agreement.

Binding Effect. This right of first refusal shall be binding upon, and inure to the benefit of, the parties and their respective heirs, assigns, legal representatives, and successors.

5. **Submissions to the COGCC.** Provided that they are in conformity with the terms of this Agreement, the Town will not object to any of Kerr-McGee's submissions to the COGCC pertaining to the Identified Well Pads and the wells located thereon. Furthermore, upon Town approval of operations pertaining to a new well, Town will promptly notify the COGCC in writing that the Town has approved such operations under its land use review procedures and pursuant to this Agreement.

ARTICLE III. OTHER PROVISIONS

1. No Waiver of Rights. The Parties acknowledge and agree that this Agreement will not be used as evidence that either Party has waived any rights to assert its claims concerning the validity of Firestone's land use authority or jurisdiction or Kerr-McGee's rights to develop its mineral resources. Nothing herein will be construed as an admission by either Party of any legal right or obligation.

2. Force Majeure. Neither Party will be liable for any delay or failure in performing under this Agreement in the event and to the extent that the delay or failure arises out of causes beyond a Party's reasonable control, including, without limitation, war, civil commotion, act of God, strike or other stoppage (whether partial or total) of labor, any law, decree, regulation or order of any government or governmental body (including any court or tribunal), or inability to obtain permits, licenses, consents, easements, or rights-of way. If any Party is rendered, wholly or in part, unable to carry out its obligations under this Agreement due to any such force majeure event, it is agreed that, upon the affected Party's giving notice and a description of such delay in reasonable detail in writing to the other Party as soon as reasonably possible after the occurrence of the causes relied on, the obligation of the Party giving such notice, so far as it is affected by such condition or event, will be suspended and any time periods will be extended for a period equal to the period of the continuance of the event or condition.

3. **Authority to Execute Agreement.** Each Party represents that it has the full right and authority to enter into this Agreement.

4. **Governing Law.** This Agreement will be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of law's provisions.

5. **No Third-Party Beneficiaries.** This Agreement is not intended to, and does not, create any right, benefit, responsibility or obligation that may be enforced by any non-party. Additionally, nothing in this Agreement will entitle any third party to any claims, rights or remedies of any kind.

6. **Notices.** All notices and other correspondence related to this Agreement will be in writing and will be delivered by: (i) certified mail with return receipt, (ii) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.), (iii) fax transmission if verification of receipt is obtained, or (iv) email with return receipt, to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

Firestone: Town of Firestone
151 Grant Ave
P.O. Box 100
Firestone, Colorado 80520
Attn: Town Manager
Telephone: 303.833.3291
Fax: 303.833.4863
Email: [_____]

Kerr-McGee: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Danielle Piernot
Telephone: 720-929-6157
Fax:
Email: danielle_piernot@oxy.com

AEP: Anadarko E&P Onshore LLC
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Surface Land Manager
Telephone: 720-929-6026
Fax:
Email: Don_Jobe@oxy.com

With a copy to:

Robert C. Mathes

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Managing Counsel – Rockies
Telephone: 720-929-4326
Email: Robert_Mathes@Oxy.com

7. **No Presumption.** The Parties to this Agreement and their attorneys have had a full opportunity to review and participate in the drafting of the final form of this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction against the Party causing the Agreement to be drafted.

8. **Severability.** If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws. If any section, paragraph, provision, or portion thereof of this Agreement is held by any Court to be void and/or unenforceable for any reason, such section, paragraph, provision, or portion thereof shall be excised from the Agreement and shall be replaced with terms and provisions that are most consistent with, and which reflect, the Parties' intention. All remaining sections, paragraphs, provisions, or portions thereof shall remain in full force and effect.

9. **Dispute Resolution.** If either Party believes that the other Party has violated any provision of this Agreement, the Party claiming that a violation has occurred will send written notice to the other Party, identifying the violation and invoking the dispute resolution process in this Section. Upon receiving such written notice, the other Party will have thirty (30) calendar days to remedy the alleged violation, unless such violation involves operations at a well pad site, in which case the time period will be ten (10) days. If the other Party denies the alleged violation, then the Parties will meet to resolve the alleged violation within ten (10) or thirty (30) calendar days (as the case may be) of the date of delivery of the initial written notice. If a resolution of the matter cannot be achieved at the meeting, both Parties agree to make a reasonable effort to work through and with a mutually acceptable mediator to attempt to resolve the dispute. Notwithstanding the foregoing, if either Party believes that the dispute will not otherwise be resolved in a sufficiently prompt and effective manner, such Party may, at its discretion, institute a legal proceeding in a court of proper jurisdiction to seek appropriate remedies. Such remedies may include, without limitation, an injunction to stop an alleged violation or an order requiring the performance of all acts and things required by the Agreement. Provided, however, that no such legal proceeding will be initiated for a period of at least thirty (30) calendar days after delivery of the initial written notice.

10. **Amendments to Agreement.** No changes, alterations or modifications to any of the provisions hereof will be effective unless contained in a written agreement signed by both Parties.

[*Signature page follows.*]

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by a duly authorized representative on the day and year first above written.

FIRESTONE:

THE TOWN OF FIRESTONE

By: Bobbi Sindelar
Name: Bobbi Sindelar
Title: Mayor
Date: April 14, 2021

KERR-MCGEE:

Kerr-McGee Oil & Gas Onshore LP

DocuSigned by:
By: Danielle Piernot
DCF1AB1984DD497...
Name: Danielle Piernot
Title: Regulatory Affairs Director
Date: 3/29/2021

Anadarko E&P Onshore LLC

DocuSigned by:
By: David J. Woest
794A124B0778445...
Name: David J. Woest
Title: Attorney-in-fact
Date: 3/29/2021

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EXHIBIT A
OPERATIONAL STANDARDS FOR IDENTIFIED WELL PADS

1. **Odor Mitigation**: Kerr-McGee will suppress odors, to the maximum extent practicable, through the use of closed loop systems. Odor emissions from Well Pads must be controlled as soon as reasonably practicable with utmost diligence and dispatch. Kerr-McGee will minimize odors by proactively addressing citizen concerns within 24 hours. Kerr-McGee will add additives to drilling fluids to minimize odors using natural odor neutralizing compounds, not masking agents. In order to meet the provisions of this section, Kerr-McGee will implement the following measures:

   A. Utilization of certain additives to drilling mud to neutralize odors using a specific designed blend of essential oils from natural plant extracts;

   B. Continue to evaluate different additive formulations that have the potential to better suppress odors, including but not limited to non-diesel-based additives;

   C. During flowback and well completions, utilize closed-loop green completion techniques to the maximum extent practicable to minimize emissions and the flaring of natural gas;

   D. Wiping down the drill pipe, to the extent practicable without creating a safety hazard or unsafe work condition, each time that the drilling operation "trips" out of the hole; and

   E. Drill cuttings, while temporarily on location, will be run through a centrifugal dryer to remove residual drilling fluid to the maximum extent practical prior to transportation for disposal.

2. **Noise Mitigation.** To reduce the noise effects on the Town and its residents during drilling, and to provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

   A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

   B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

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C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at least 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based noise mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

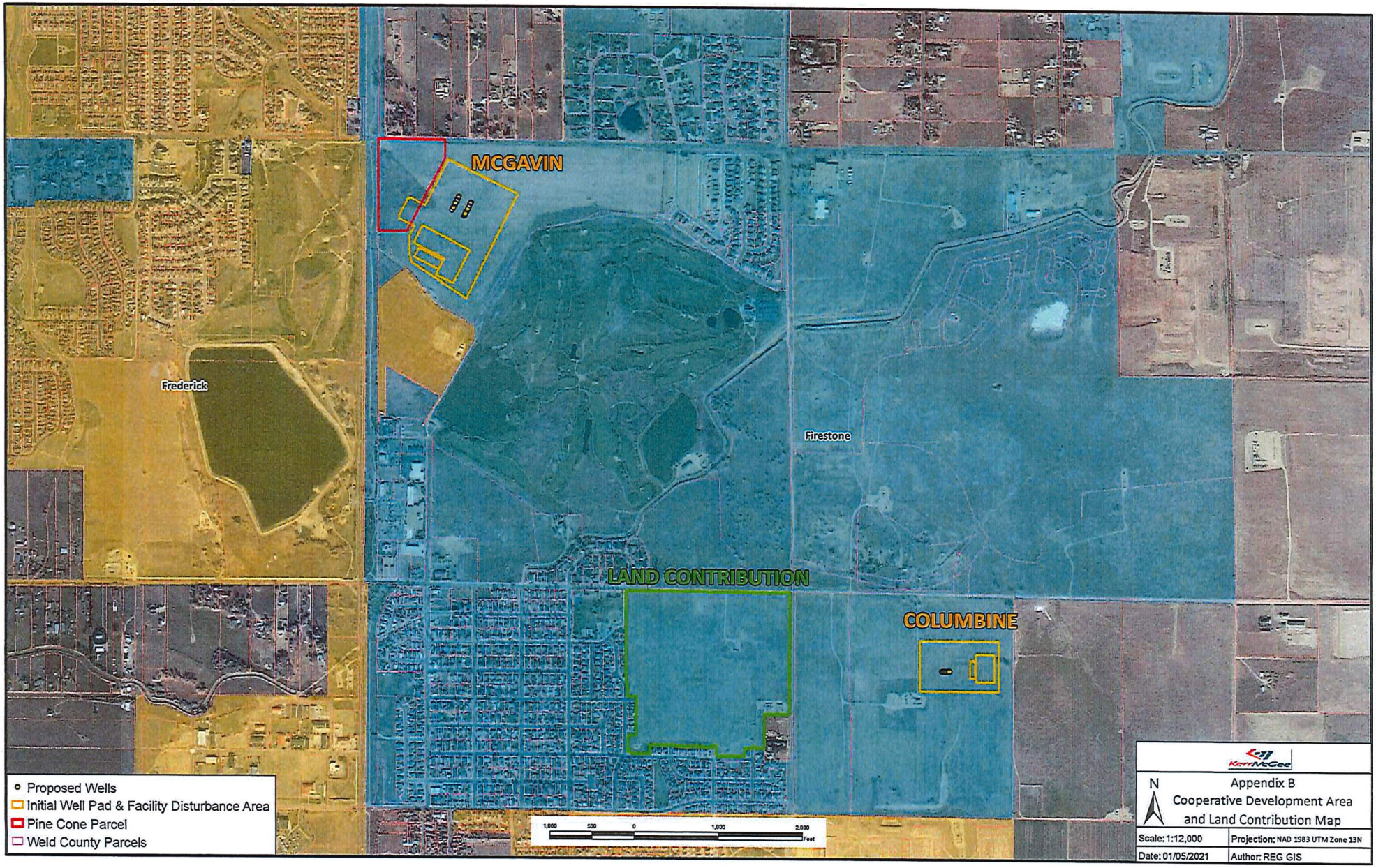
3. **Lighting.** Kerr-McGee will install down cast lighting or some other form of lighting that mitigates light pollution and spill-over onto adjacent properties; provided, however, that Kerr-McGee may still use lighting that is necessary for public and occupational safety.

4. **Road Repairs.** The Parties recognize that truck traffic accessing the Identified Well Pads may cause damage to Firestone roads and that road repairs may be needed to mitigate such damage. Kerr-McGee will arrange for a qualified outside consultant to perform a road impact study for all Firestone roads that are used to access an Identified Well Pad during the Term. The consultant will conduct the first part of the study prior to Kerr-McGee's drilling phase of operations at such Identified Well Pad and the second part of the study after Kerr-McGee completes all drilling, completions, and reclamation activities at such Identified Well Pad. The Parties will use these studies to determine the extent of any damage accruing to the road during the study period. Kerr-McGee will then promptly pay proportionate share to Firestone to repair such damage or else arrange and pay the cost of such repairs itself based on Firestone's preference.

5. **Drilling Pipe and other Large Tubulars Loading.** Kerr-McGee will make all attempts possible to avoid loading large tubulars between 10:00 pm and 7:00 am Mountain Time.

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EXHIBIT B
COOPERATIVE DEVELOPMENT AREA AND LAND CONTRIBUTION MAP


MCGAVIN
Frederick
Firestone
LAND CONTRIBUTION
COLUMBINE
Proposed Wells
Initial Well Pad & Facility Disturbance Area
Pine Cone Parcel
Weld County Parcels
1,000 500 0 1,000 2,000
Feet
N
Appendix B
Cooperative Development Area
and Land Contribution Map
Scale: 1:12,000
Projection: NAD 1983 UTM Zone 13N
Date: 01/05/2021
Author: REG GIS

Firestone Neighborhood Meeting Summary
McGavin 6-19HZ and Columbine 4-29HZ Oil and Gas Applications

Kerr McGee Oil & Gas Onshore, LP (KMOG), a subsidiary of Occidental, conducted a virtual neighborhood meeting on Wednesday, August 25th from 6-7:00 p.m. for stakeholders within close proximity to the proposed McGavin 6-19HZ and Columbine 4-29HZ pads. The purpose of the meeting was for KMOG's subject matter experts to provide an overview of the proposed projects, listen to feedback, and provide answers to stakeholder questions. On August 9th, KMOG mailed invitations to all owners and tenants within 300 feet of the property boundaries, those within 2,000 feet of the working pad surface, and businesses in the shopping center south of the McGavin 6-19HZ pad. Additionally, neighborhood meeting signs were posted on both properties on August 9th.

Fifty-three stakeholders and seven local and state government representatives registered for the meeting. Thirty-five stakeholders, four unknown cell phone numbers, plus fourteen KMOG panelists participated in the neighborhood meeting. Please see the list below including names of attendees. KMOG extended the meeting from 7:00 to 7:15 to finish addressing the ninety-nine questions and comments submitted by twenty-two stakeholders. KMOG uploaded the meeting slide deck to our website (OxyColoradoStakeholder.com) on August 26th and emailed the deck to stakeholders on August 30th. KMOG's Stakeholder team, a dedicated resource for community members, will continue to work with owners and residents to provide frequent and transparent information, answer questions, and seek feedback.

Meeting Attendees:

1. Sheryl Adam
2. Scott Anderson
3. Garrett B
4. Garold Bell
5. Kate Cloud
6. Steven & Alene Colvin
7. Donna Dansdill
8. William Deegan
9. Carl Enright
10. Kris Escalante
11. Beth Faller
12. Belinda Hanke
13. Kari Hebert
14. Bill Hohs
15. Suzanne Johnson
16. Marty Lagae
17. Robert Landrey
18. Michele Martinez
19. Randy Matsushima
20. William McGehee
21. Lisa McGehee
22. Kristin Mercer
23. D Okada
24. Ellen & Gary Pakel
25. Kristin Peart
26. Debra Pierce
27. Dave Rossiter
28. Cody Scott
29. Pat Seifert
30. Paul Seyler
31. Jeannette Sisario
32. Randal Smith
33. Crystal Soderman
34. Bret & Amy Ward
35. Susan Whittaker

Agency Attendees:

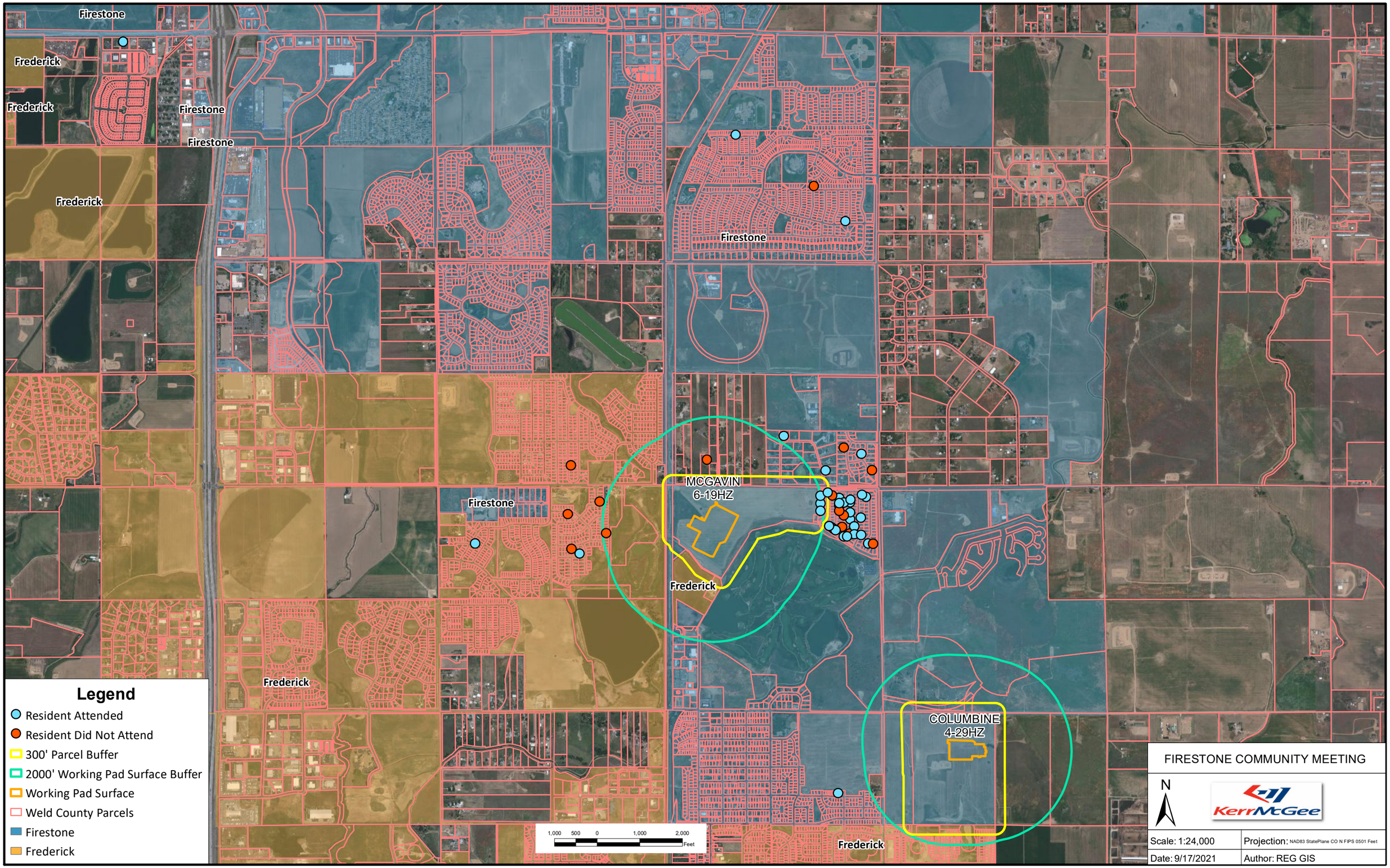
36. Weld County
37. Firestone
38. COGCC
39. Frederick

Other Attendees:
Four additional attendees called in on cell phones

KMOG Panelists:

1. Andy Lytle
2. Anthony Rader
3. Beth Bosworth
4. Chad Schlichtemeier
5. Dani Piernot

6. Jay Bridgeman
7. Jennifer Brice
8. Justin Nelson
9. Lisa Denk
10. Moe Felman
11. Rob Mathes
12. Shaye Marshall
13. Stephanie Madrid
14. Tom Crouch



Depicted information is subjective and its accuracy has not been verified. Attendee locations may not be accurate or extend beyond map extent.

Firestone Neighborhood Meeting

August 2021

Welcome

- Please submit your questions anytime using the Q&A button in the control panel at the bottom of your screen
- If you have questions or would like to provide feedback, please reach out to a member of our Stakeholder Relations team at coloradostakeholder@oxy.com or at 1.866.248.9577
- Also visit us at OxyColoradoStakeholder.com for additional information and resources



About Occidental - Commitment to Safety



- Oxy has a 100-year history of operating oil and gas assets in a variety of unique communities
- Our highest priority is the health, safety and welfare of communities, our employees, and the environment
- We are committed to listening, proactively addressing community concerns, and incorporating your feedback into our plans and operations

McGavin 6-19HZ Pad



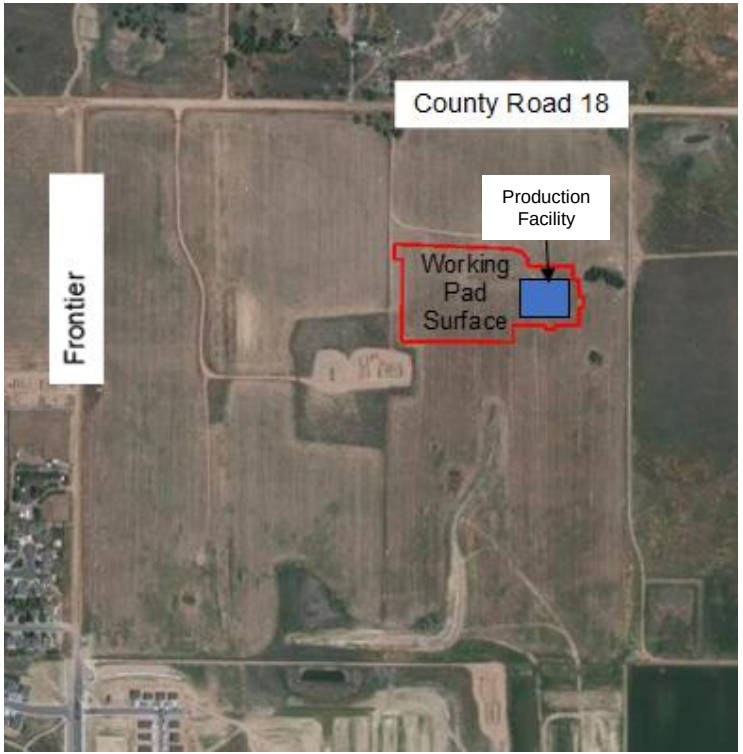
Work Activity	Estimated Timeline
Pad Construction	May 2022 – June 2022
Surface Drilling	June 2022 – July 2022
Horizontal Drilling	August 2022 – January 2023
Well Completions	March 2023 – June 2023
Production Facility	December 2022 – March 2023
Reclamation	November 2023 – December 2023

*For up-to-date timelines
OxyColoradoStakeholder.com

Columbine 4-29HZ Pad

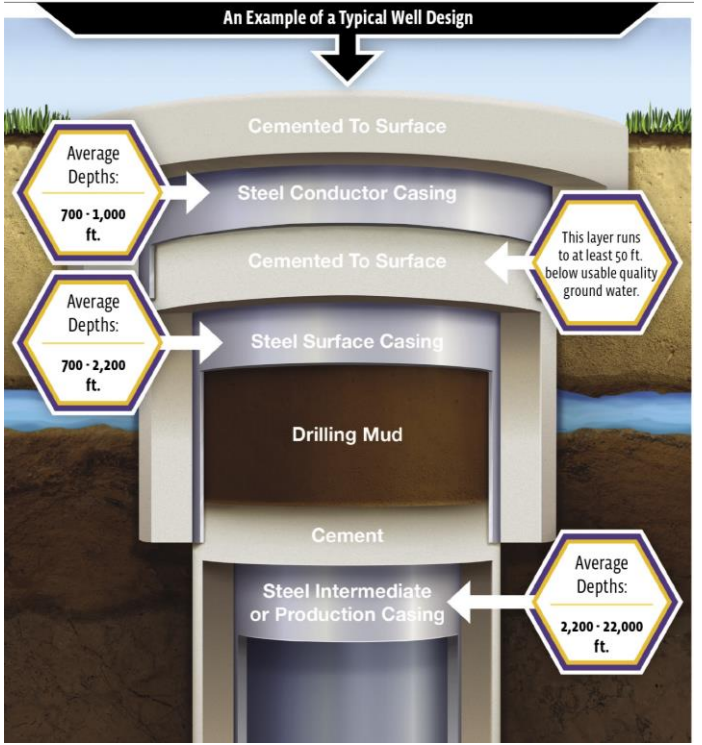
Work Activity	Estimated Timeline
Pad Construction	July 2022 – August 2022
Surface Drilling	August 2022
Horizontal Drilling	September 2022 – November 2022
Well Completions	February 2023 – April 2023
Production Facility	December 2022 – February 2023
Reclamation	June 2023 – August 2023

*For up-to-date timelines
OxyColoradoStakeholder.com



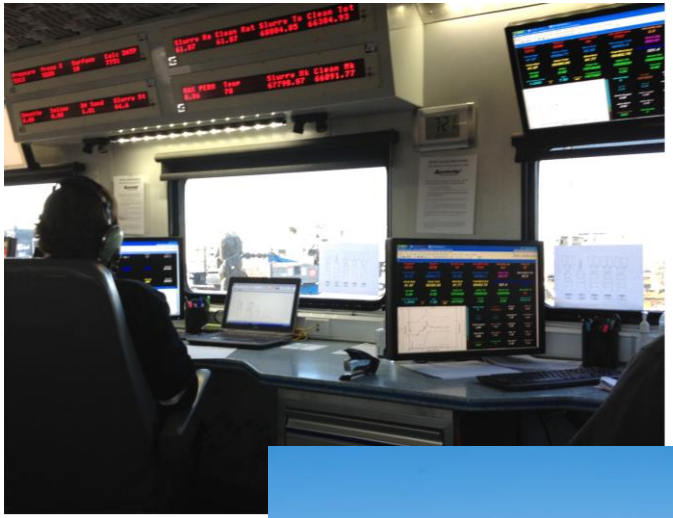
Drilling

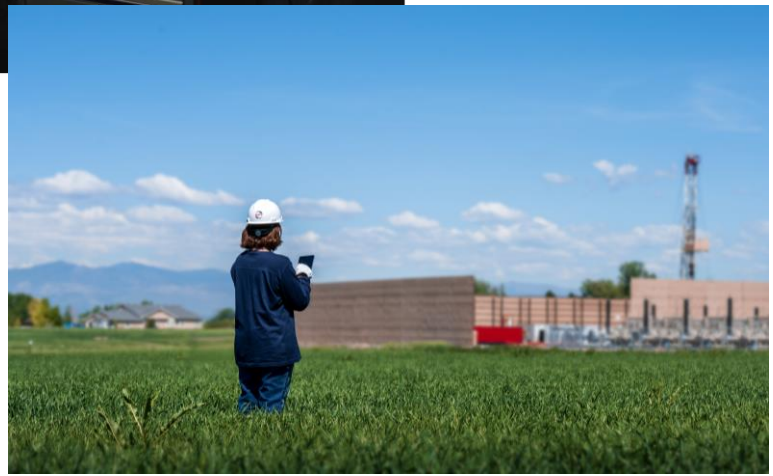


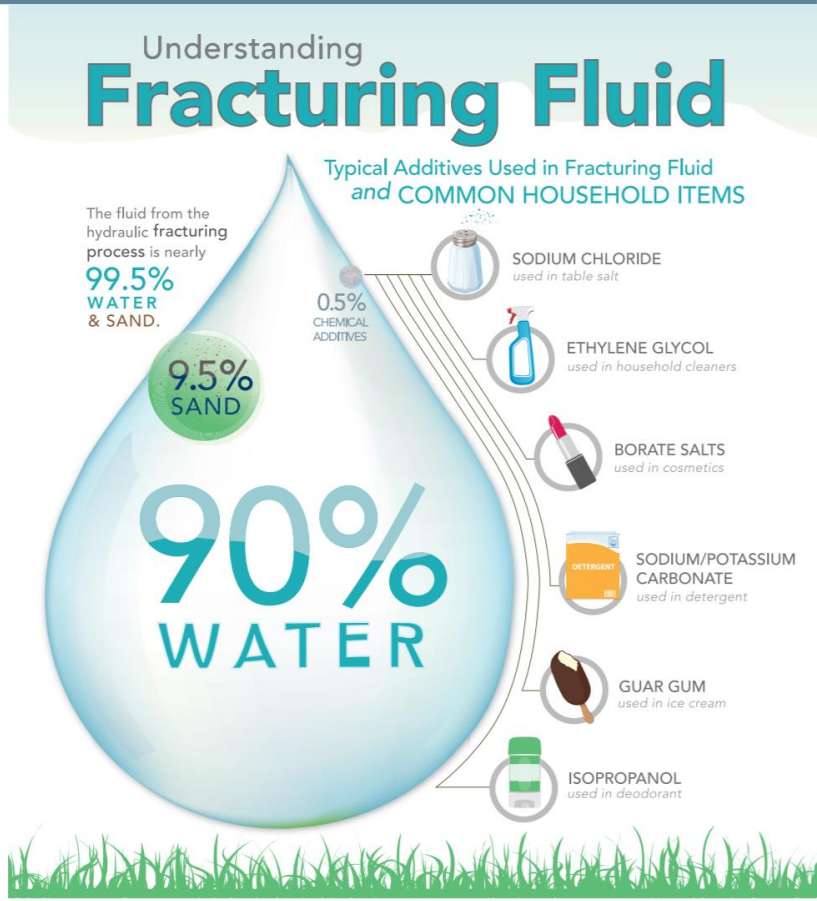


- Surface drilling – Installing casing to protect groundwater
- Horizontal Drilling – Drilling to depth of ~7,000 feet and then horizontally up to 2 miles
- Low emission drilling engines upgraded with noise reducing features

Well Completions







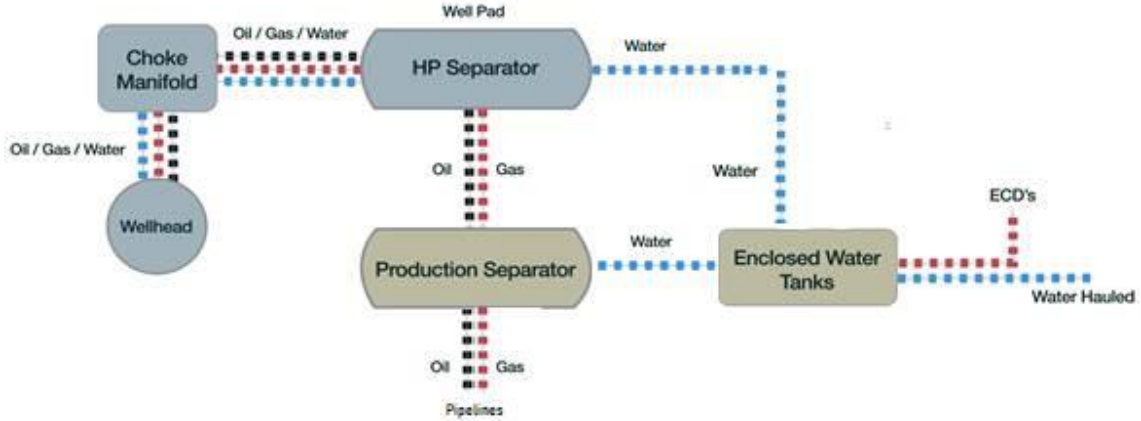
Source: Groundwater Protection Council, API, Energy and Communities (2017)

Production

- Zero routine flaring
- Tankless design, no hydrocarbons stored on-site
- 24-hour monitoring
- Reclaimed to match existing landscape

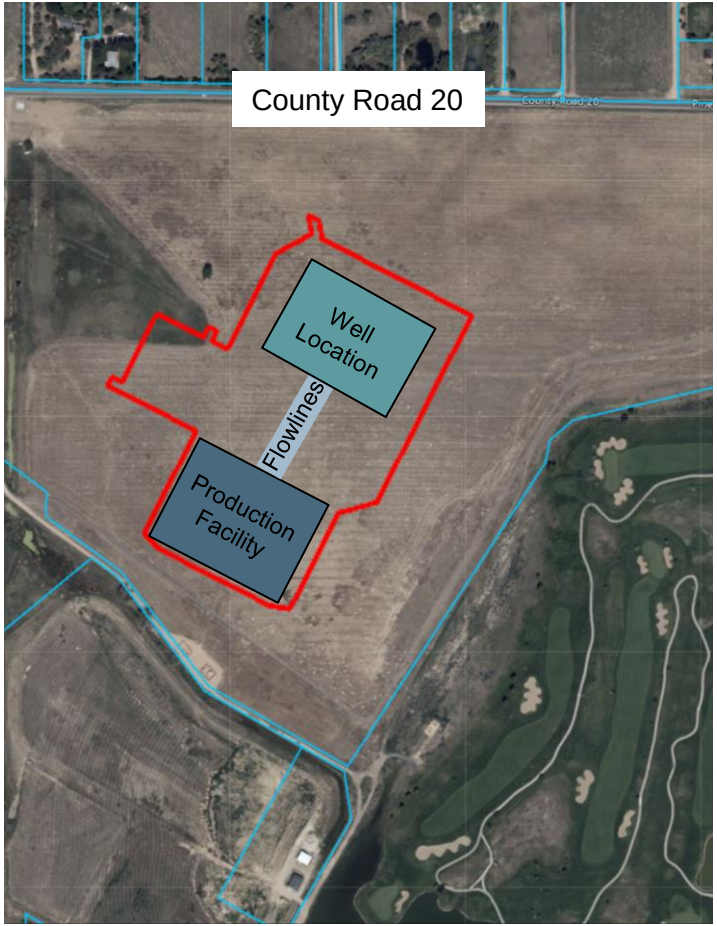


Production facility



Flowlines and Pipelines

- Oil and gas flow from the well heads to the production facility
- Each well has one, 2” steel flowline pipe
- Flowlines are continuously monitored by our Integrated Operations Center and undergo yearly pressure tests
- Exact pipeline locations are still under review and will be owned and operated by Western Midstream (WES)



Reclamation





- When development work is completed, the well pad footprints will be reduced
  - McGavin from 25.63 acres to 7.08 acres
  - Columbine from 12.66 acres to 2.76 acres
- To screen the locations, we plan to install berms and black steel fences around the facilities and wells
- We are evaluating 39 wells for potential retirement near the development area
  - Approximately 1.5 acres are restored and revegetated per well that is retired

Good Neighbor Commitment – Noise, Light, Odor



Noise: State of the art sound walls and continuous sound monitors will be installed

Light: LED lights strategically oriented downward and away from nearby homes

Odor: Odor neutralizer used as part of Oxy's standard drilling system

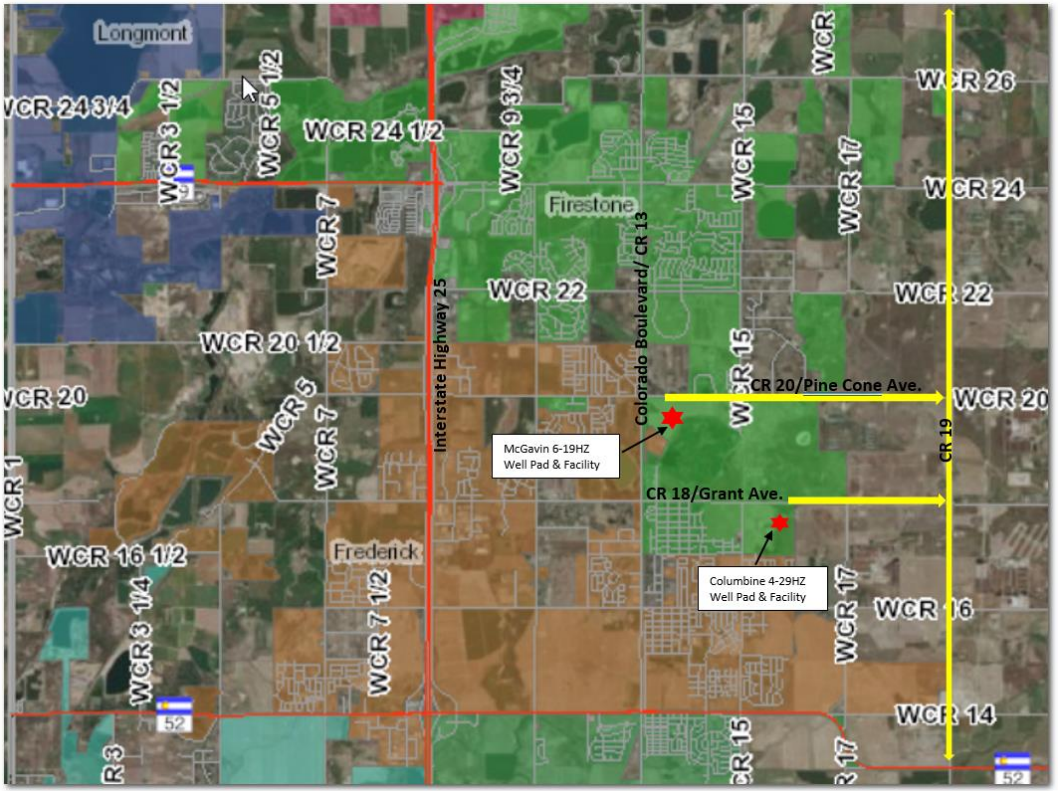
Good Neighbor Commitment – Air Quality

- Continuous air monitoring during drilling and completion activities
- Air monitoring data will be available at OxyColoradoStakeholder.com
- Low emission drilling and completion equipment
- Zero routine flaring
- Tankless design



Good Neighbor Commitment – Traffic

- Comprehensive Traffic Management Plan
  - Plan includes pre/post road studies
- Water-on-demand system, consisting of over 180 miles of underground pipelines, will be utilized to source and transport water
  - This system eliminates more than 2,000 truck trips per day
  - The traffic reduction greatly reduced noise, dust and emissions



State and Local Permitting Process

Permitting milestones
Cooperative Development Agreement - **Completed**
Submit Local Permits - **Submitted**
Submit State Permits - **Submitted**
Planning Commission Hearing
Board of Trustees Hearing
State Public Comment Period
State Public Hearing Date

*For up-to-date timelines
OxyColoradoStakeholder.com

Contacts





Stakeholder Relations Team
1099 18th Street, 7th floor
Denver, CO 80202
866.248.9577
ColoradoStakeholder@oxy.com
OxyColoradoStakeholder.com

Integrated Operations Center (IOC)
970.515.1500

- Real-time monitoring of wells, water tanks, and production facilities
- 24 hours a day, 365 days a year

Q&A

- Please submit your questions using the Q&A button
- We will send you a survey via email and welcome your feedback and questions



www.oxycoloradostakeholder.com

Thank you for joining!



From: Colin Baldwin <colininboulder@gmail.com>
Sent: Saturday, August 21, 2021 11:29 AM
To: Marty Ostholthoff
Subject: Gavin Well Pad

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

We are writing out of concern about the proposed Gavin Well Pad at Pine Cone and Colorado. This is in the heart of the town, near the trail we take often to Safeway and by the golf course, and next to the Firestone trail. This is a poor location, surrounded in all 4 directions by homes, and we would ask the Town consider our opposition to the proposal.

Please advise what we can do to formally register our opposition.

Thank you for your consideration,
Colin and Brandi Baldwin
9077 Foxfire St, Firestone, CO 80504

From: Donna <donnadollarhide@gmail.com>
Sent: Saturday, August 21, 2021 1:13 PM
To: Marty Ostholthoff
Subject: Drilling of pine cone and colorado

<table style="width: 891px; border-color: black; margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="width: 891px; text-align: center;"><hr /><big>CAUTION:</big> <big>This email originated from outside of the Town of Firestone.</big>
<big>Do not click links or open attachments unless you can confirm the sender and know the content is safe</big><hr /></td> </tr> </tbody> </table>   Good afternoon Marty,

My family and I live in the Falcon point neighborhood and we are concerned with the Drilling that is happening. We were under the impression that it had not been yet. Is this not the case? Your help is greatly appreciated.

Nurse Donna D
Nurses are the heart of healthcare.

Sent from my iPhone=

From: Jennifer Shackleton <jshackleton1@yahoo.com>
Sent: Tuesday, August 24, 2021 1:44 PM
To: Marty Ostholthoff
Subject: Re: Proposed oil drilling Kerr/McGee (Oxy) in Firestone/Jennifer Shackleton 9179 Ferncrest St. Firestone

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Dear Mr. Osthlehoff,

I am writing to you regarding a flyer I received alerting me to a proposal for an oil drilling site on the corner of Colorado and Pine Cone Ave. in Firestone.

I bought my house on in Firestone almost exactly one year ago on August 31st of 2020. I had just been divorced and used the small settlement I received as a down payment on my home. I was only able to qualify for the house because of the settlement and I do not work because of severe auto-immune disease and my age (I am a senior).

I moved to Firestone after owning a small house in Superior for 20 years. I wanted to escape the overwhelming growth and loss of quality of living that occurred in Superior with all of the growth and after viewing the house in Firestone I fell in love with the small town feel of the area. I looked Firestone up on www,citydata.com and was happy to see that the crime rate was low, the quality of living was high, and people loved living here. I was also drawn to the area because of the golf courses and trails. How unpleasant would it be to play golf within in the midst of oil well equipment, noise, and smells? The site proposed is within plain site of anyone driving to Firestone/Frederick and the homes in this community

I had planned on retiring here in a house that is large enough for my grandkids to come and visit for days or weeks. I planned on the equity in the house being available as I age to allow me to live my final years of retirement in relative comfort. I cannot qualify to buy another home because of the fact that I have no income due to my health and age. I was also looking around this area for more members of my family to move to Firestone because I love it so much. Even though I am older and do not have children, I love that many families with children surround my home. The health consequences of oil drilling to all of us cannot be underestimated. Those who are able to leave definitely will. The rest of us will be stuck here unable to ever escape an environment that would destroy our health and well-being. I was seeking a clean, natural environment when I moved here, as I'm sure everyone who lives here can say!

Aside from health issues, the proposed oil facility will ruin feel the community permanently. Even in places where 30 years from now the oil is capped and covered, ongoing methane issues are an issue (as mentioned in an article below) as with the home that exploded in Firestone a few years ago(and in as with issues in Broomfield and other locations). A huge influx of workers who are not from our area will bring in temporary low quality homes for them to live in, which will be abandoned later when the work is complete. It will change the comparables and property values that are taken into account when an appraisal is done. This has happened in other drilling areas. The increase in crime cannot be underestimated (see links below). As I mentioned above, if I lose value in my home I can't come up with the cash to sell. The house would not appraise for enough for me to refinance or take a reverse mortgage as I had planned in order to

supplement my income as I age. This house is where I hold my retirement dreams and where many here hold their wealth in hoped for future equity or at least the ability to retrieve cash invested in the home.

Please see the articles I have attached below.

I appeal to you and the other member of the Planning and Zoning Commission to please not allow the drilling to move in.

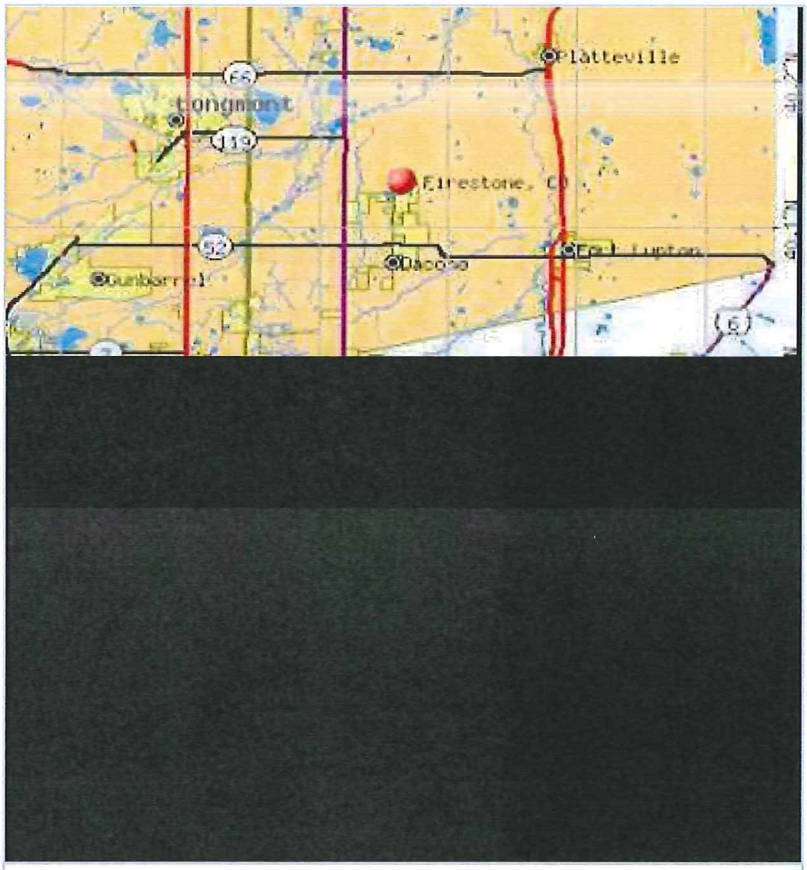
Thank you so much for giving my appeal your consideration!

I just did research on living near gas/oil production facilities which I'm sure you have also done. (I searched "how are property values affected when oil drilling moves nearby" and "what are effects of oil drilling in Weld County", among others). I got many results. Here are just a few critical findings...

Already Firestone is discussing water conservation. As we know lack of water is happening everywhere:

https://www.firestoneco.gov/196/Water-Conservation-Programs

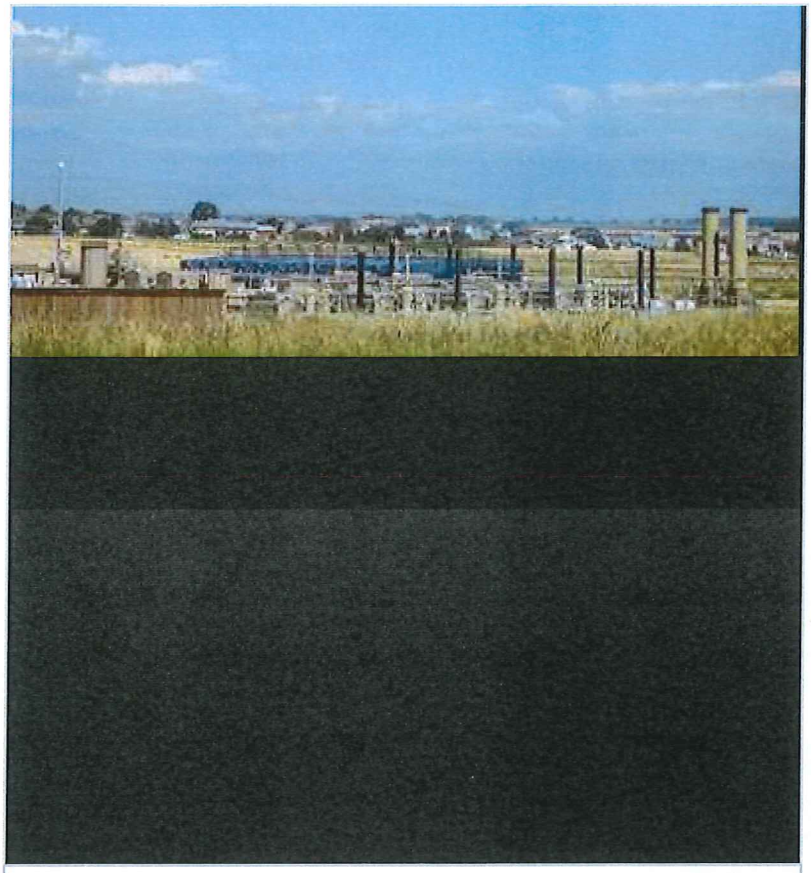
Firestone, Colorado (CO 80520) profile: population, maps, real estate, averages, homes, statistics, relocation, travel, jobs, hospitals, schools, crime, moving, houses, news, sex offenders



Firestone, Colorado (CO 80520) profile: population, maps, real estate, a...

Firestone, Colorado detailed profile

Weld County energy, part 3: Homeowners criticize residential oil, gas development



Weld County energy, part 3: Homeowners criticize residential oil, gas de...

Note: This is Part Three in a series about energy-related issues in Weld County. The remaining parts will be pub...

An ongoing study from Anschutz Medical Campus at the University of Colorado indicates children ages 5 to 24 who develop acute lymphocytic leukemia are four times more likely to live in an area with a large number of oil and gas developments.
The Centers for Disease Control and Prevention and Environmental Protection Agency warn that benzene, a common VOC, can cause drowsiness, dizziness, changes in heart rhythm, headaches, confusion and death when inhaled in at high levels. Long-term exposure to high levels of benzene is linked to leukemia, anemia and issues with menstrual cycle

From a researchgate.net publication:

Drilling causes a depletion of water resources including drinking water. Firestone is already worried about water resources based on a recent document posted on the Town of Firestone website.

https://oilandgasbmps.org/docs/bennett_loomis_fracking_property_values_society_natural_resources.pdf

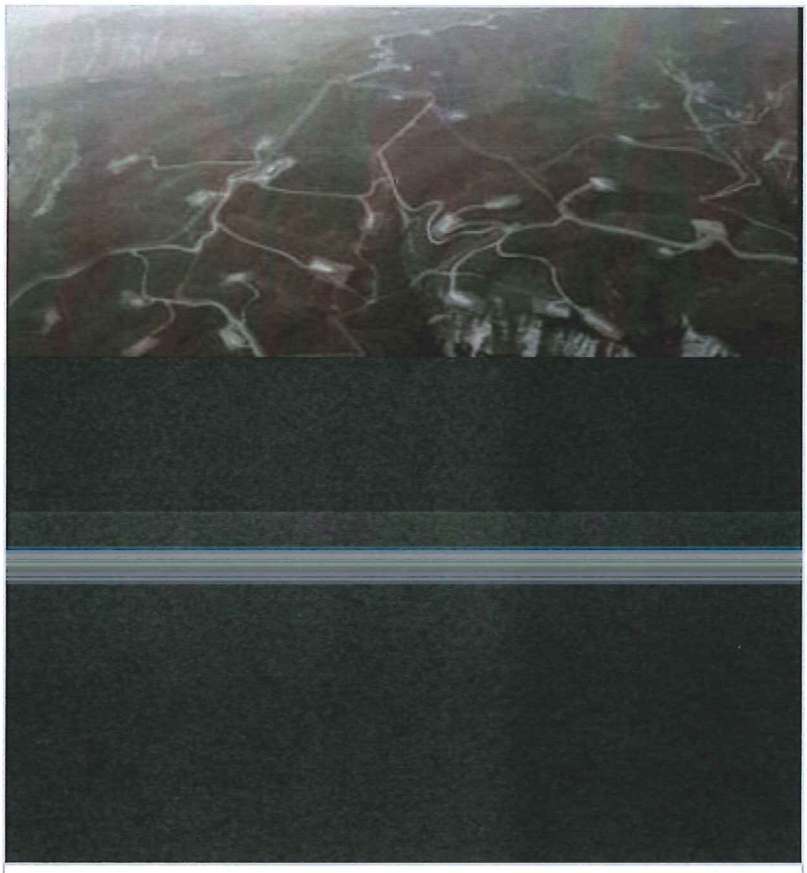
https://www.greeleytribune.com/2021/08/17/weld-county-oil-spills-for-aug-18/

From Boulder Weekly:

In a recent interview, Throupe told *BW* that in a county such as Boulder, where the apprehension over fracking is quite high, it is likely that homes near drilling operations could easily lose as much as 20 percent of their value. And he also pointed out that it isn't just the homes adjacent to drilling that are being impacted. For instance, if a well is being drilled and fracked on the edge of a housing addition or within a town, the homes located in close proximity to

the well and/or production platform will decrease in value, but so will all the homes within the addition or within a certain distance to the well. This loss in real estate value to homes that can't even be seen from a well site is due to the comparable sales process used during the appraisal process.

Energy companies have left Colorado with billions of dollars in oil and gas cleanup

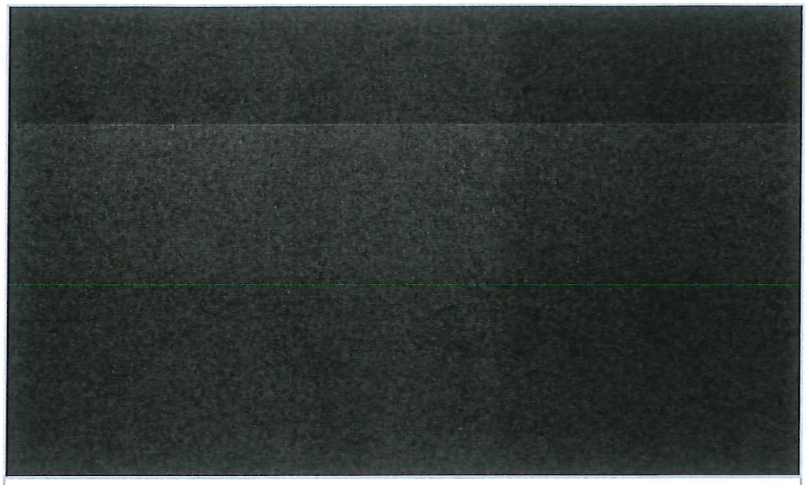


Energy companies have left Colorado with billions of dollars in oil and ...

As the state tries to reform its relationship to drilling, an expensive task awaits.

Drilling, dollars & debt: Colorado's oil and gas industry is leveraged to the hilt. What does that mean for the future?

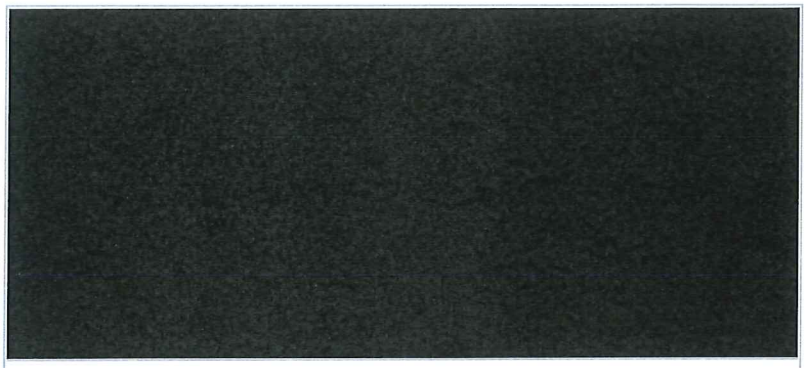




Drilling, dollars & debt: Colorado's oil and gas industry is leveraged t...

A new and more severe ruler is on the throne in oil and gas country, and the state's petroleum producers are ben...

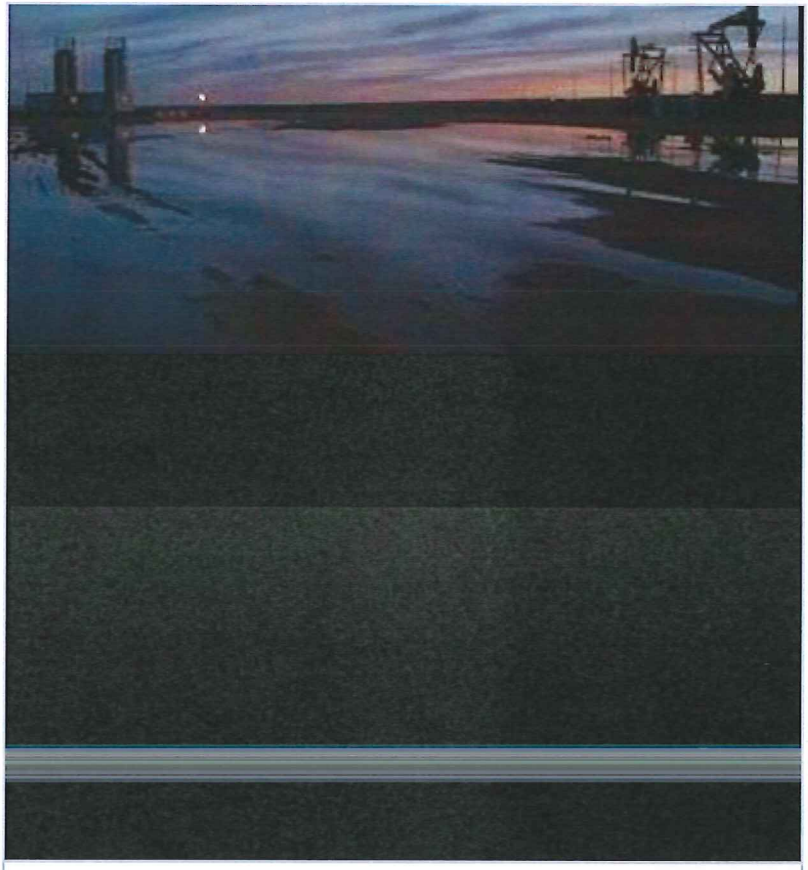
The fracking/real estate conundrum - Boulder Weekly



The fracking/real estate conundrum - Boulder Weekly

The New York State Bar Association calls it the "perfect storm begging for immediate attention." For homeowners ...

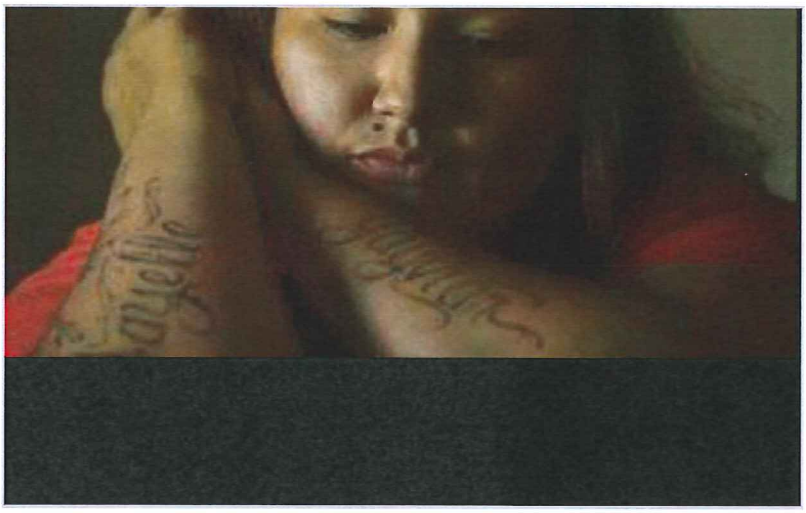
A New Film Examines Sexual Violence as a Feature of the Bakken Oil Boom



A New Film Examines Sexual Violence as a Feature of the Bakken Oil Boom

"Nuuca" looks at attributes of the boom that go beyond emissions and oil spills: rising rates of sexual violence...

Dark side of the boom



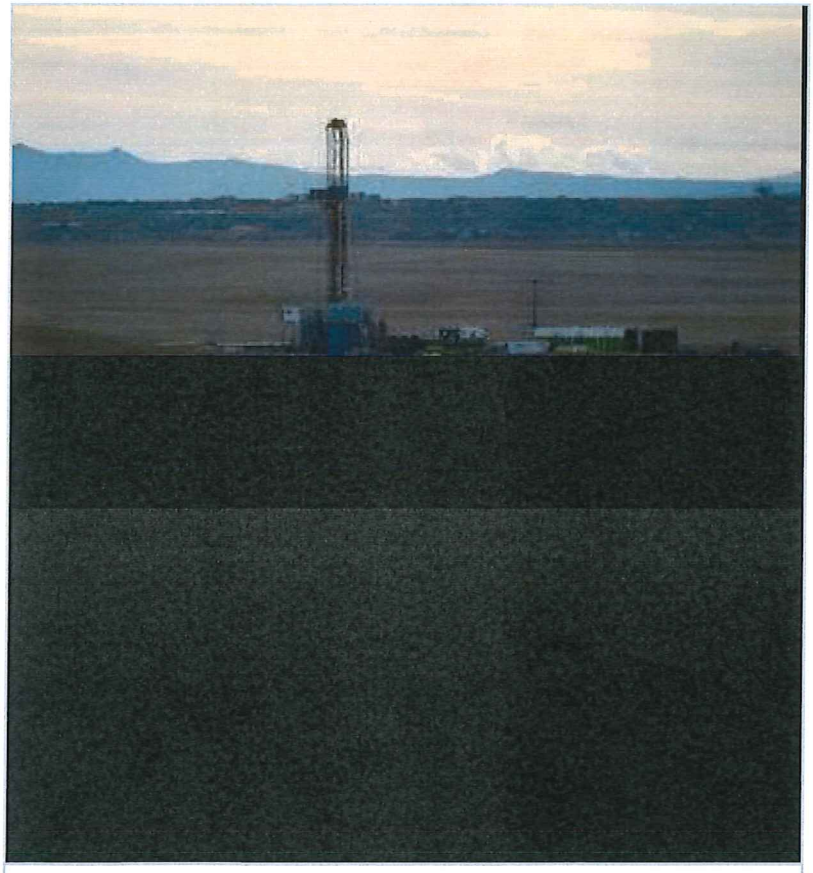


Dark side of the boom

North Dakota's oil boom could bring in hundreds of millions to one reservation, but at a steep social cost. http...

https://www.sciencedaily.com/releases/2018/04/180409103920.htm

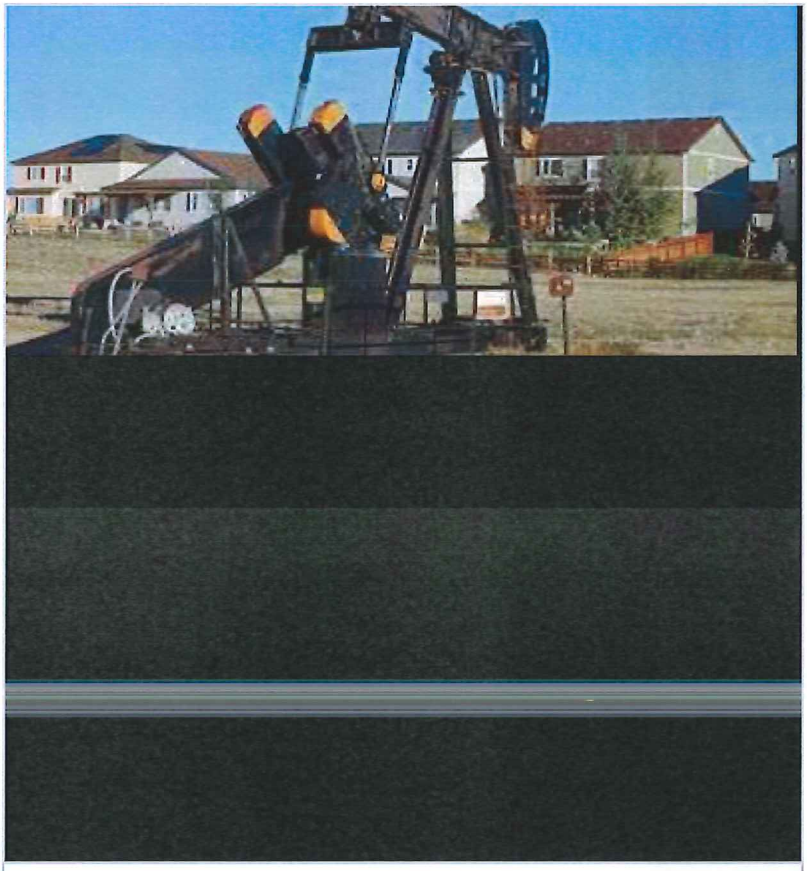
Does living near an oil and gas well increase your risk of cancer? A new Colorado study says yes.



Does living near an oil and gas well increase your risk of cancer? A new...

A new study from the Colorado School of Public Health found that people living next door to oil and gas wells ar...

Colorado homes near oil wells face lower values, new study finds

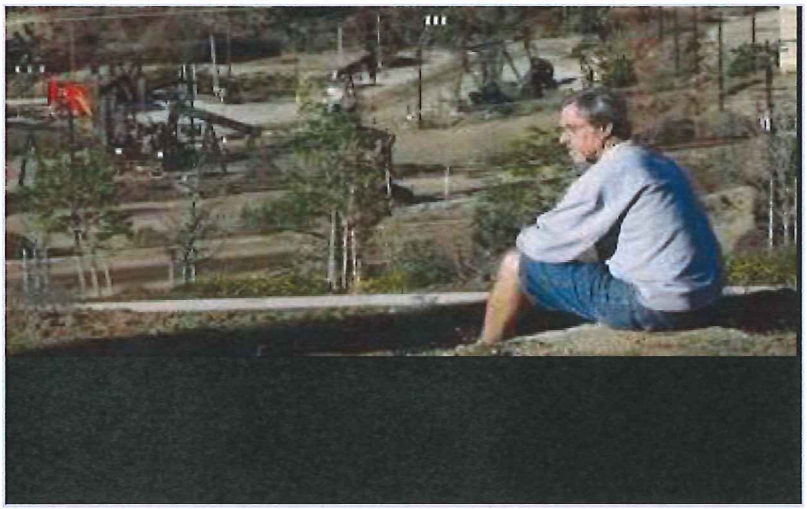


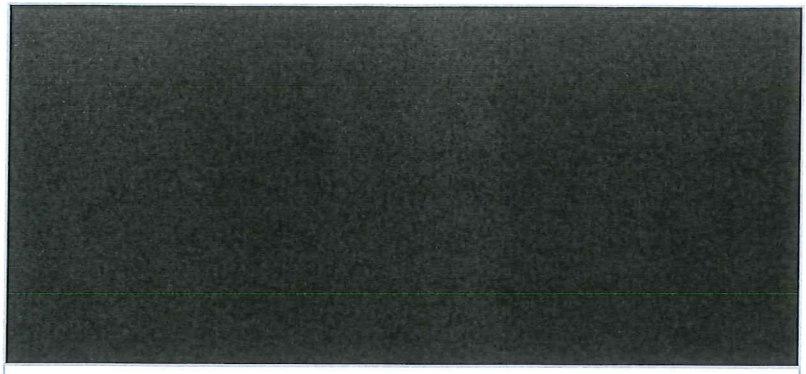
Colorado homes near oil wells face lower values, new study finds

Colorado's most active oil and gas drilling is happening near land that is also hosting some of the fastest hous...

https://grist.org/climate-energy/living-next-to-natural-gas-wells-is-no-fun/

Gas Drilling Is Killing Property Values For Some Americans



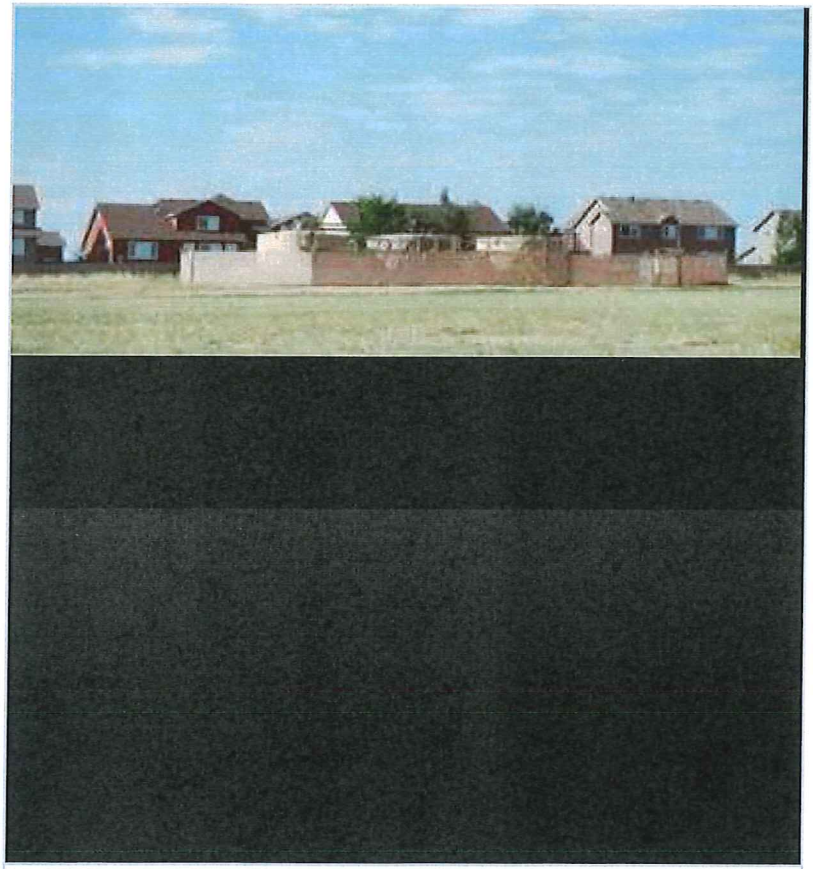


Gas Drilling Is Killing Property Values For Some Americans

Michelle Conlin

Fracking is opening the way for industrial activity in middle and upper-middle class neighborhoods.

For example, the oil and gas boom in Colorado makes headlines often. If oil rigs were to dot the landscape in Longmont, Colorado — a community of 88,000 people — homeowners would see an estimated 15 percent reduction in property values, which would equal a loss of $1.2 billion based on a 2013 estimate.



The fracking/real estate conundrum - Boulder Weekly

> The New York State Bar Association calls it the "perfect storm begging for immediate attention." For homeowners ...

https://www.slb.com/-/media/files/oilfield-review/p04-18

From: Leslie & Steve Walker <sjlrwalker@gmail.com>
Sent: Tuesday, August 24, 2021 11:57 AM
To: Marty Ostholthoff
Subject: Against Kerr/McGee (Oxy) at Corner of Colorado/Pine Cone Firestone

CAUTION: This email originated from outside of the Town of Firestone.
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Marty Osthlehoff,

PLEASE do not allow Kerr/McGee (Oxy) to drill for oil and then leave a permanent oil production facility on the land area at the crossroads of Colorado and Pine Cone roads or anywhere around that area. I vote NO on Kerr/McGee or any other company petitioning to do that.
I have signed the petition to stop this.

Firestone is a lovely town:

1. It does not make sense to put this between two beautiful golf courses. One golf course is with the City of Firestone and would surely reduce use and revenue.

2. This site would have unseen air pollutants that would adversely affect people living in the neighborhoods or walking on the Historic Firestone Trails and potentially cause respiratory, heart and other diseases.

3. The City of Firestone previously approved lovely neighborhoods of homes to be built around this area, and the drilling and especially the production site would substantially decrease home values (and tax values) in these neighborhoods.

4. Surely any oil company can find land OUTSIDE of Firestone to drill and place their production site. For safety, and for the beautiful continued expansion of Firestone, it should be away from any neighborhoods.

Respectfully yours, Leslie Walker

From: Garold Bell <garold.bell@gmail.com>
Sent: Wednesday, August 25, 2021 5:44 PM
To: Marty Ostholthoff
Subject: Article about explosion of a gas pipeline and its damage near Alex, OK
Attachments: scan (1).pdf

CAUTION: This email originated from outside of the Town of Firestone.
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Attached is an article about a gas pipeline explosion in Oklahoma in 2008. We were 11 miles from it at 3 am and it lit the sky like it was day time. Damage was significant and it was not near housing developments and businesses.

Garold Bell
8937 Ferncrest St.
Firestone, CO 80504
402-709-8191

Natural gas pipeline explosion destroys homes near Alex

WWW.NPMS.PHMSA.DOT.GOV BY JENNIFER GRISWOLD AND BRIAN SARGENT - STAFF WRITERS
Published: Fri, November 14, 2008 12:00 AM | Updated: Fri, November 14, 2008 5:45 PM

A 20-inch round line exploded less than 50 yards north of State Highway 19, two miles east of Alex. The highway between Alex and Bradley was closed for about eight hours, a state Transportation Department spokeswoman said.

"The immediate threat is over. Everyone has been accounted for," Grady County sheriff's Capt. Robert Jolley said.

Two mobile homes and a rock house within one-fourth of a mile of each other caught fire and were destroyed, said Gil Broyles, spokesman for the pipeline's operator Enogex. There were no other houses in the area and no cause for further evacuation. The explosion, which could be heard for a couple of miles, caused a grass fire, Jolley said.

A man and woman in a mobile home were hurt, Broyles said.

The man's identity and the extent of his injuries isn't known. He was taken to Grady Memorial Hospital in Chickasha. Mildred Hull was in good condition at the Integris Baptist Medical Center burn unit, a hospital spokeswoman said. She has second- and third-degree burns on nearly 17 percent of her body.

Alex School Superintendent Norvel Heston said one of their students and his mother lost their mobile home.

"They lost everything and their house burned to the ground," Heston said. "We've already got clothes sizes and there will be help that way. But of course you can never replace everything."

The rock house was unoccupied.

A section of pipe about 16 to 18 feet long blew, causing a crater 30 to 40 feet wide, Broyles said.

"When the pressure drop was noted, we manually closed valves on either end of the leak," Broyles said.

The explosion's cause isn't known. Enogex and Oklahoma Corporation Commission inspectors have been sent to the scene.

Grady County Fire Chief Perry Wenzel lives 20 miles from the explosion site. He said he could see flames from his house.

"They (the victims) are very lucky to be alive," Wenzel said.

About the pipeline

The pipeline, built in 1975, transports natural gas from wells northwest of Thomas in Custer County to a production plant south of Alex.

No problems were found when its integrity was inspected last year and when a routine maintenance operation was performed within the last week, Broyles said.

There was no construction in the area, Broyles said.

CONTRIBUTING: STAFF WRITER BRYAN PAINTER

VIEW NATIONAL PIPELINE MAPPING SYSTEM ONE COUNTY AT A TIME

From: The Pearts <thepeartfamily@gmail.com>
Sent: Wednesday, August 25, 2021 11:42 AM
To: Marty Ostholthoff
Subject: Kerr/McGee Proposal

CAUTION: This email originated from outside of the Town of Firestone.
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Good afternoon,

I'm writing to you today to voice my concerns about the proposed oil drilling and production site on the corner of Colorado Blvd. and Pine Cone Ave. Please do not approve this proposal. This is not an appropriate location for this project. Not only will it disrupt the beauty of the oft-used Firestone Trail, it will be an eyesore at the Saddleback and Bella Rosa Golf Courses. We moved to this area because of its beauty, small-town feel, and family-friendly neighborhoods. This project would permanently reduce home values by industrializing this area.

Thank you for your consideration to keep Firestone beautiful and family-friendly!

Kristin Peart
Firestone Resident
in Saddleback neighborhood
850-865-2939

From: Leigh Koldeway <leighkoldeway@yahoo.com>
Sent: Monday, August 30, 2021 9:01 AM
To: Marty Ostholthoff
Subject: Proposed Oil Production

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Dear Marty Osthlehoff,
I am writing to you as a concerned Firestone citizen. The oil production facility proposed by Kerr/McGee on the corner of Colorado Blvd and Pine Cone Ave will be a definite detriment to the town. Not only will our property values suffer but is this eyesore really what you would want people to see when entering our town? Our proposed park on Frontier has already been ruined by the oil production facility that was allowed to be built there. The site Kerr/McGee is wanting is in between two lovely golf courses and will ruin those lovely views. The truck traffic is already very heavy on Pine Cone and this will increase it to intolerable levels.

This proposal is not complimentary to the surroundings of this corner - lovely homes, golf courses, and the Firestone Trail. This will not add quality of life to the citizens of this community. Please do not allow this to be approved.

Thank you,
Leigh Koldeway
9030 Foxfire St.
Firestone

From: Debra Pierce <debra.l.pierce@gmail.com>
Sent: Tuesday, August 31, 2021 6:55 AM
To: Marty Ostholthoff
Subject: New natural gas drilling on corner of Pinecone Ave and Colorado Blvd

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I would like to let you know that my husband and I live at Falcon point at Saddleback. We just moved into the Neighborhood in December and when we moved, we expected to have other neighborhoods in the area in question. That is what the builder told us. I am very against Fracking as I feel it is quite dangerous to the environment. I think it could reduce air quality and also affect the vegetation in the surrounding area. I am an organic gardener. I worry about what that means for myself and my family living so close to a fracking facility. I know they say that they are going to have safeguards in place, but if they do hit a big methane pocket or something of the likes, what can they do to stop it? It is too late at that point and the environment and everyone around it suffers the consequences. It is also well known that drilling and fracking in the immediate area lowers property value. That is a shame for all of us who just moved in and were told something else was going into the surrounding area. It will also be an eyesore to the beauty that they have created for the Firestone/Frederick/Dacono area who have worked hard to beautify the area along Colorado Blvd and surrounding areas.
Please consider these things and do not let this Fracking/Drilling company come into this area. Lets keep the Town Beautiful and family friendly.
Sincerely,
Debra Pierce and Michael Pierce
Debra.L.Pierce@gmail.com
720-334-0776

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 30, 2021 3:18 PM
To: Marty Ostholthoff
Subject: Re: Request for Cooperative Development Agreement

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Hello Marty,

Thanks so much for sending this link over. I was able to find the documents pursuant to the April 14, 2021 meeting on the Town's website. The CDPA and the resolution are however not signed by the Town. Was this agreement indeed adopted? If so, is the signed copy only available via the public documents request?

Thank you for finding out the number of attendees.

Thanks, Suzanne Johnson

Keep Firestone Beautiful!

On Mon, Aug 30, 2021 at 7:46 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> To get a copy of the Oxy CDPA please use the following link and fill out the Public Information Request form and we will get it over to you. Also, the CDPA will outline the terms for the Town to receive the 78 acres. This Town does NOT control the 78 acres today.
>
> https://co-firestone2.civicplus.com/FormCenter/Open-Records-Request-7/Open-Records-Request-42
>
> I will be speaking with Oxy today and will get the number of attendees for the Neighborhood Meeting from last Wednesday.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

Please Note: Firestone Town Hall is moving soon! New address starting on Tuesday, September 7, 2021: 9950 Park Ave., Firestone, CO 80504

firestoneco.gov | Twitter | Facebook



From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Thursday, August 26, 2021 2:41 PM
To: Marty Ostholthoff
Subject: Request for Cooperative Development Agreement

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---

Hello Marty,

The Oxy people said that the above agreement was signed in April 2021 with the Town of Firestone. May I please have a copy of this?

They also mentioned that they gave the Town of Firestone 78 acres of land. When was this done and where is it?

Do you know how many people attended the online meeting that they held last night?

Thank you!

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 30, 2021 4:50 PM
To: Marty Ostholthoff
Subject: Re: Request for Cooperative Development Agreement

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Thank you!

Keep Firestone Beautiful!

On Mon, Aug 30, 2021 at 4:49 PM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> Yes, the CDPA was adopted by the Board of Trustees. To get a fully executed copy of the CDPA you will need to fill out the public information request.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager
>
> **P** 303.531.6275
>
> 151 Grant Avenue, Firestone, CO 80520
>
> Mail: P.O. Box 100, Firestone, CO 80520
>
> mostholthoff@firestoneco.gov
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> https://co-firestone2.civicplus.com/FormCenter/Open-Records-Request-7/Open-Records-Request-42
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mostholthoff@firestoneco.gov

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Sent: Thursday, August 26, 2021 2:41 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Subject: Request for Cooperative Development Agreement

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Do you know how many people attended the online meeting that they held last night?

Thank you!

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 23, 2021 3:16 PM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; Joelpriest37@yahoo.com; jdubbs2023@yahoo.com; Ronald Alper; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; Dot Priest; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; Ned redenbarger; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
Subject: Re: Colorado and Pine Cone - drilling rig on property

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Thank you for clarifying this. Most appreciated!

Keep Firestone Beautiful!

On Mon, Aug 23, 2021 at 7:07 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> The rig currently operating near the southeast corner of Pine Cone Avenue and Colorado Boulevard is a maintenance rig that is working on the plugging and abandonment of an existing well that was drilled in 1992. More information can be found by this link:
>
> https://www.firestoneco.gov/DocumentCenter/View/7608/ROCKY-MOUNTAIN-FUEL-19-4N---Start-of-Plugging-Operations---08132021
>
> Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

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From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Saturday, August 21, 2021 11:33 AM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; JoelP@idealfencingcorp.com; jdubbs2023@yahoo.com; Ronald Alper <alperrd@gmail.com>; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; dschlegel2963@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce <debra.l.pierce@gmail.com>; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; dot@mykeyinsurance.com; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; nedred8@gmail.com; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
Subject: Colorado and Pine Cone - drilling rig on property

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---

Hello Marty,

We wanted to first thank you for fielding all of our questions and for keeping a file of our concerns/questions/feedback to the Gavin well pad proposal.

We have communicated to the homeowners at Falcon Point at Saddleback that the proposal has not been approved so we were all confused when we saw the activity on the site and a drilling rig.

Can you please share with us what is happening so we are informed?

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 23, 2021 3:17 PM
To: Marty Ostholthoff
Subject: Re: Gavin well pad proposal - Filing with State of CO

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Thank you Marty. We will do that.

Keep Firestone Beautiful!

On Mon, Aug 23, 2021 at 7:10 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> I'm pretty sure Oxy has filed their permits with the State. I suggest that you contact Oxy or the COGCC to find out about the state's process/timeline.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager
>
> **P** 303.531.6275
>
> 151 Grant Avenue, Firestone, CO 80520
>
> Mail: P.O. Box 100, Firestone, CO 80520
>
> mostholthoff@firestoneco.gov

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From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Sunday, August 22, 2021 3:06 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Cc: keepfirestonebeautiful@gmail.com
Subject: Gavin well pad proposal - Filing with State of CO

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---

Hello Marty,

Unsure of this process, when does the applicant file the permit with the State of CO? I was unable to locate anything on this proposal with the COGCC.

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Saturday, August 21, 2021 11:33 AM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; JoelP@idealfencingcorp.com; jdubbs2023@yahoo.com; Ronald Alper; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; dschlegel2963@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; dot@mykeyinsurance.com; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; nedred8@gmail.com; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
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We have communicated to the homeowners at Falcon Point at Saddleback that the proposal has not been approved so we were all confused when we saw the activity on the site and a drilling rig.

Can you please share with us what is happening so we are informed?

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Friday, August 20, 2021 6:05 AM
To: Marty Ostholthoff
Subject: Fwd: Re: Contact Info

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Hello Marty,

Per our phone call yesterday, please find the questions I have asked Julie Coleman at Oxy. I will forward you her replies.

Thank you!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

---------- Original Message ----------
From: Suzanne Johnson
To: "Coleman, Julie"
Cc: Colorado Stakeholder , Suzanne Johnson
Date: 08/19/2021 8:48 AM
Subject: Re: Contact Info

Hello Julie,

Thanks so much for reaching our earlier in the week; I appreciate this very much.

I have the following questions for you or your team:

1. What is the value of the equipment that will be on the 25 acreas during the drilling phase?
2. What is the value of the equipment that will by on the permanent 7.08 acres?
3. How long is the drilling phase?

4. How long do you plan to keep your equipment on the permanent footprint?
5. How long will it take to reduce the disturbance area from 25 acres to 7.08 acres?
6. Will the permanent location of 7.08 acres be landspaced around the equipment? If so, what will that consist of?
7. What did McKee/Oxy/Anadarko pay in property tax on the land for 2020 (tax year 2019.)
8. What did McKee/Oxy/Anadarko pay in property tax for the land in 2021 (tax year 2020.)
9. What does McKee/Oxy/Anadarko expect to pay in personal property tax on the equipment? During drilling and for the permanent equipment?
10. Is there plans to build anything else on the approx 100 acres?
11. Is there plans to sell off any of the 100 acres?
12. Is there plans to submit additional Special Review Use permits on any other sections of the land?
13. Will drilling take place 24 hours a day, 7 days a week?
14. Can you please provide photographs (aerial and street level,) of another one of your 7 acre permanent production facilities that is exactly or similar in nature to the equipment you are proposing for this site?
15. Will the equipment on the permanment site be "tankless?"
16. What type of oil are you seeking to extract?
17. Is the product trucked out or piped out or both?
18. What is the circle of exposure? What does circle of exposure mean?
19. Were other sites, not adjacent to homes, recreation areas, and retail considered to access this oil?
20. Are any of the mineral rights owned by residents of Firestone, CO? Any who neighbor, or are in close proximity to the site in question?
21. On Page 12 of the Special Review Use Proposal dated June 2021, there is a "Typical Drilling Payout." Does that cover the 25 acres or the 7.08 acres?
22. There was a Raptor survey that appears to have not been completed. Will it be?
23. What does the 1/2 mile buffer refer to?
24. Are any berms in the plan for the area surrounding the permanent site?

I really appreciate you taking the time to gather the information requested and I will look forward to receiving a reply to this email with the information hopefully by close today.

Thanks so much, Suzanne Johnson

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

On 08/16/2021 6:39 PM Coleman, Julie wrote:

Suzanne,

It was great talking to you tonight. Attached is a fact sheet about our team and the project in your neighborhood. We look forward to meeting with you at your convenience to answer your questions, get your feedback and share additional resources. Also, if there are specific topics or questions you'd like us to discuss in the community meeting, please let us know.

It does not appear that you've registered for the community meeting yet. Would you like us to register you? If not, you can sign up here.

We look forward to meeting with you. Have a great night.

Julie W. Coleman | Stakeholder Relations Manager
720.929.4572 office – 303.667.9343 cell



From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Thursday, August 19, 2021 9:12 AM
To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

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Hi Marty,

I received a call from Julie Coleman/Oxy and have since sent her a list of questions.

I have a couple for you:

1. Do you know how many cars/trucks trips are made going South to North on Colorado at or around Pine Cone?
2. Can you send me the link for the Town of Firestone's mission?
3. Do you know what the resorviour in Frederick is used for?
4. Do you have how many car/truck trips are made daily on Pine Cone from Colorado to CR 19?

You explained the process of the planning commission make a recommedation to the trustees and then they vote on it based upon all the evidence for and against the use permit. When and where is the public comment/assembly to express thoughts on this use permit?

Thank you!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

On 08/16/2021 4:54 PM Marty Ostholthoff wrote:

No problem...please call me back if you have any additional questions. Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

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From: Suzanne Johnson
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To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

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Thank you Marty. I really appreciate this!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

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> On 08/16/2021 2:59 PM Marty Ostholthoff <mostholthoff@firestoneco.gov> wrote:
>
> Hi Suzanne,

I just spoke with my contact at Oxy and they told me that someone from the Oxy Stakeholder team should be giving you a call shortly. Please feel free to give me a call back after you speak with Oxy.

Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

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Mail: P.O. Box 100, Firestone, CO 80520

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Sent: Sunday, August 15, 2021 2:30 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Subject: Gavin well head proposal - questions

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Hello Marty,

Thank you for returning my call in late July. I called you on Friday and left another VM but decided to write instead.

I have since read the PDF provided to our HOA from McKee and have the following questions about this proposal.

1. What does the City of Firestone gain from having an oil/gas production facility on land within the city limits?

2. Can the City refuse to approve this special use permit proposal? If so, what is needed to do this?

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I look forward to hearing from you and if hopping on a call would be better, I'd be happy to do this too.

Thanks so much, Suzanne Johnson

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Thursday, August 19, 2021 9:32 AM
To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Hi Marty,

Some folks have asking who they address their feedback and concerns to at the Town of Firestone about this proposal. Is there name and email of someone who this feedback should go to?

Thank you!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

On 08/16/2021 4:54 PM Marty Ostholthoff wrote:

No problem...please call me back if you have any additional questions. Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

firestoneco.gov | Twitter | Facebook



From: Suzanne Johnson
Sent: Monday, August 16, 2021 3:21 PM
To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

CAUTION: This email originated from outside of the Town of Firestone
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Thank you Marty. I really appreciate this!

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>
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>
> Town of Firestone | Planning Manager
>
> **P** 303.531.6275
>
> 151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

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Staff Report

McGavin 6-19HZ Pad and Production Facility

Special Review Use
and
Final Development Plan

Prepared by the
Town of Firestone for the
Planning and Zoning Commission

January 6, 2022

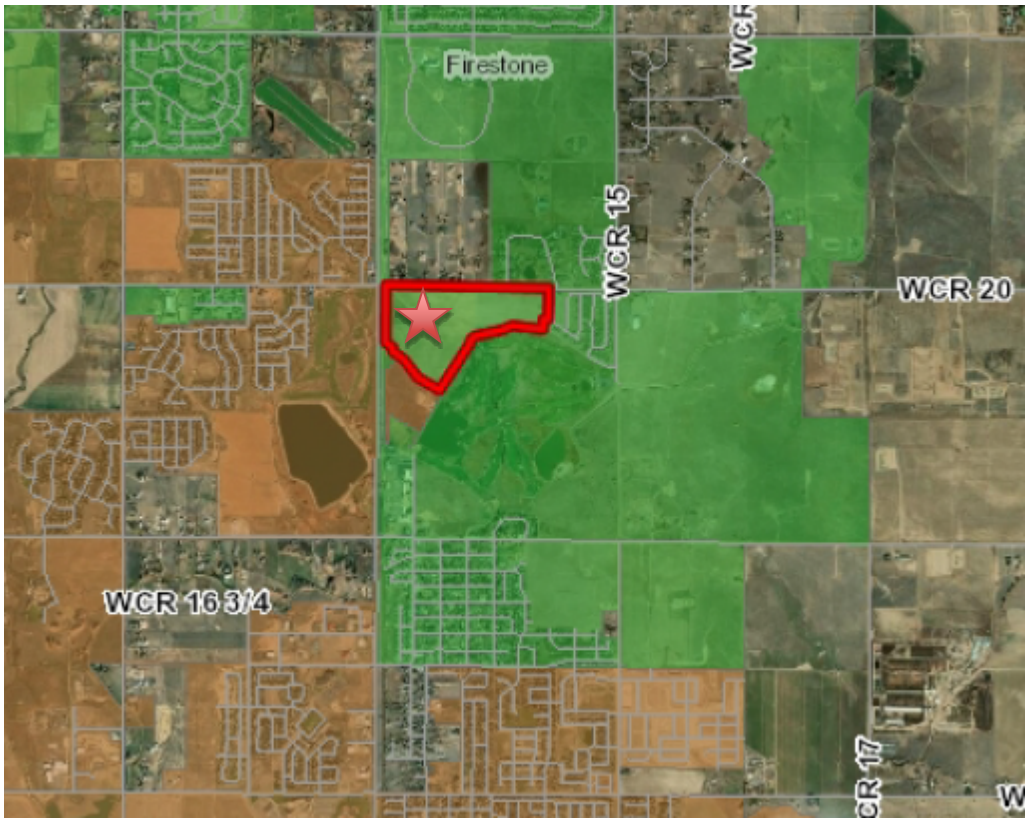
GENERAL INFORMATION

Purpose: This staff report is for the McGavin 6-19HZ Pad and Production Facility Special Review Use and Final Development Plan applications proposing to locate twenty-six (26) horizontal oil and gas wells and associated production facilities within the Town.

Applicant: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, CO 80202

Surface Owner: Anadarko E & P Onshore LLC
1099 18th Street
Denver, CO 80202

Location: The proposed well pad is located south of Pine Cone Avenue (WCR 20) and east of Colorado Boulevard (WCR 13).



Existing Conditions:

Existing Zoning:	R-B (Residential-B)
Existing Use:	Vacant land and oil/gas operations

Adjacent Land Use/Zoning:

	ZONING	LAND USE
NORTH	A – Agricultural (Weld County)	Single-family residential + animal hospital
SOUTH	R-C – Residential-C OS – Open Space	Vacant land + oil/gas operations Saddleback golf course
EAST	R-B – Residential-B R-C – Residential-C	Single-family residential Single-family residential
WEST	R-C – Residential-C P – Public (Town of Frederick)	Vacant land + oil/gas operations Bella Rosa golf course

State Oil and Gas Regulations:

The Colorado Oil and Gas Conservation Commission (COGCC) governs the permitting and regulation of oil and gas wells throughout the state.

Town of Firestone Oil and Gas Regulations:

The Town of Firestone Development Code regulates siting, access roads, fencing and color of oil and gas wells and associated above ground production facilities through the review of the required Special Review Use and Final Development Plan applications for proposed oil and gas facilities. Other operational aspects of and oil and gas facility are regulated by the COGCC.

McGavin 6-19HZ Pad and Production Facility Analysis:

The proposed McGavin 6-19HZ Pad and Production Facility consists of twenty-six (26) horizontal wells, well heads, well related equipment and facilities (combustors/separators, etc.), meter houses, access roads, drainage facilities and pipelines.

Pad Size:

- Approximately 25.6 acres of the site will be used for drilling and completions operations. When drilling and completions activities are finished, a large portion of the disturbed area will be reclaimed, leaving approximately 7.1 acres of disturbed area while the site is in the production phase.
- Construction of the pad site and improvements to the existing access road will take approximately 6 weeks to complete.
- When the wells have reached the end of production, the wells will be plugged and abandoned and the site will be reclaimed, including the removal of flowlines.

Access:

- Access into the McGavin pad will be from a new access drive off of Pine Cone Avenue.

- Per the FDC, the applicant will be required to pave (asphalt or concrete) the first 100-feet of the access road from Pine Cone Avenue.
- Per standards in the Cooperative Development Plan Agreement, the applicant will be responsible for any damage caused to Town roads.
- Per a condition of approval, the applicant will be responsible for sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard.

Drilling Operations:

- Each well will take approximately 5 to 6 days to drill.
- Drilling occurs 24 hours per day.
- Well completions will occur after the drilling phase and takes approximately 4 to 6 days per well.
- Permanent production facilities installed after drilling and completions are completed.
- Interim reclamation of the site from 25.6 acres to 7.1 acres.

Mitigation Measures:

- Temporary 32-foot sound walls will be installed to control sound to the maximum extent practicable.
- Shrouding of lighting to the maximum extent practicable.
- Closed loop water system will be utilized to reduce truck trips and minimize site disturbance.
- Tankless facility is proposed to eliminate hydrocarbon storage tanks and associated emissions and to reduce truck trips.
- Air monitoring during pre-production and during the first six months of production.

Production Equipment/Facilities:

- All production equipment and facilities on the pad will be fenced and painted according to FDC requirements.
- No permanent liquid hydrocarbon tanks are included at this facility as the liquid hydrocarbons from the wells will be piped off-site.

Pipelines:

- Flowlines are proposed from the well heads to the production equipment and are internal to the pad. No flowlines are proposed outside of the pad area.

APPROVAL CRITERIA AND STAFF ANALYSIS

Special Review Use Approval Criteria and Staff Analysis:
The Special Review Use application for the McGavin 6-19HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.11 of the FDC. Staff makes the following findings.

A. The proposed use is generally consistent with the Town's Comprehensive Master Plan and all applicable provisions of this FDC and applicable State and Federal regulations;

Staff: *The proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan and Section 16.6.14 of the FDC. In addition,*

the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.

B. The proposed use is generally consistent with the purpose and intent of the zoning district in which it is located;

Staff: *The proposed use is consistent with the purpose and intent of the R-B zone district in that "Mining and Mineral Extraction" is permitted within the R-B zone district under the Special Review Use regulations of the Town.*

C. The proposed use is generally consistent with any applicable use-specific standards set forth in Section 3.2;

Staff: *There are no use-specific standards for "Mining and Mineral Extraction" within Section 3.2, however, the proposed use is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

D. The proposed use is compatible with adjacent uses in terms of scale, site design, and operating characteristics (hours of operation, traffic generation, lighting, noise, odor, dust, and other external impacts);

Staff: *The proposed use is compatible with adjacent uses in that the applicable development and design standards set forth in Section 16.6.14 of the FDC are met. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

E. Any significant adverse impacts anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable;

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. Facilities and services (including sewage and waste disposal, water, gas, election, police and fire protection, and streets and transportation, as applicable) will be available to serve the subject property while maintaining adequate levels of service for existing development;

Staff: *The proposed pad and production facility will not have a significant impact on any Town facilities or other utility providers.*

G. Adequate assurances of continuing maintenance have been provided; and

Staff: *The applicant will be responsible for the ongoing maintenance of the well pad and production facilities, including the reclamation of disturbed areas. In addition, all wells and production facilities are remotely monitored 24 hours/7 days a week.*

H. Any significant adverse impacts on the natural environment will be mitigated to the maximum extent reasonably practicable.

Staff: *The applicant will meet Town and State regulations relative to impacts on the natural environment to the maximum extent practicable. In addition, the*

applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.

Final Development Plan Approval Criteria and Staff Analysis:
The Final Development Plan application for the McGavin 6-19HZ Pad and Production Facility was reviewed for compliance with the Approval Criteria from Section 16.7.10 of the FDC. Staff makes the following findings.

A. The Final Development Plan is generally consistent with the Town's Comprehensive Master Plan;

Staff: *The FDP showing the proposed pad and production facility is consistent with Section 7.5 of the Town of Firestone Master Plan.*

B. The Final Development Plan is generally consistent with any previously approved subdivision plat, planned development, or any other precedent plan or land use approval as applicable;

Staff: *The FDP is consistent with previously approved land use actions for the subject property.*

C. No buildings or structures infringe on any easements so as to impact the full use of the easement;

Staff: *No buildings or structures proposed on the FDP will infringe on any easements.*

D. The Final Development Plan complies with all applicable development and design standards set forth in this FDC;

Staff: *The FDP is consistent with applicable development and design standards set forth in Section 16.6.14 of the FDC. In addition, the applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement.*

E. Any significant adverse impacts reasonably anticipated to result from the use will be mitigated or offset to the maximum extent reasonably practicable; and

Staff: *The applicant will meet the Operational Standards identified in Exhibit A of the Cooperative Development Plan Agreement. These operational standards are intended to mitigate the identified operational issues to the maximum extent practicable.*

F. The development proposed on the Final Development Plan and its general location is or will be compatible with the character of surrounding land uses.

Staff: *The proposed pad and production facility meets applicable Town setback standards. In addition, the applicant is also the surrounding land owner and in control of any surface development in and around the pad and production facility.*

NEIGHBORHOOD MEETING

As required by the Firestone Development Code, a Neighborhood Meeting was held on August 25, 2021 at 6:00 pm as a virtual neighborhood meeting. The required notice for the Neighborhood Meeting was provided.

PUBLIC NOTICE

Notice of the Public Hearings has been provided as follows:

Published in the Longmont Times Call:	December 22, 2021
Property Posted:	December 20, 2021
Letters to Adjacent Property Owners:	December 20, 2021

RECOMMENDATIONS

Special Review Use:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-03, a resolution recommending approval of the Special Review Use application to the Board of Trustees with the following conditions:

a. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

c. Prior to commencement of any work within Town limits, the Applicant, including contractors and sub-contractors, shall obtain from the Town necessary contractor's licenses.

d. Prior to commencement of any site work, the Applicant shall obtain from the Town all necessary permits, including but not limited to, storm water, access, overweight vehicle and building permits.

e. Applicant shall be responsible for construction and installation of certain public improvements required to serve the McGavin 6-19HZ Pad and Production Facility, including but not limited to sidewalk/trail improvements along Pine Cone Avenue from Falcon Street to Colorado Boulevard, which shall be outlined in a Development Agreement in a form approved by the Town Attorney.

f. Prior to drilling, the Applicant shall construct a fire hydrant and associated water lines as approved by the Town Engineer and the Frederick Firestone Fire Protection District.

g. Prior to beginning completions, the Applicant shall plat/dedicate additional right-of-way for Pine Cone Avenue as determined by the Town.

h. A burrowing owl survey shall be required if prairie dog colonies are disturbed by pad development or drilling between March 15th and October 31st. Applicant shall use the "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" from Colorado Parks and Wildlife.

Final Development Plan:
Town staff recommends the Planning and Zoning Commission approve draft Resolution PC-22-04, a resolution recommending approval of the Final Development Plan application to the Board of Trustees with conditions:

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FIRESTONE PLANNING AND ZONING COMMISSION

RESOLUTION NO. PC-22-04

A RESOLUTION OF THE FIRESTONE PLANNING AND ZONING COMMISSION RECOMMENDING APPROVAL WITH CONDITIONS OF A FINAL DEVELOPMENT PLAN APPLICATION TO OPERATE OIL AND GAS WELLS AND PRODUCTION FACILITIES ON REAL PROPERTY LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST, WITHIN THE TOWN OF FIRESTONE

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, who is the owner of certain real property located in the Town of Firestone, having a legal description of NW ¼ of Section 19, 2N, 67W ("Property"), has submitted an application for Final Development Plan to construct and operate a new oil and gas well pad, including 26 wells and one production facility, to be known as the "McGavin 6-149HZ Pad and Production Facility," on the Property (the "Application"); and

WHEREAS, Kerr-McGee Oil & Gas Onshore LP ("Applicant"), on behalf of Anadarko E&P Onshore LLC, has also submitted an application for a Special Review Use relating to the Application; and

WHEREAS, the Firestone Planning and Zoning Commission has conducted a public hearing on the Application, and has considered all the evidence presented at the public hearing, the relevant standards to accommodate oil and gas wells and facilities set forth in Sections 16.6.14 of the Firestone Development Code ("Code") and the Final Development Plan criteria set forth in Step 9, Section 16.7.10.D. of the Code; and

WHEREAS, the Firestone Planning and Zoning Commission wishes to make a recommendation to the Board of Trustees regarding the Application.

NOW, THEREFORE, BE IT RESOLVED BY THE FIRESTONE PLANNING AND ZONING COMMISSION:

1. That the Firestone Planning and Zoning Commission recommends approval of the Application, with the following conditions:

   a. All minor, technical corrections to the McGavin6-19HZ Pad and Production Facility Special Review Use/Final Development Plan application materials shall be made to the Town's satisfaction.

   b. Oil and gas operations at the well site shall comply with the Cooperative Development Plan Agreement.

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PASSED AND ADOPTED this ____ day of _____, 2022.

_____
Chairperson

ATTEST:

_____
Lisa Bartley, Secretary

EXHIBIT A
Cooperative Development Plan Agreement

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE MCGAVIN 6-19HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

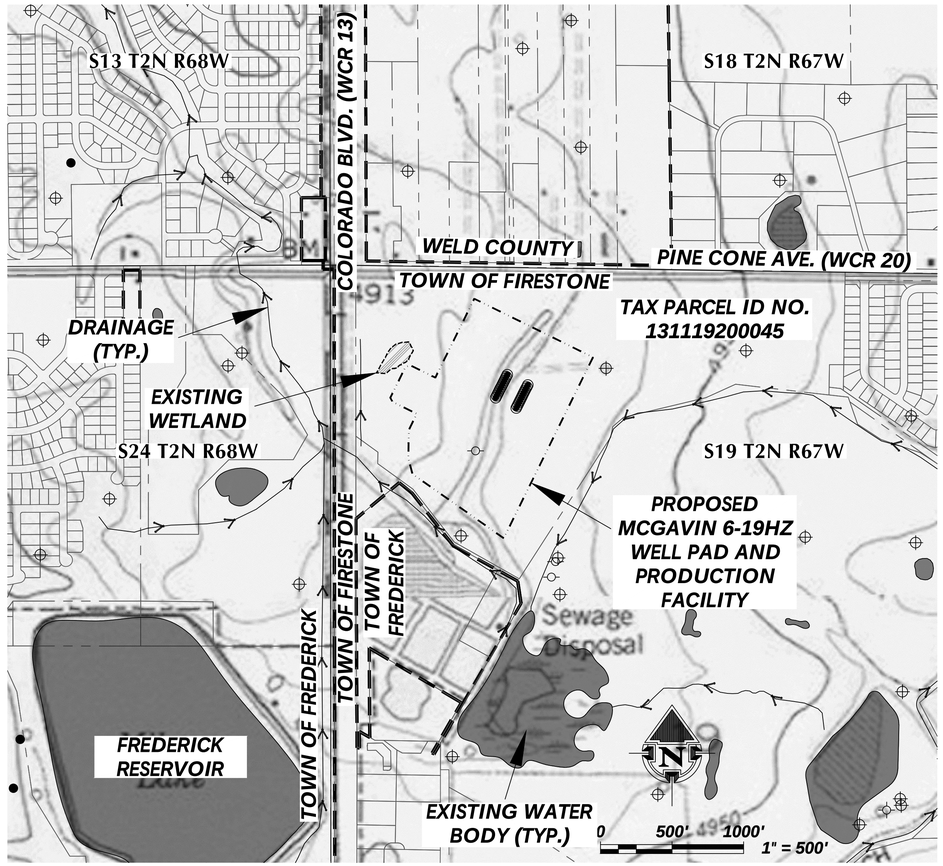
_____ MAYOR

ATTEST_____ TOWN CLERK

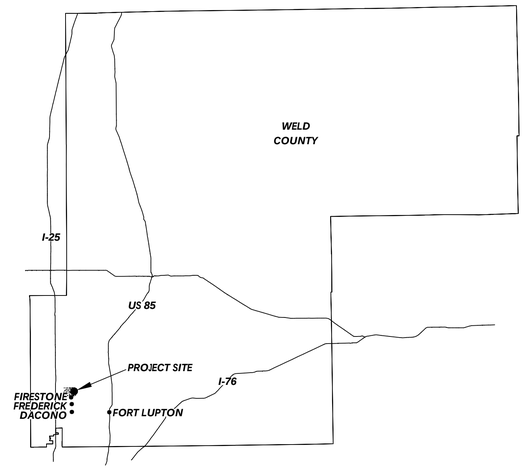
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- ***CONSTRUCTION LIMITS OF DISTURBANCE***
- ***PROPOSED WELL***
- ***EXISTING WELL (PRODUCING)***
- ***EXISTING WELL (PLUG & ABANDONED)***
- ***EXISTING WELL (SHUT IN)***
- ***EXISTING WELL (DRY AND ABANDONED)***
- ***EXISTING WELL (TEMPORARILY ABANDONED)***
- ***TOWN LIMITS***
- ***WATER BODY***
- ***PROPERTY LINE***
- ***EXISTING DITCH / STREAM***

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC
LOVELAND OFFICE
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Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-014 / FDP21-014

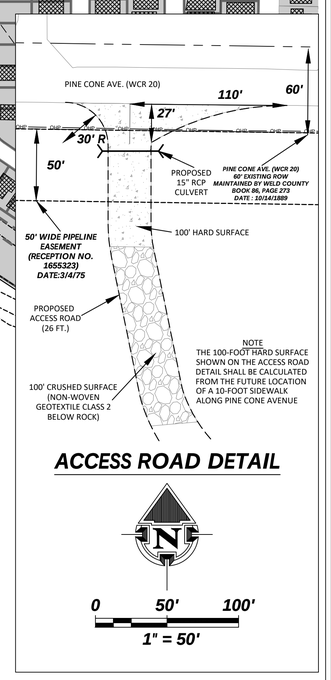
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SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_6-19HZ_FDP_COVER.dwg, 12/13/2021 10:08:02 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

SUBDIVISION: NONAME CREEK WEST
SUBDIVISION: NO NAME CREEK ESTATES
S13 T2N R68W
OWNER: FALK GREGORY A & VELUSCEK STEVEN (WELD COUNTY PARCEL I.D. 131313000059) ZONING: FREDERICK
SUBDIVISION: CANSANO RANCH
OWNER: TOWN OF FIRESTONE (WELD COUNTY PARCEL I.D. 131118000060) ZONING: FIRESTONE
OWNER: DUSO PEGGY DIVING TRUST (WELD COUNTY PARCEL I.D. 131118300009) ZONING: AG-A
OWNER: TYMOCZKO DARRELL R & TYMOCZKO NOLA M (WELD COUNTY PARCEL I.D. 131118000057) ZONING: AG-A
OWNER: KNUDSON ANITA R (WELD COUNTY PARCEL I.D. 131118300016) ZONING: AG-A
OWNER: KNUDSON FAMILY TRUST (WELD COUNTY PARCEL I.D. 131118300019) ZONING: AG-A
OWNER: OCONNOR DANIEL J & OCONNOR NICOLE L (WELD COUNTY PARCEL I.D. 131118300072) ZONING: AG-A
OWNER: KANE JOHN ARTHUR & KANE TRACY LEIGH (WELD COUNTY PARCEL I.D. 131118300071) ZONING: AG-A
OWNER: LAM CRAIG A & (WELD COUNTY PARCEL I.D. 131118300013) ZONING: AG-A
OWNER: GRAY JENNIFER L & GRAY DANIEL P (WELD COUNTY PARCEL I.D. 131118300011) ZONING: AG-A
OWNER: DVORAK KATHERINE M (WELD COUNTY PARCEL I.D. 131118300014) ZONING: AG-A
OWNER: ALDERFER LOWELL M & ALDERFER BETTY L (WELD COUNTY PARCEL I.D. 131118000035) ZONING: AG-A
WELD COUNTY
TOWN OF FIRESTONE
PINE CONE AVE. (WCR 20)
SUBDIVISION: OWL LAKE ESTATES SUB
S18 T2N R67W
PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK HEIGHTS
SUBDIVISION: LAWSON SUB
OWNER: PETRAS TIMOTHY (WELD COUNTY PARCEL I.D. 131324000064) ZONING: AG-A
OWNER: CLEVER LARRY C & CLEVER SUSAN K (WELD COUNTY PARCEL I.D. 131313000048) ZONING: AG-A
CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01
DRAINAGE (TYP.)
EXISTING WATER BODY
COLORADO BLVD. (WCR 13)
COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK
SUBDIVISION: MOORE FARM
EXISTING WATER BODY (BELLA ROSA POND)
S24 T2N R68W
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324411017) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000054) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000050) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000028) ZONING: FREDERICK
EXISTING WATER BODY (FREDERICK RESERVOIR)
100-YEAR FLOODPLAIN
TOWN OF FREDERICK
TOWN OF FIRESTONE
TOWN OF FREDERICK
OWNER: BEILAND KATHRYN & BEILAND KEVIN D (WELD COUNTY PARCEL I.D. 131118300076) ZONING: AG-A
APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93
30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08
SEE ACCESS ROAD DETAIL
OWNER: YEAGER JUDITH E (WELD COUNTY PARCEL I.D. 131118300066) ZONING: AG-A
PROPOSED ACCESS ROAD
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)
16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01
OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE
EXISTING FACILITY
30' WIDE PIPELINE EASEMENT (RECEPTION NO. 2238664) DATE: 1/17/91
50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75
VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08
EXISTING ACCESS ROAD
COAL MINE BOUNDARY
EXISTING WETLANDS
PROPOSED MLVT
PROPOSED MCGAVIN 6-19HZ WELL PAD
TEMPORARY EQUIPMENT AREA (328' X 60')
EXISTING WALKING/BIKE PATH
PROPOSED MCGAVIN 6-19HZ FACILITY PAD
TEMPORARY EQUIPMENT AREA (150' X 60')
35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05
EXISTING FACILITY
SUBDIVISION: ST. VRAIN SANITATION DISTRICT MINOR SUBDIVISION 1
OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK
100-YEAR FLOODPLAIN
OWNER: ST VRAIN SANITATION DISTRICT (WELD COUNTY PARCEL I.D. 131119209002) ZONING: FREDERICK
S19 T2N R67W
EXISTING WATER BODY
EXISTING WATER BODY
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK FG



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- SS — EXISTING SANITARY SEWER LINE
- EPL — ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE***

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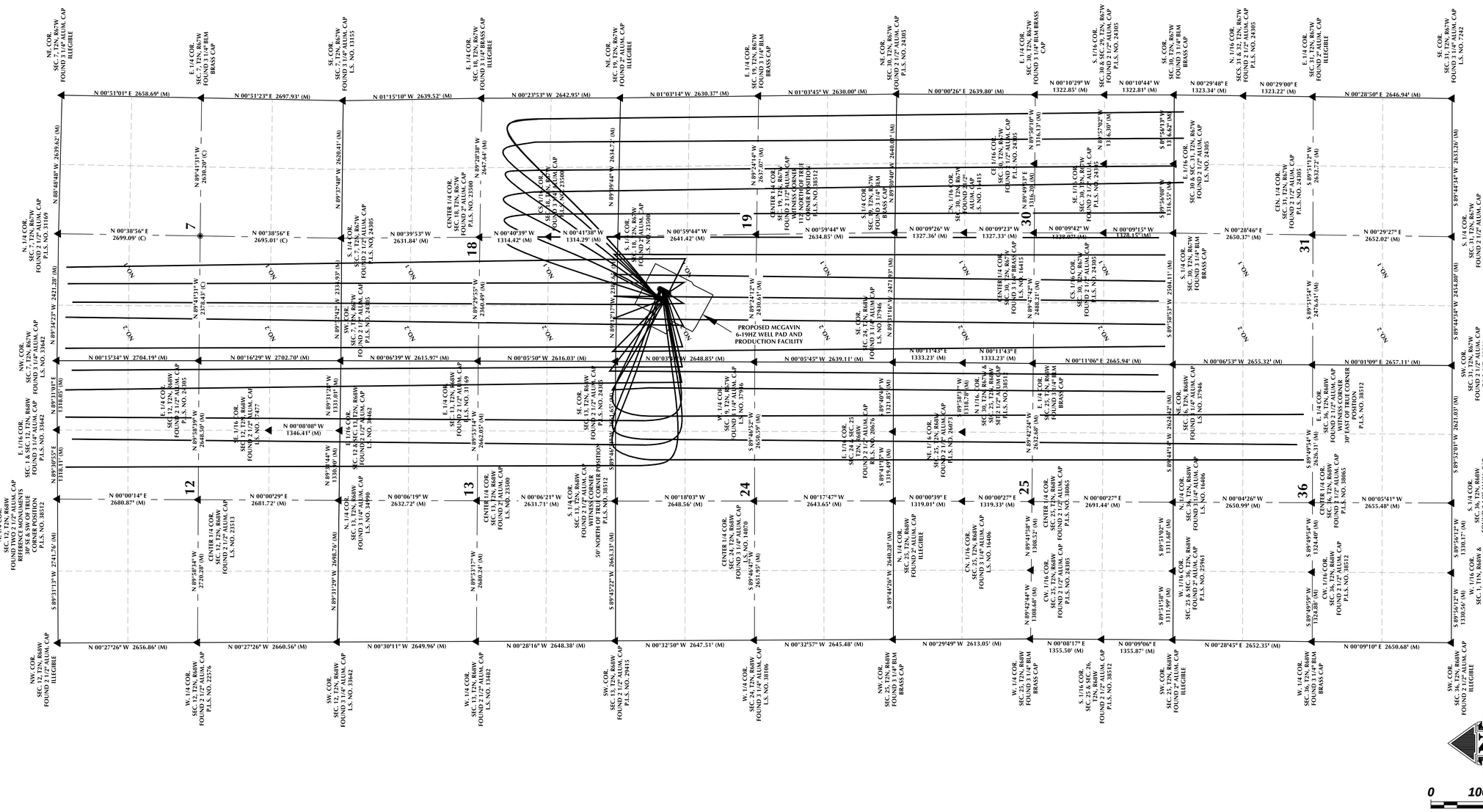
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-014 / FDP21-014

SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.
2. ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972362 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.

GENERAL NOTES:
- ORIGINAL DOCUMENT SIZE: 24" x 36"
- SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE

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MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-014 / FDP21-014

SCALE:	1" = 1000'	PAGE:	FDP-3
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_8-19HZ_FDP_COVER.dwg, 12/13/2021 10:07:26 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

S18 T2N R67W

S24 T2N R68W

S19 T2N R67W

WELD COUNTY

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

COLORADO BLVD. (WCR 13)

TOWN OF FREDERICK

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

SEDIMENT TRAP

PROPOSED SOUND WALL

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

PROPOSED MLVT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 19-1HZ
MCGAVIN 19-2HZ
MCGAVIN 19-3HZ
MCGAVIN 19-4HZ
MCGAVIN 19-5HZ
MCGAVIN 19-6HZ
MCGAVIN 19-7HZ
MCGAVIN 19-8HZ
MCGAVIN 19-9HZ
MCGAVIN 19-10HZ
MCGAVIN 19-11HZ
MCGAVIN 19-12HZ
MCGAVIN 19-13HZ

MCGAVIN 19-14HZ
MCGAVIN 19-15HZ
MCGAVIN 19-16HZ
MCGAVIN 19-17HZ
MCGAVIN 19-18HZ
MCGAVIN 19-19HZ
MCGAVIN 19-20HZ
MCGAVIN 19-21HZ
MCGAVIN 19-22HZ
MCGAVIN 19-23HZ
MCGAVIN 19-24HZ
MCGAVIN 19-25HZ
MCGAVIN 19-26HZ

50' FLOWLINE CORRIDOR

TOPSOIL STOCKPILE

PROPOSED CULVERT

EXISTING WALKING/BIKE PATH

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 328021

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N, (DJ) API: 05-123-34478, TOTAL MEASURED DEPTH: 9240'

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

SEDIMENT TRAP

TEMPORARY EQUIPMENT AREA (328' X 60') & (350' X 60')
(TEMPORARY TANKS - 44)
(TEMPORARY ECDs - 13)
(TEMPORARY PROPANE TANK - 2)

TEMPORARY GENERATOR (50' x 20')

TEMPORARY PURGE GAS AREA (10' x 30')

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666, TOTAL MEASURED DEPTH: 5026'

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318, TOTAL MEASURED DEPTH: 5094'

COAL MINE BOUNDARY

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 1311190000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

4910'

4915

4920

4925

4930

4935

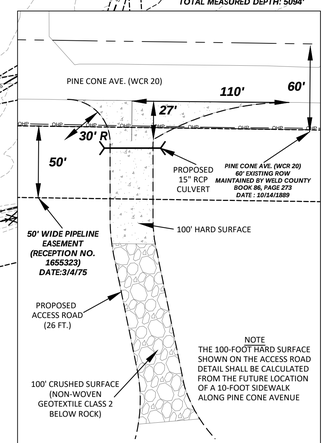
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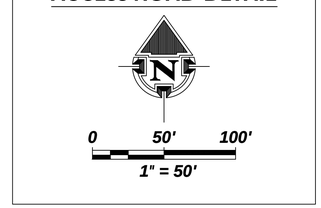
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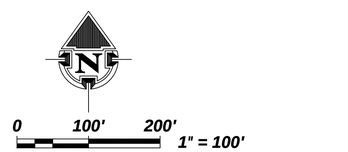
4950

4930'

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- PROPOSED SLOPE PROTECTION
- DIVERSION DITCH

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"

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Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
CONSTRUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

WELD COUNTY

S18 T2N R67W

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

COLORADO BLVD. (WCR 13)

STORMWATER STORAGE BERM

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED CULVERT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 18-1HZ
MCGAVIN 18-2HZ
MCGAVIN 18-3HZ
MCGAVIN 18-4HZ
MCGAVIN 18-5HZ
MCGAVIN 18-6HZ
MCGAVIN 18-7HZ
MCGAVIN 18-8HZ
MCGAVIN 18-9HZ
MCGAVIN 18-10HZ
MCGAVIN 18-11HZ
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MCGAVIN 18-21HZ
MCGAVIN 18-22HZ
MCGAVIN 18-23HZ
MCGAVIN 18-24HZ
MCGAVIN 18-25HZ
MCGAVIN 18-26HZ

OFF-SITE FLOW DEFLECTION

STORMWATER STORAGE BERM

50'

50' FLOWLINE CORRIDOR

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNW COGCC LOCATION NUMBER: 320821

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SU) API: 05-123-24478, TOTAL MEASURED DEPTH: 9249'

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

SEE VISUAL MITIGATION BERM CROSS SECTION ON FDP-7

WEIR & SPILLWAY

OUTLET PIPE

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

EXISTING WALKING/BIKE PATH

S24 T2N R68W

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

TOWN OF FREDERICK

TOWN OF FIRESTONE

TOWN OF FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

SEE MASONRY WALL DETAIL ON FDP-7

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

COAL MINE BOUNDARY

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666 TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318 TOTAL MEASURED DEPTH: 5094'

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

S19 T2N R67W

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

4910'

4920

4925

4930

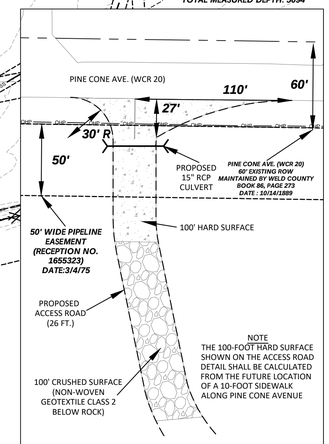
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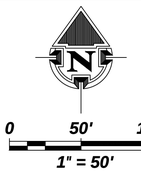
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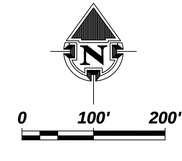
4945

4950

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EPL — EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- (PS) PROPOSED PERMANENT SEEDING
- MASONRY WALL
- DIVERSION DITCH

GENERAL NOTES:

- *ORIGINAL DOCUMENT SIZE: 24" x 36"*
- *SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6*

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

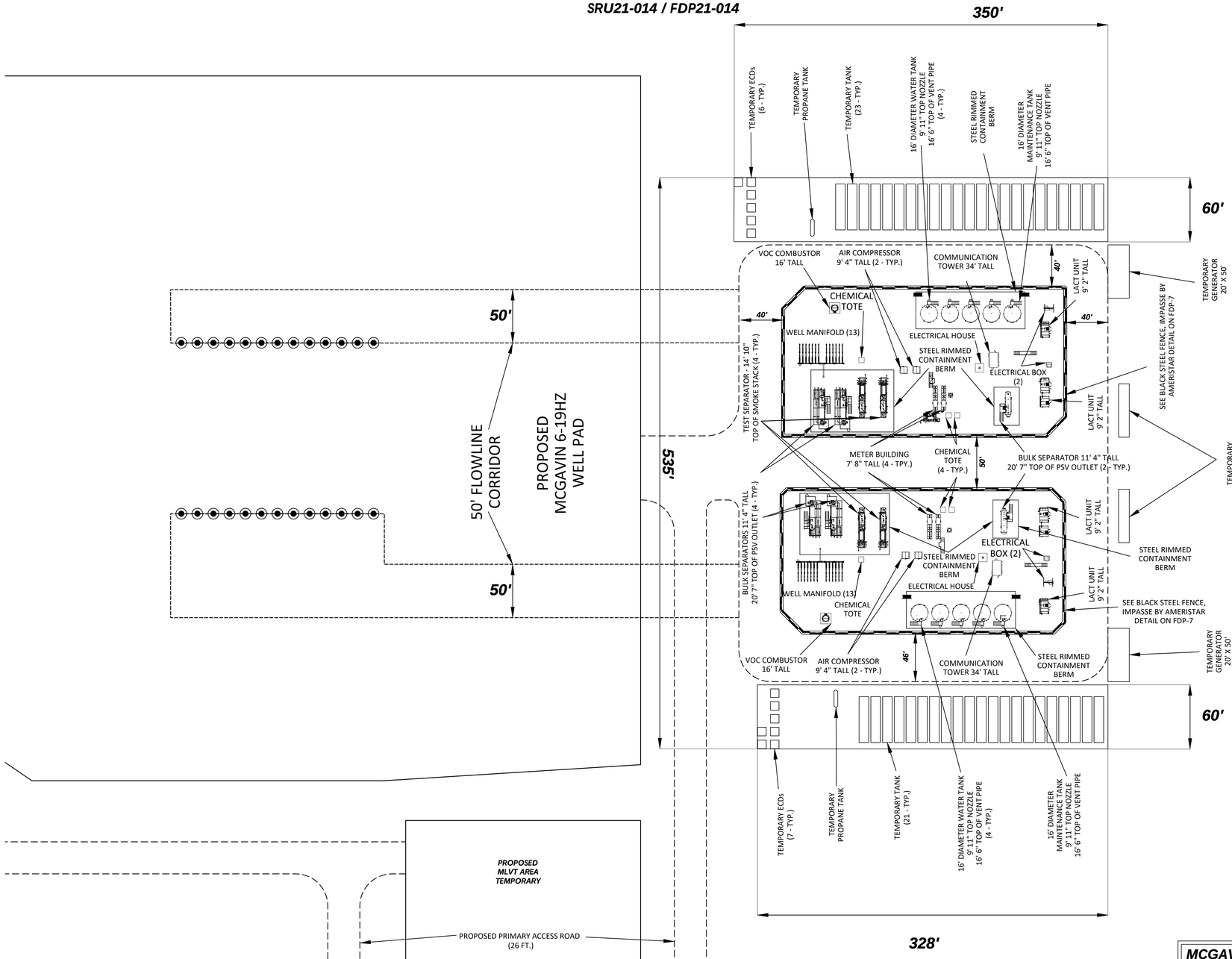
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



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GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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Phone 970-776-4331

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Phone 307-674-0609

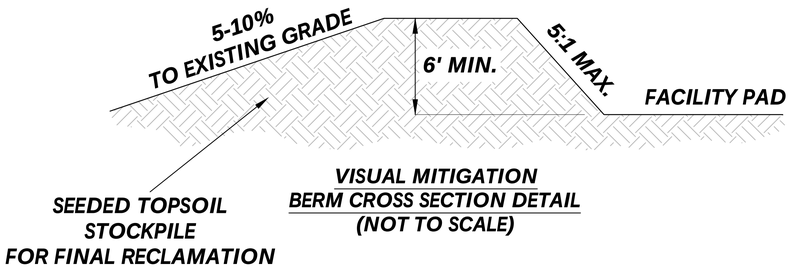
Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-014 / FDP21-014

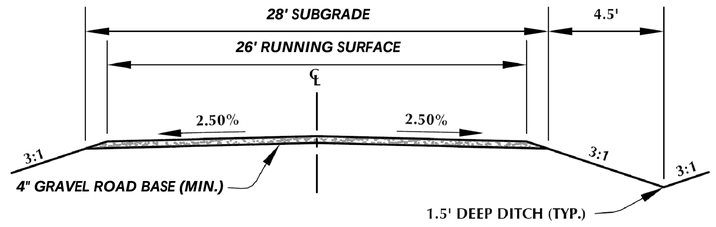
SCALE:	1" = 50'	SHEET:	FDP-6
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

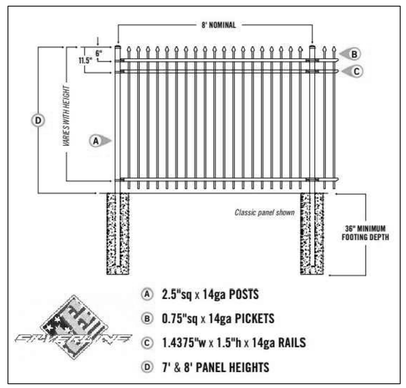
Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



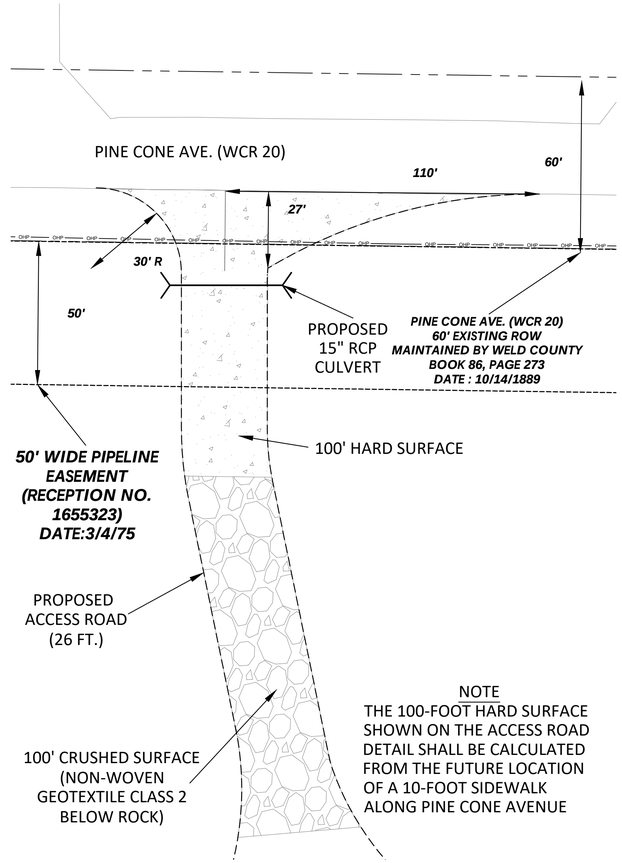
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



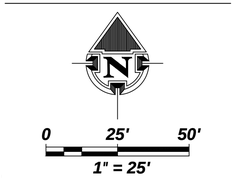
TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



TYPICAL MASONRY WALL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE MCGAVIN 6-19HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-014 / FDP21-014

SCALE:	VARIOUS	SHEET:	FDP-7
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-014 / FDP21-014

NW. COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
P.L.S. NO. 24305

N. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2" ALUM. CAP
L.S. NO. 23500

N 89°12'17" W 2387.65'
(N. LINE OF THE NW1/4 OF SECTION 19)

N 89°09'45" W 927.97'
N 89°09'45" W 282.70'
N 83°43'12" W 316.62'

60' PINE CONE AVE. (WCR 20)

PINE CONE AVE. (WCR 20)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

SEE ACCESS ROAD DETAIL

N 83°09'44" W 279.51'
N 83°30'43" W 243.86'

50' WIDE PIPELINE EASEMENT
(RECEPTION NO. 1655323)
DATE: 3/4/75
GRID TIE TO CENTERLINE

CL OF PIPELINE ROW
(RECEPTION NO. 2843044)
DATE: 4/25/01

50'
30'

30' WIDE SANITARY SEWER
LINE EASEMENT
(RECEPTION NO. 3589233 &
3593372)
DATE: 11/12/08 & 12/5/08

N 71°43'21" W 1157.86'

APPROXIMATE LOCATION
OF 30' WIDE PIPELINE
ROW EASEMENT
(RECEPTION NO. 2857509
& 2323862)
DATE: 6/14/01 & 3/3/93

SEE GRID TIE
DETAIL ON FDP-9

S 63°17'59" E 1160.00'

N 26°42'01" E 479.00'

S 63°17'59" E 240.00'

N 26°42'01" E 179.26'

N 63°17'59" W 384.57'

N 26°42'01" E 437.37'

PROPOSED
MCGAVIN 6-19HZ
WELL PAD

PROPOSED
MCGAVIN 6-19HZ
FACILITY PAD

EXISTING WELL:
ROCKY MOUNTAIN FUEL 19-4H,
(SI), API: 05-123-16476,
TOTAL MEASURED DEPTH: 8248'

N 63°17'59" W 128.00'

N 0°03'41" W 2648.85'
(W. LINE OF THE NW1/4 OF SECTION 19)

COLORADO BLVD. (WCR 13)

35' WIDE PUBLIC TRAIL
(RECEPTION NO. 3299167)
DATE: 6/30/05
GRID TIE TO CENTERLINE

60'

COLORADO BLVD. (WCR 13)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

S 58°16'24" W 1184.18'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA),
API: 05-123-08665,
TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH DRAINAGE
EASEMENT
(RECEPTION NO. 3106304 & 3316421)
DATE: 9/15/03 & 8/24/05

N 35°32'29" E 880.04'
N 34°43'39" E 882.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA),
API: 05-123-08666,
TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY
MOUNTAIN FUEL CO D 12, (PA),
API: 05-123-10318,
TOTAL MEASURED DEPTH: 5094'

16.5'

16.5' WIDE
UTILITY EASEMENT
(RECEPTION NO. 2857509)
DATE: 6/14/01

VARYING WIDTH SANITARY
SEWER LINE EASEMENT
(RECEPTION NO. 3586220)
DATE: 10/27/08

30'

30' WIDE
PIPELINE EASEMENT
(RECEPTION NO. 2238664)
DATE: 1/17/91
GRID TIE TO CENTERLINE

S 0°03'41" E 2648.85'
(E. LINE OF THE NW1/4 OF SECTION 19)
N 00°59'44" W 2641.42'

S 5°56'20" W 740.00'

S 43°13'14" E 2315.64'

S 44°47'25" W 61.65'

S 35°52'40" W 724.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-3 JI,
(PA), API: 05-123-20218,
TOTAL MEASURED DEPTH: 8440'

EXISTING WELL: ROCKY MTN FUEL V 19-5JI, (SI),
API: 05-123-20217,
TOTAL MEASURED DEPTH: 8358'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-6JI, (SI),
API: 05-123-19583,
TOTAL MEASURED DEPTH: 8100'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 13,
(PA), API: 05-123-10317,
TOTAL MEASURED DEPTH: 5076'

S 53°17'52" E 1050.43'
S 54°59'08" E 1048.17'
S 60°56'59" E 1011.11'
S 65°38'39" E 907.33'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 5, (PA),
API: 05-123-08531,
TOTAL MEASURED DEPTH: 8095'

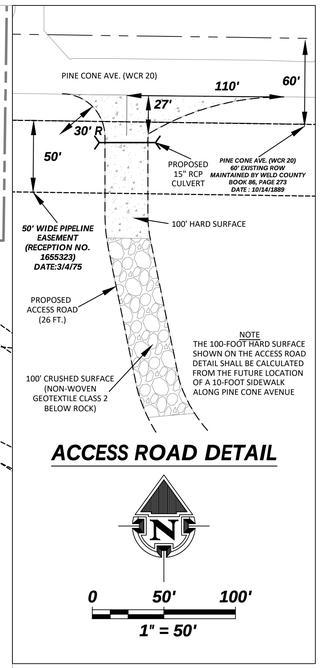
S 68°37'02" W 1175.60'

W. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 3 1/4" ALUM. CAP
L.S. NO. 37946

(S. LINE OF THE NW1/4 OF SECTION 19)
N 89°24'12" W 2430.61'

CENTER 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
WITNESS CORNER
112' NORTH OF TRUE CORNER POSITION
P.L.S. NO. 38512

0 150' 300'
1" = 150'



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

609 CONSULTING, LLC

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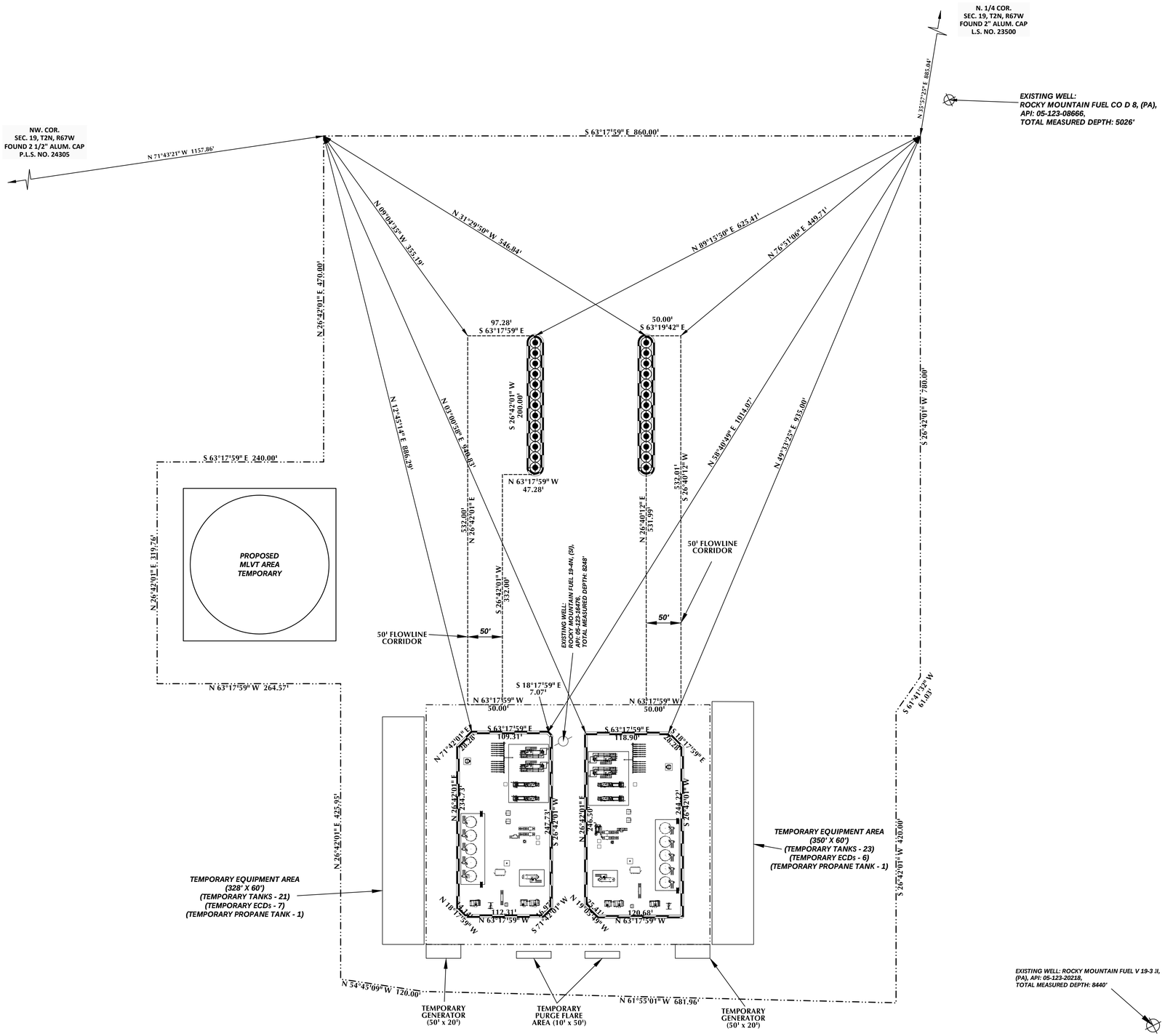
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-014 / FDP21-014

SCALE:	1" = 150'	SHEET:	FDP-8
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR

GENERAL NOTES:

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1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-014 / FDP21-014

SCALE:	1" = 75'	SHEET:	FDP-9
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/13/2021 10:11:19 AM, casey

Special Review Use Application
Town of Firestone

McGavin 6-19HZ Pad and Production Facility

Township 2 North, Range 67 West, 6th P.M.
Section 19: NW/4
Firestone, Colorado
Parcel # 131119200045
6240 Pine Cone Avenue

Location Lat/Long (NAD 83): 40.127518, -104.938519
Access Road Lat/Long (NAD 83): 40.131307, -104.937875

APPLICANT:

Kerr-McGee Oil & Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Revised December 2021

Table of Contents

Section

Application Form 1
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Phase III Drainage Study (REVISED) 5
Stormwater Management Plan 6
Dust Suppressant Plan 7
Wildlife Assessment and Weed Management Plans 8
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Cultural Assessment 10
Lighting Plan 11
Noise Mitigation Plan 12
Traffic Management Plan and Baseline Road Study (REVISED) 13
Reclamation Plan 14
Community Consultation Plan 15
Final Development Plan (REVISED) 16
Alta Survey 17

Section 1

Application Form

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

TOWN OF FIRESTONE
DEVELOPMENT REVIEW APPLICATION

Incomplete applications will not be processed. Attach additional sheets if necessary. Application fees must accompany application.

PROJECT INFORMATION	
Project Name: McGavin 6-19HZ Well Pad and Facility	
Address/Location: NW/4 of Section 19, 2N 67W	
Brief Project Description: KMOG proposes to construct a new oil and gas well pad including 26 wells and one production facility.	
Date of Pre-Application Conference with Staff: 6/26/2020	
Submittal Check List Attached: Yes	Fee Payment Included with Application: Yes
Mark As Applicable:	
Current Zoning: PUD	Proposed Zoning: No change
Current Use: AG	Proposed Use: N/A
# of Lots Proposed: N/A	Density Proposed: N/A
Gross Floor Area Proposed: N/A	
SITE INFORMATION	
Legal Description: NW/4 of Section 19, 2N 67W	
Location Size: ~25.63 Acres (DA); ~7.08 Acres (Interim Rec)	Floodplain On Site: No
SERVICE PROVIDERS	
Water: N/A	School District: N/A
Sewer: N/A	Fire District: Frederick Firestone Fire District
Gas: N/A	Ditch Company: N/A
Electric: N/A	Other:
Metro District: N/A	Other:
PROPERTY OWNER	**APPLICANT**
Name/Company: ANADARKO E&P ONSHORE LLC	Name/Company: Kerr McGee Oil and Gas Onshore LP
Address: 1099 18TH ST., DENVER CO 80202	Address: 1099 18TH ST., DENVER CO 80202
Phone Number: 720-929-6026	Phone Number: 720-929-6907
Email Address: don_jobe@oxy.com	Email Address: shayelyn_marshall@oxy.com
MINERAL RIGHTS OWNER	**MINERAL LEASE HOLDER**
Name/Company: Please see list attached.	Name/Company: **Please see list attached.**
Contact Information:	Contact Information:

Please see page 2 of this application.

FOR OFFICE USE ONLY	
Date submitted:	Project #:
Fees Paid:	Planner:

ACKNOWLEDGEMENT & AUTHORIZATION

The undersigned is fully aware of the request/proposal being made and the actions being initiated on the referenced property. The undersigned understand that the application must be found to be complete by the Town of Firestone before the request can officially be accepted and the development review process initiated.

The undersigned is aware that the applicant is fully responsible for all reasonable costs associated with the review of the application/request being made to the Town of Firestone. Applicants shall pay all costs billed by the Town for legal, engineering and planning costs incurred by staff, including consultants acting on behalf of staff, necessary for project review. By this acknowledgement, the undersigned hereby certify that the above information is true and correct.

Property Owner Signature: _____ Applicant Signature: Shayelyn Marshall

Digitally signed by: Shayelyn Marshall
DN: CN = Shayelyn Marshall email = shayelyn_marshall@oxy.com C = AD
Date: 2021.06.23 12:53:33 -06'00'

Date: 6/23/2021 Date: 6/23/2021

DEVELOPMENT REVIEW FEE SCHEDULE

	Application Type	Fee	Deposit
Annexation			
☐	Major (10+ Acres)	$4,000	$2,500
☐	Minor (<10 acres)	$2,000	$1,500
Zoning / Rezoning			
☐	Initial Zoning	$1,500+$10/acre	n/a
☐	Rezoning	$1,500+$10/acre	$2,500
☐	PUD Rezoning	$3,000+10/acre	$5,000
☐	Overlay Rezoning	$2,000+10/acre	$2,500
☐	Minor Amendment	$500	n/a
Final Development Plan			
☐	Major Amendment	$1,000	n/a
☐	Minor Amendment	$400	n/a
☐	Residential	$1,400+$10/unit	$5,000
☐	Non-Residential (>10,000 sf)	$2,500	$1,500*
☐	Non-Residential (<10,000 sf)	$1,500	$1,500*
Miscellaneous			
☐	Metro District Service Plan	$10,000	n/a
☐	Other**:		

	Application Type	Fee	Deposit
Comprehensive Plan Amendment			
☐	Major Amendment	$3,000	$1,500
☐	Minor Amendment	$1,000	n/a
Subdivision			
☐	Preliminary Plat	$2,000+$40/lot	$5,000
☐	Final Plat	$2,000+$20/lot	$10,000
☐	Minor Subdivision Plat	$2,000+$20/lot	$1,500
☐	Non-residential Minor Plat	$2,000+$20/lot	$5,000
☐	Minor Plat Amendment	$500	n/a
Special Use Review			
☐	Major	$1,000	n/a
☐	Minor	$500	n/a
☑	Oil & Gas	$1,000 per well	$1,500

*All fees **include** both Town of Firestone Planning & Engineering review. These fees **do not include** referral agency review fees, outside consultant review fees, or review fees incurred by consultants acting on behalf of staff.*

** may be waived at staff's discretion*

*** fee provided at pre-application meeting*

McGavin Surface Location: 2N-67W-19: NW				
Lease Holder	**Address**	**City**	**State**	**Zip**
Kerr-McGee Oil & Gas Onshore LP	PO Box 173779	Denver	CO	80217
Mineral Owner	**Address**	**City**	**State**	**Zip**
Black Stone Minerals Company, L.P.	1001 Fannin Street, Suite 2020	Houston	TX	77002
CMS Minerals II, LLC	1300 Post Oak Blvd., Suite 800	Houston	TX	77056
Unionrock Royalties II, LLC	1999 Broadway, Suite 850	Denver	CO	80202
Oleo Acres Minerals, LLC	5251 DTC Pkwy, Suite 425	Greenwood	CO	80111
Black Magic #2, LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Magic M&R, LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Richard H. Linn Trust for Nancy E Linn	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
RHL 219 LLC	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
Gittelman I LLLP	1720 S. Bellaire Street, Suite 1209	Denver	CO	80222
TRP Minerals, LLC	1455 West Loop South, Suite 230	Houston	TX	77027
Pinto Investment Partners, LP	1000 Main Street, Suite 3250	Houston	TX	77002

Section 2

Narrative

NARRATIVE

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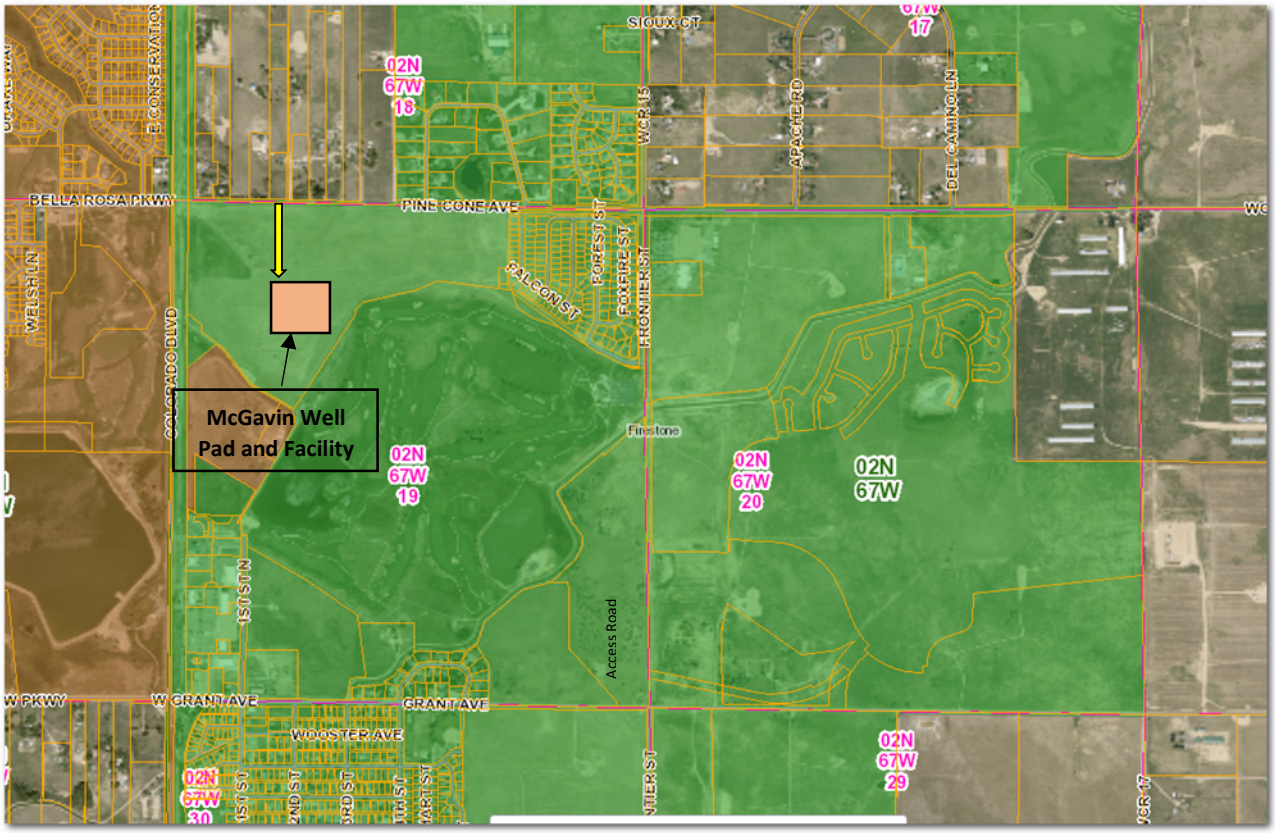
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1. Narrative

1.1 DESCRIPTION OF INTENDED USE

Kerr-McGee Oil & Gas Onshore LP (KMOG), intends to horizontally drill twenty-six (26) oil and gas wells from one well pad location. The proposed well names are listed in Section 1.2. The desired outcome of this application is to permit the wells to all formations. The purpose of the wells is to produce hydrocarbons from underlying formations known to have commercial potential from the production of such substances.

The proposed wells and production facility are located in Section 19, Township 2 North, Range 67 west 6th P.M. See the aerial vicinity map below showing an arrow for the site access from WCR 20/Pine Cone Ave.



1.2 SITE IMPROVEMENTS

KMOG is proposing one temporary operations area of approximately 25.63 acres for drilling and completions operations. After drilling and completions activities, the site will be reclaimed to approximately 7.08 acres, as the permanent disturbance area.

McGavin 6-19HZ Well Pad:

McGavin 19-1HZ	McGavin 19-15HZ
McGavin 19-2HZ	McGavin 19-16HZ
McGavin 19-3HZ	McGavin 19-17HZ
McGavin 19-4HZ	McGavin 19-18HZ
McGavin 19-5HZ	McGavin 19-19HZ
McGavin 19-6HZ	McGavin 19-20HZ

McGavin 19-7HZ	McGavin 19-14HZ
McGavin 19-8HZ	McGavin 19-21HZ
McGavin 19-9HZ	McGavin 19-22HZ
McGavin 19-10HZ	McGavin 19-23HZ
McGavin 19-11HZ	McGavin 19-24HZ
McGavin 19-12HZ	McGavin 19-25HZ
McGavin 19-13HZ	McGavin 19-26HZ

A Final Develoment Plan is included with this application for further use and review.

After the wells have been drilled to their total depths and completed as wells capable of production, KMOG will reclaim the drill site. The reclamation will be in accordance with the applicable rules and regulations of the Colorado Oil and Gas Conservation Commission (COGCC). The completed well sites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the well sites regularly upon completion of the wells. Flowlines will be laid to connect the wells to the production facility.

If any of the wells are not capable of production, that specific well (or wells) will be plugged and abandoned as a dry hole and the same reclamation of the site will apply.

1.3 CHARACTERISTICS OF INSTALLATION

These wells will have a wellhead assembly installed on site as well as production and gathering facilities. Pumping units may be installed should pressure within the wells necessitate their use.

1.4 CHARACTERISTICS OF DRILLING AND COMPLETION OPERATIONS

KMOG management will utilize authorized employees and professional contractors to conduct the drilling and completion operations on site. The actual drilling phase is approximately five to six days per well, under normal circumstances. Drilling will be continuous, 24 hours a day, for this period. Completion operations will be performed on each well following the drilling phase. The production facility will be installed, and the wells turned over to production. KMOG anticipates mobilization and pad construction to begin the second quarter 2022 contingent upon approval from the Town of Firestone. Completion of all construction activities including site preparation, drilling, completion, facility and pipeline installation and final re-grading will occur within six months of the completion of hydraulic fracturing, construction of production facility and the initiation of oil and gas production.

1.5 CHARACTERISTICS OF MAINTENANCE

A lease operator will inspect the wells on a regular basis under normal conditions and as required by any special circumstances under the supervision of the KMOG Area Manager. In addition, all wells and production facilities are remotely monitored 24 hours a day / seven days a week from our Integrated Operations Center (IOC) located in Platteville, Colorado.

1.6 DISPOSAL METHODS STATEMENT

- Drilling mud will be spread on lands outside of the town limits in a manner approved by the COGCC or taken to a commercial disposal.
- A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation.

- Human waste will be properly handled by portable sanitary facilities located on site. KMOG will contract a sanitary service company to provide and maintain the self-contained sanitary facilities throughout the oil and gas operation.
- Produced water will be disposed of off-site as approved by the COGCC.

2. Operator Information

2.1 OPERATOR IDENTIFICATION

Kerr-McGee Oil & Gas Onshore LP
(Subsidiary of Occidental Petroleum Corporation)
1099 18th Street
Denver, Colorado 80202
Tel:(720) 929-6000
Fax: (720) 929-7297

Kerr-McGee Oil & Gas Onshore LP (KMOG), a subsidiary of Occidental Petroleum Corporation, is a fully insured and bonded oil and gas operator, organized as a Delaware Limited Partnership and authorized to do business in the State of Colorado as Kerr-McGee Oil & Gas Onshore LP. All insurance and bonds held by KMOG meet the requirements as set forth in the rules and regulations as adopted by the COGCC.

2.2 SURFACE OWNER

Anadarko E&P Onshore LLC
PO Box 173779
Denver, Colorado 80217

The surface owner is the applicant and therefore a surface use agreement is not applicable.

3. Operating Plan

3.1 CONSTRUCTION & DRILLING PHASE

The construction and drilling operations for this location are expected to take about six months (under normal circumstances). The subject land is first surveyed, and a well location is staked in accordance with COGCC regulations. The drilling pad is designed to prevent run off so that any spills would be contained on-site. The pad is lined with a layer of compacted clay materials to help prevent fluids from migrating vertically to the subgrade. From this point forward, twenty-four (24) hour operations of dirt work equipment begins to preparing the location including leveling the surface where the drilling rig will be located. After the location has been prepared, a drilling rig will move in to drill the surface intervals of the wells and cement the surface pipe to protect ground water formations. This process will take approximately one day per well under normal circumstances, subsequently a 26 well pad will take 26 days to drill and cement the surface casing pipes. Depending on the size/type of rig utilized to drill the surface interval, production drilling operations will either begin immediately with the same rig or a different rig will be moved onto location at a later date to drill the production interval. Drilling the production interval of the well will take five to six days per well, under normal circumstances. The actual drilling proceeds at a constant rate unless below the surface or mechanical problems are encountered.

If the well is deemed viable, casing is run in the hole and cemented (alternatively the well is plugged according to COGCC regulations). The casing, constructed of steel pipe, is designed to specific criteria to provide an integral conduit for transporting hydrocarbons to the surface. The casing strength is further enhanced by the cementing process. Cement is placed in the space between the casing and the wall of the hole. The cement anchors the casing, provides increased burst resistance, and contains the fracturing and produced fluids. The cement is also designed to special criteria. The cement is then allowed to cure and concurrently the rig is moved off location. At this point the drilling phase is complete.

3.2 DRAINAGE AND EROSION CONTROL PLAN

Changes in the current drainage patterns are not anticipated. The well site will be monitored during the drilling and completion phases for any problems with drainage or erosion. Necessary measures will be taken to correct any problems. Once the drilling and completion phases are complete, the drill site will be restored as near as practical, to its original grade and vegetation planted as required by regulations and surface use agreements. KMOG will continue to monitor the site until all applicable regulatory requirements for revegetation have been met.

KMOG uses a closed loop or "pitless" system for drilling and fluid management and does not construct a reserve pit. The drilling company will actively manage the area around the rig equipment such that any minor fluid spills will be diverted and drain to small pumps strategically located and from there, if only water, will be pumped into the drilling fluid system. If the fluid is contaminated by fluids other than water, it will be pumped into a separate container and removed from the site to an approved disposal facility.

Please see the Phase III Drainage Study in Section five (of the permit) for more detail.

3.3 WATER SOURCES FOR ACTIVITIES

Water for use in completions operations will be secured by KMOG through its own "Water On Demand" system, or from a water supplier in the immediate area of the drill site. Water use will be approved for commercial and industrial use and will be subject to a mutually acceptable agreement between KMOG and the water supplier. The water-on-demand system is a network of over 180 miles of underground pipeline that stretches the length of the 20-mile by 30-mile field to source and transport water to completions crews. This system eliminates more than 2,000 truck trips per day field wide, also reducing associated concerns of traffic, noise, emissions and dust.

KMOG plans to install temporary lay flat waterlines to transfer water from its permanent infrastructure ending on parcel #131121000003 to the well pad for use during completions operations.

3.4 COMPLETIONS PHASE

Sometime after the drilling rig has rigged down, horizontal completions operations may begin.
The construction of the production facility, where practical may occur concurrent with the drilling and/or completions operations. Completions operations include all operations performed after drilling the well up to delivering a producing well to be managed by the Production Operations group. These completions operations consist of well preparation, fracture stimulation, and preparing the well for production to sales.

The well preparation phase of completions operations is performed to prepare for the fracture stimulation operation. Initially, the necessary wellhead equipment is installed to conduct well preparation operations. KMOG wells are designed, built, operated and maintained to the highest standards. Logging is performed to confirm the cement quality behind the well casing meets KMOG and regulatory standards. The wellbore is

pressure-tested to confirm the casing can withstand the high pressures associated with a fracture stimulation. The casing is then perforated at the toe end of the wellbore to prepare the well for the initial fracture stimulation. Lastly, the remaining necessary wellhead equipment is installed to ready the well for fracture stimulation. A crew of one to six people are required to perform the above operations. The cumulative duration of the well preparation operations is three to four days.

The fracture stimulation operation is conducted to stimulate the flow of hydrocarbons from the targeted geologic formation to the wellbore and up to the wellhead. Fracture stimulation consists of pumping a water and sand mixture into the wellbore at a high pressure and flow rate. The water/sand mixture exits the wellbore to contact the rock formation through perforations made to the well casing. The stimulation operation for each well is performed in stages to concentrate the stimulation of the rock formation at designed intervals along the wellbore. In the event multiple wells are included in the fracture stimulation operations, only one well is under stimulation at one time. During stimulation, a crew of 35 to 45 people are required. The cumulative duration of the fracture stimulation operation is three to seven days per well.

At the end of the fracture stimulation operation, the well is prepared for long-term production. A coiled tubing unit is utilized to mill the plugs set in the wellbore to isolate the stimulation stages and to clean out the wellbore. Production tubing is installed to direct the flow of hydrocarbons inside the wellbore to the wellhead at surface. Once the production tubing is landed, the well is managed by the Production Operations group. The cumulative duration of the post fracture stimulation operations is two to five weeks with a crew of three to ten people.

The completion process is a 24 hour a day / seven-days a week operation and crews are rotated every 12 hours for continuous operations. Once fracture stimulation operations begin there will be varying activity on location until the well is turned over to permanent production operations.

3.5 PRODUCTION PHASE

The production phase may overlap the completion phase. After the completions fleet has cleared location, the wells are connected to a production facility. Gathering equipment may also be installed on location by a third-party gathering company. The production and gathering facility, may consist of maintenance/oil tank(s), water tank(s), separator(s), LACT(s) units (Lease Automatic Custody Transfer), vapor recovery unit(s) (VRU), emission control device(s) (ECDs), meter(s) house, chemical tote(s), purge flare(s), communications tower, temporary produced water tanks, temporary ECDs and temporary generator. The temporary equipment will be on site for six to 12 months and then will be removed. In addition, pumping units may be installed. The production facility will be connected to the wells by pressure tested flowline buried approximately four feet deep. At this point, the gas and oil purchasers are preparing to connect the gas and oil sales meter loop.

The production facility installation is completed by constructing an earthen or metal berm around the production tank(s) and separator. The enclosed area will have sufficient volume to contain the entire contents of the largest tank plus adequate freeboard to contain a 24-hour 25-year precipitation event. The berms will be inspected at regular intervals and maintained in good condition. When a berm is provided around tanks no potential ignition sources shall be installed inside that area.

The lease operator then begins his monitoring of the wells. Reports consist of tank measurements, gas sales estimates, and pressure reading. This information is compiled monthly and filed with the COGCC.

When a well is completed for production, all disturbed areas no longer needed will be restored and re-vegetated as soon as practicable. All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established. All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions. The segregated soil horizons will contour as near as practicable to achieve erosion control and long-term stability and shall be tilled adequately to establish a proper seedbed. The disturbed area then shall be re-seeded in the first favorable season.

At some point in the well's life, tubing may be run in the well with the possible addition of a plunger lift and/or pumping unit. This will extend the well's producing life and maximize reserves.

3.6 PLUGGING AND ABANDONMENT PHASE

Plugging and abandonment is the cementing of a well and removal of its associated production facility. This also includes the removal of flowlines after all the wells on the pad are plugged and the remediation and reclamation of the well site.

Upon the plugging and abandonment of a well, all cellars will be backfilled. All debris abandoned gathering line risers, and flowline risers, and surface equipment will be removed, and the location will be graded and re-contoured. Within 90 days after a well is plugged and abandoned, the well site shall be cleared of all non-essential equipment, and debris. All access roads to the plugged and abandoned wells and associated production facilities shall be closed, graded and re-contoured in accordance with the COGCC regulations and Surface Use Agreement (if applicable). Culverts and any other obstructions that were part of the access road(s) shall be removed. Well locations, access roads and associated facilities shall be reclaimed. As applicable, compaction alleviation, restoration, and revegetation of well sites and access roads shall be performed. After plugging a well, reclamation work will be completed within three months on crop land, and six months on non-crop land, or with landowner consent reclamation will occur during optimal re-vegetation times of the year.

Successful Final Reclamation of the well sites and access roads will be considered completed when:

1. Reclamation of crop land has been performed and over two growing seasons has indicated no significant un-restored subsidence.
2. Reclamation of non-crop land has been performed and the total cover of live perennial vegetation, excluding noxious weeds, provides sufficient soils erosion control. The total cover of live perennial vegetation of adjacent or nearby undisturbed land, not including overstory or tree canopy cover, having similar soils, slope and aspect of the reclaimed area.
3. Disturbances resulting from flow line installations shall be adequately reclaimed when the disturbed area is reasonably capable of supporting the pre-disturbance land use.
4. A Sundry Notice, Form 4, will be submitted to the COGCC, which describes the final reclamation procedures and any mitigation measures associated with final reclamation

KMOG will evaluate the 39 wells below for potential plug and abandon operations. The 39 wells are associated with 10 locations and if plugged, nearly 37 acres of previously created pads will be reclaimed.

FIRESTONE 20-29D
FIRESTONE V 20-03
FIRESTONE V 20-04D
FIRESTONE V 20-18D
ROCKY MOUNTAIN FUEL 19-4N (currently being plugged and abandoned)
ROCKY MOUNTAIN FUEL V 19-6JI
ROCKY MTN FUEL V 19-5JI
CENTEX 40-25
TOM L RUSSELL UNIT 1
DUNAWAY U 13-10 (currently being plugged and abandoned)
VICTORIA U 01-14JI
DACONO STATE 22-36 (currently being plugged and abandoned)
DACONO STATE 6-36 (currently being plugged and abandoned)
HSR-TEETS 11-20A
TEETS 12-20A
FIRESTONE 12-30
KUGEL 12-18
KUGEL V 18-4
OVERLOOK 21-30

OVERLOOK 2-30
OVERLOOK 27-30
OVERLOOK 28-30
OVERLOOK 8-30
WALSH GAS UNIT 6-24
WALSH U 24-15 JI
HIDDEN CREEK 12-29
HIDDEN CREEK 13-29X
HIDDEN CREEK 14-29
HIDDEN CREEK 19-29
HIDDEN CREEK 22-29
HIDDEN CREEK 25-29
HIDDEN CREEK 35-29
DACONO STATE 17-36
DACONO STATE 24-36
DACONO STATE 39-36
FREDERICK STATE 1-36 (currently being plugged and abandoned)
NEWTON 1
HSR-TEETS 5-29A
FIRESTONE V 20-2 (currently being plugged and abandoned)

4. Graphics

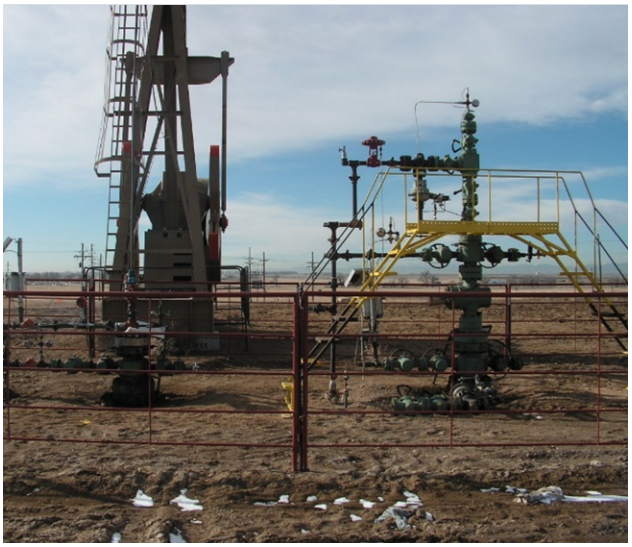
4.1 TYPICAL DRILLING RIG

Temporary, used during the drilling phase.



4.2 TYPICAL WELLHEADS

Permanent equipment for the life of the well.





4.3 TYPICAL SEPARATORS

Permanent equipment, part of the production facility.



Bulk Separators – approximately 11 to 21-foot-tall to top of Pressure Safety Valve (PSV) outlet.



Production Separators - 12 to 15 -foot tall to top of exhaust stack.

4.4 TYPICAL MAINTENANCE – CONDENSATE/OIL AND WATER TANKS

Permanent equipment, part of production facility – approximately ten -foot tall top of tank, 17 -feet tall to top of vent pipes.

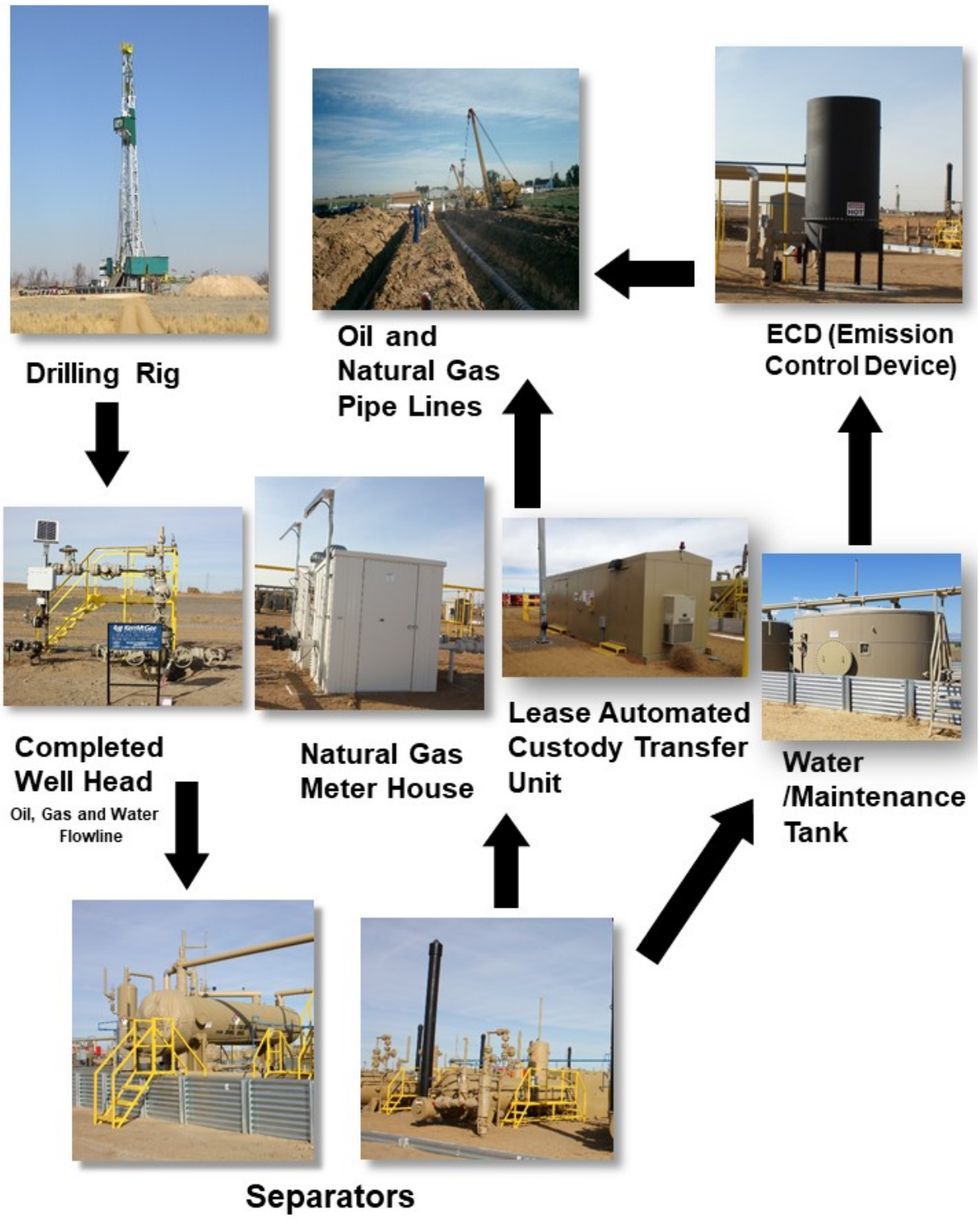


4.5 LACT UNIT - (LEASE AUTOMATED CUSTODY TRANSFER)

Permanent Equipment part of the production facility – nine to ten foot tall.



4.6 TYPICAL FLOW DIAGRAM



Section 3

COGCC Permits

Please see the submitted COGCC permit attached.

FORM 2A Rev 01/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Oil and Gas Location Assessment

Document Number: 402703587

Date Received: 07/12/2021

Location ID:

Expiration Date:

This Oil and Gas Location Assessment is to be submitted to the COGCC for approval prior to any ground disturbance activity associated with oil and gas operations. Approval of this Oil and Gas Location Assessment will allow for the construction of the below specified Location; however, it does not supersede any land use rules applied by the local land use authority. Please see the COGCC website at https://cogcc.state.co.us/ for all accompanying information pertinent this Oil and Gas Location Assessment.

[X] New Location [ ] Refile [ ] Amend Existing Location #

If this Location assessment is a component of an Oil and Gas Development Plan (OGDP) application, enter the OGDP docket number(s).

Docket Number	OGDP ID	OGDP Name
210700114		

If this Location assessment is part of an existing Oil and Gas Development Plan, enter the OGDP ID number(s).

<No existing OGDP number provided>

CONSULTATION

[ ] This location is included in a Comprehensive Area Plan (CAP). CAP ID #

[ ] This Location or its associated new access road, utility, or Pipeline corridor meets Rule 309.e.(2).A, B, or C.

[ ] This Location is within 2,640 feet of a GUDI or Type III Well per Rule 411.b.(4).

[ ] This Location includes a Rule 309.e.(2).E variance request.

[ ] This location includes a Rule 309.f.(1).A.ii. variance request.

Operator

Operator Number: 47120

Name: KERR MCGEE OIL & GAS ONSHORE LP

Address: P O BOX 173779

City: DENVER State: CO Zip: 80217-3779

Contact Information

Name: Shayelyn Marshall

Phone: (720) 929-6907

Fax: ( )

email: shayelyn_marshall@oxy.com

FINANCIAL ASSURANCE

[X] Plugging and Abandonment Bond Surety ID (Rule 706): 20010124

[ ] Gas Facility Surety ID (Rule 711):

[ ] Waste Management Surety ID (Rule 704):

LOCATION IDENTIFICATION

Name: MCGAVIN Number: 6-19HZ

Provide the location description and the latitude and longitude of a single point near the center of the Working Pad Surface as a reference for this Location.

QuarterQuarter: NENW Section: 19 Township: 2N Range: 67W Meridian: 6 Ground Elevation: 4929

Latitude: 40.129275 Longitude: -104.937539

GPS Quality Value: 1.4 Type of GPS Quality Value: PDOP Date of Measurement: 05/04/2021

RELATED REMOTE LOCATIONS

(Enter as many Related Locations as necessary. Enter the Form 2A document # only if there is no established COGCC Location ID#)

This proposed Oil and Gas Location is:	LOCATION ID #	FORM 2A DOC #
☐		

RELEVANT LOCAL GOVERNMENT SITING INFORMATION

County: WELD Municipality: Firestone

Per § 34-60-106 (1)(f)(I)(A), the following questions pertain to the "Relevant Local Government approval of the siting of the proposed oil and gas location."

This proposed Oil and Gas Location is in an area designated as one of State interest and subject to the requirements of § 24-65.1-108, C.R.S. No

Does the Relevant Local Government regulate the siting of Oil and Gas Locations, with respect to this location? Yes

A siting permit application has been submitted to the Relevant Local Government for this proposed Oil and Gas Location: Yes

Date Relevant Local Government permit application submitted: 07/08/2021

Current status or disposition of the Relevant Local Government permit application for this proposed Oil and Gas Location: In Process

Status/disposition date: 07/08/2021

If Relevant Local Government permit has been approved or denied, attach final decision document(s).
Provide the contact information for the Relevant Local Government point of contact for the local permit associated with this proposed Oil and Gas Location:

Contact Name: MARTY OSTHOLTHOFF Contact Phone: 303.531.6275

Contact Email: mostholthoff@firestoneco.gov

PROXIMATE LOCAL GOVERNMENT INFORMATION

For every Proximate Local Government (PLG) associated with this proposed Oil and Gas Location, provide the PLG's point of contact and their contact information.

< No row provided >

FEDERAL PERMIT INFORMATION

A Federal drilling permit (or related siting application) has been submitted for this proposed Oil and Gas Location: No

Date submitted:

Current status or disposition of the Federal drilling permit (or related siting application) for this proposed Oil and Gas Location:

Status/disposition Date:

If Federal agency permit has been approved or denied, attach the final decision document(s).
Provide the contact information of the Federal point of contact for the Federal permit associated with this proposed Oil and Gas Location.

Contact Name: Contact Phone:

Contact Email: Field Office:

Additional explanation of local and/or federal process:

Since 2019, KMOG has worked with the Town of Firestone to negotiate a Cooperative Development Agreement which includes the proposed location. After years of thoughtful planning and significant input from the Town staff, the Board of Trustees approved the Agreement in April of 2021. KMOG submitted the local permit to the town on July 8, 2021.

RELEVANT LOCAL GOVERNMENT OR FEDERAL PRE-APPLICATION CONSULTATION

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Did a pre-application Formal Consultation Process occur with the Relevant Local Government per Rule 301.f.(3)?` No

Date of local government consultation:

Did a pre-application Formal Consultation Process occur with the Federal land manager per Rule 301.f.(3)? No

Date of federal consultation:

Was an ALA that satisfies Rule 304.b.(2).C (or substantially equivalent information per Rule 304.e) developed during a federal or local government permit application process? If yes, attach the ALA to the Form 2A. Yes

ALA APPLICABILITY AND CRITERIA

Complete this section for any pre-application consultation related to this proposed Oil and Gas Location that occurred prior to the submission of this Form 2A. If a pre-application Formal Consultation Process occurred, attach a Consultation Summary.

Does the proposed Oil and Gas Location meet any of the criteria listed in Rule 304.b.(2)B? Yes

If YES, indicate by checking the box for every Rule 304.b.(2).B criterion met by this proposed Location, and attach an ALA. See Rule 304.b.(2).B.i-x for full text of criteria.

- [X] i. WPS < 2,000 feet from RBU/HOBU
- [ ] ii. WPS < 2,000 feet from School/Child Care Center
- [ ] iii. WPS < 1,500 feet from DOAA
- [ ] iv. WPS < 2,000 feet from jurisdictional boundary and PLG objects/requests ALA
- [ ] v. WPS within a Floodplain
- [ ] vi.aa. WPS within a surface water supply area
- [ ] vi.bb. WPS < 2,640 feet from Type III or GUDI well
- [X] vii. WPS within/immediately upgradient of wetland/riparian corridor
- [ ] viii. WPS within HPH and CPW did not waive
- [ ] ix. Operator using Surface bond
- [ ] x. WPS < 2,000 feet from RBU/HOBU/School within a DIC

Is the proposed Oil and Gas Location within the exterior boundaries of the Southern Ute Indian Reservation, and the Tribe objects to the Location or requests an ALA? If YES, attach an ALA to the Form 2A. No

Operator requests the Director waive the ALA requirement per Rule 304.b.(2).A.i: [ ]

Provide an explanation for the waiver request, and attach supporting information (if necessary).

ALTERNATIVE LOCATIONS DASHBOARD

List every alternative location reviewed and included in the ALA. Provide a latitude and longitude for the approximate center of the alternative location, all Rule 304.b.(2).B Criteria met, if a variance would be required to permit the location, and a brief comment on the key points of the alternative location.

304.b.(2).B.i-x Criteria Met:

< No row provided >

SURFACE & MINERAL OWNERSHIP

Surface Owner Info:

Name: Anadarko E&P Onshore LLC Phone: 720-929-6000

Address: Address: 1099 18th St. Fax:

Address: Email:

City: Denver State: CO Zip: 80202

Surface Owner at this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Check only one:

[X] The Operator/Applicant is the surface owner.

[ ] The Operator has a signed Surface Use Agreement for this Location – attach SUA.

[ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the surface owner owns the minerals beneath this Location and is committed to an oil and gas lease – attach lease map or provide lease description.

[ ] All operations on this Oil & Gas Location will develop the minerals beneath the Location, and the Operator intends to use a surface bond per Rule 703 to secure access to this Location – attach lease map or provide lease description.

Surface Owner protection Financial Assurance type: N/A Surety ID Number:

Mineral Owner beneath this Oil and Gas Location: [X] Fee [ ] State [ ] Federal [ ] Indian

Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: Yes

Lease description if necessary:

SITE EQUIPMENT LIST

Indicate the number and type of major equipment components planned for use on this Oil and Gas Location:

Wells	26	Oil Tanks	0	Condensate Tanks	2	Water Tanks	8	Buried Produced Water Vaults	0
Drilling Pits	0	Production Pits	0	Special Purpose Pits	0	Multi-Well Pits	0	Modular Large Volume Tank	1
Pump Jacks	26	Separators	10	Injection Pumps	0	Heater-Treaters	0	Gas Compressors	0
Gas or Diesel Motors	0	Electric Motors	0	Electric Generators	0	Fuel Tanks	0	LACT Unit	2
Dehydrator Units	0	Vapor Recovery Unit	0	VOC Combustor	2	Flare	0	Enclosed Combustion Devices	0
Meter/Sales Building	4	Pigging Station	0			Vapor Recovery Towers	0		

OTHER PERMANENT EQUIPMENT

< No Row Provided >

OTHER TEMPORARY EQUIPMENT

< No Row Provided >

GAS GATHERING COMMITMENT

Operator commits to connecting to a gathering system by the Commencement of Production Operations? Yes

If the answer is NO, a Gas Capture Plan consistent with the requirements of Rule 903.e MUST be attached on the Plans tab.

FLOWLINE DESCRIPTION

Per Rule 304.b.(6), provide a description of all onsite and off-location oil, gas, and/or water flowlines.

Please see Operator Comments Section for flowline description.

CONSTRUCTION

Size of disturbed area during construction in acres: 25.63

Size of location after interim reclamation in acres: 7.08

Estimated post-construction ground elevation: 4930

DRILLING PROGRAM

Will a closed-loop drilling system be used? Yes

Is H2S gas reasonably expected to be encountered during drilling operations at concentrations greater than or equal to 100 ppm? No If YES, attach H2S Drilling Operations Plan.

Will salt sections be encountered during drilling: No

Will salt based (>15,000 ppm Cl) drilling fluids be used? No

Will oil based drilling fluids be used? Yes

DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

Please see attached Waste Managment Plan.

Beneficial reuse or land application plan submitted? Yes

Reuse Facility ID: _____ or Document Number: _____

Centralized E&P Waste Management Facility ID, if applicable: 149021

CURRENT LAND USE

Current Land Use: check all that apply per Rule 304.b.(9).

Crop Land: [X] Irrigated [ ] Non-Irrigated [ ] Conservation Resource Program (CRP)

Non-Crop Land: [ ] Rangeland [ ] Forestry [ ] Recreation [ ] Other

Subdivided: [ ] Industrial [ ] Commercial [ ] Residential

Describe the current land use:

The current land use is agriculture, more specifically irregated cropland. There are no plans to subdivide the property or add any other types of land use at this time.

Describe the Relevant Local Government's land use or zoning designation:

Current zoning designation is a Planned Unit Development.

Describe any applicable Federal land use designation:

N/A

FINAL LAND USE

Final Land Use: check all that apply per Rule 304.b.(9).

Crop Land: [X] Irrigated [ ] Non-Irrigated [ ] Conservation Resource Program (CRP)

Non-Crop Land: [ ] Rangeland [ ] Forestry [ ] Recreation [ ] Other

Subdivided: [ ] Industrial [ ] Commercial [ ] Residential

REFERENCE AREA INFORMATION

If Final Land Use includes Non-Crop Land (as checked above), the following information is required:
Describe landowner's designated final land use(s):

Reference Area Latitude: Reference Area Latitude:

Provide a list of plant communities and dominant vegetation found in the Reference Area.

< No row provided >

Noxious weeds present:

SOILS

List all soil map units that occur within the maximum extent of the proposed Oil and Gas Location. Attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" listing the typical vertical soil profile(s). This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS website at https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/ or from the COGCC website GIS Online map page. Instructions are provided within the COGCC website help section.

NRCS Map Unit Name: 47- Olney fine sandy loam 1-3% slopes

NRCS Map Unit Name: 72- Vona loamy sand 0-3% slopes

NRCS Map Unit Name: 4- Aquolls and Aquepts, flooded

GROUNDWATER AND WATER WELL INFORMATION

Provide the distance and direction, as measured from the Working Pad Surface, to the nearest:

water well: 584 Feet SW

Spring or Seep: 5280 Feet W

Estimated depth to shallowest groundwater that can be encountered at this Oil and Gas Location: 7 Feet

Basis for estimated depth to and description of shallowest groundwater occurrence:

584' SW, Permit 7-WBC, depth 42', Static Water Level unknown, Elev 4923'
Loc Elev 4929'
SWL based off of shallowest groundwater encountered with monitoring well beneath the proposed working pad surface (see attached grading plan for reference).

SURFACE WATER AND WETLANDS

Provide the distance and direction to the nearest downgradient surface Waters of the State, as defined 157 Feet NW

in the 100-Series Rules, measured from the Working Pad Surface:

If less than 2,640 feet, is the Waters of the State identified above within 15 stream miles upstream of a Public Water System intake? No

Provide the distance and direction to the nearest downgradient wetland, measured from the Working Pad Surface: 157 Feet NW

Provide a description of the nearest downgradient surface Waters of the State:

Following a wetland delineation performed in 2020, the nearest wetland was identified 157' NW of the Project Area. This freshwater emergent wetland was not mapped on the National Wetland Inventory (NWI). This wetland is assumed to have connectivity to an unnamed ditch 420' west of the Project Area, as mapped on the National Hydrology Dataset (NHD). This wetland is dominated by Baltic rush (Juncus balticus), creeping spike rush (Eleocharis palustris), and salt grass (Distichlis spicata).

If the proposed Oil and Gas Location is within a Rule 411.a Surface Water Supply Area buffer zone, select the buffer

zone type: _____

If the proposed Oil and Gas Location is within a Rule 411.b GUDI/Type III buffer zone, select the buffer zone type: _____

Is a U.S. Army Corps of Engineers Section 404 permit required for the proposed Oil and Gas Location, access road, or associated pipeline corridor? No

If a U.S. Army Corps of Engineers Section 404 permit is required, provide the permit status, and permit number if available:

Is the Location within a Floodplain? No Floodplain Data Sources Reviewed (check all that apply):

[X] Federal (FEMA) [ ] State [X] County [ ] Local

[ ] Other

Does this proposed Oil and Gas Location lie within a Sensitive Area for water resources, as defined in the 100-Series Rules? Yes

CONSULTATION, WAIVERS, AND EXCEPTIONS

When Rule 309.e.(2) Consultation must occur, check all that apply:

- [ ] This location is included in a Wildlife Mitigation Plan
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within federally designated critical habitat or an area with a known occurrence for a federal or Colorado threatened or endangered species. Provide description in Comments section of Submit tab.
- [ ] This Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within an existing conservation easement established wholly or partly for wildlife habitat. Provide description in Comments section of Submit tab.

When Rule 309.e.(3) Consultation is not required, check all that apply:

- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Protection Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable Wildlife Mitigation Plan.
- [ ] This Oil and Gas Location has been included in a previously approved, applicable conservation plan.

Pre-application Consultation:

- [ ] A pre-application consultation with CPW, regarding this Oil and Gas Location, occurred on: _____

CPW Waivers and Exceptions (check all that apply and attach all CPW waivers to this Form 2A):

- [ ] The applicant has obtained a Rule 304.b.(2).B.viii CPW waiver for the requirement to complete an ALA.
- [ ] The applicant has obtained a Rule 309.e.(2).G CPW waiver and consultation is not required.
- [ ] The applicant has obtained a Rule 309.e.(5).D.i CPW waiver and is requesting an exception from Rule 1202.c.(1).R.
- [ ] The applicant has obtained a Rule 309.e.(5).D.ii CPW waiver and is requesting an exception from Rule 1202.c.(1).S.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iii CPW waiver of Rule 1202.c.(1).T.
- [ ] The applicant has obtained a Rule 309.e.(5).D.iv CPW waiver and is requesting an exception from Rule 1202.c.(1) in accordance with an approved CAP.
- [ ] The applicant has obtained a Rule 1202.a CPW waiver.
- [ ] The applicant has obtained a Rule 1202.b CPW waiver.

☐ In accordance with Rule 1203.a.(3), the applicant requests an exception from compensatory mitigation

Rule(s): _____

HIGH PRIORITY HABITAT AND COMPENSATORY MITIGATION

This Oil and Gas Location, associated access roads, utility, or Pipeline corridor falls wholly or partially within the following High Priority Habitats (Note: dropdown options are abbreviated - see Rule 1202 for full rule text):

< No row provided >

The following questions are for Oil and Gas Locations that cause the density to exceed one Oil and Gas Location per square mile in Rule 1202.d High Priority Habitat:

Direct Impacts:

Is Compensatory Mitigation required per Rule 1203.a for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address direct impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Direct impact habitat mitigation fee amount: $ _____

Indirect Impacts:

Is Compensatory Mitigation required per Rule 1203.d for this Oil and Gas Location? No

Is a Compensatory Mitigation Plan proposed to address indirect impacts for this Oil and Gas Location? No

Have all Compensatory Mitigation Plans been approved for this Location? No

If not, what is the current status of each Plan?

Not applicable.

Is a Compensatory Mitigation Fee proposed for this Oil and Gas Location? No

Indirect impact habitat mitigation fee amount: $ _____

Operator Proposed Wildlife BMPs

No BMP

CPW Proposed Wildlife BMPs

No BMP

AIR QUALITY MONITORING PROGRAM

Will the Operator install and administer an air quality monitoring program at this Location? Yes

Operator Proposed BMPs

No BMP

CDPHE Proposed COAs OR BMPs

No BMP

PLANS

Total Plans Uploaded: 0

- [ ] (1) Emergency Spill Response Program consistent with the requirements of Rules 411.a.(4).B, 411.b.(5).B, & 602.j
- [ ] (2) Noise Mitigation Plan consistent with the requirements of Rule 423.a
- [ ] (3) Light Mitigation Plan consistent with the requirements of Rule 424.a
- [ ] (4) Odor Mitigation Plan consistent with the requirements of Rule 426.a
- [ ] (5) Dust Mitigation Plan consistent with the requirements of Rule 427.a
- [ ] (6) Transportation Plan
- [ ] (7) Operations Safety Management Program consistent with the requirements of Rule 602.d
- [ ] (8) Emergency Response Plan consistent with the requirements of Rule 602.j
- [ ] (9) Flood Shut-In Plan consistent with the requirements of Rule 421.b.(1)
- [ ] (10) Hydrogen Sulfide Drilling Operations Plan consistent with the requirements of Rule 612.d
- [ ] (11) Waste Management Plan consistent with the requirements of Rule 905.a.(4)
- [ ] (12) Gas Capture Plan consistent with the requirements of Rule 903.e
- [ ] (13) Fluid Leak Detection Plan
- [ ] (14) Topsoil Protection Plan consistent with the requirements of Rule 1002.c
- [ ] (15) Stormwater Management Plan consistent with the requirements of Rule 1002.f
- [ ] (16) Interim Reclamation Plan consistent with the requirements of Rule 1003
- [ ] (17) Wildlife Plan consistent with the requirements of Rule 1201
- [ ] (18) Water Plan
- [ ] (19) Cumulative Impacts Plan
- [ ] (20) Community Outreach Plan
- [ ] (21) Geologic Hazard Plan

VARIANCE REQUESTS

Check all that apply:

- [ ] This proposed Oil and Gas Location requires the approval of a Rule 502.a variance from COGCC Rule or Commission Order number: _____

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

RULE 304.d LESSER IMPACT AREA EXEMPTION REQUESTS

Check the boxes below for all Exemptions being requested. Lesser Impact Area Exemption Request must be attached, and will include all requested exemptions.

- ☐ 304.b.(1). Local Government Siting Information
- ☐ 304.b.(2). Alternative Location Analysis
- ☐ 304.b.(3). Cultural Distances
- ☐ 304.b.(4). Location Pictures
- ☐ 304.b.(5). Site Equipment List
- ☐ 304.b.(6). Flowline Descriptions
- ☐ 304.b.(7). Drawings
- ☐ 304.b.(8). Geographic Information System (GIS) Data
- ☐ 304.b.(9). Land Use Description
- ☐ 304.b.(10). NRCS Map Unit Description
- ☐ 304.b.(11). Best Management Practices
- ☐ 304.b.(12). Surface Owner Information
- ☐ 304.b.(13). Proximate Local Government
- ☐ 304.b.(14). Wetlands
- ☐ 304.b.(15). Schools and Child Care Centers
- ☐ 304.c.(1). Emergency Spill Response Program
- ☐ 304.c.(2). Noise Mitigation Plan
- ☐ 304.c.(3). Light Mitigation Plan
- ☐ 304.c.(4). Odor Mitigation Plan
- ☐ 304.c.(5). Dust Mitigation Plan
- ☐ 304.c.(6). Transportation Plan
- ☐ 304.c.(7). Operations Safety Management Program
- ☐ 304.c.(8). Emergency Response Plan
- ☐ 304.c.(9). Flood Shut-In Plan
- ☐ 304.c.(10). Hydrogen Sulfide Drilling Operations Plan
- ☐ 304.c.(11). Waste Management Plan
- ☐ 304.c.(12). Gas Capture Plan
- ☐ 304.c.(13). Fluid Leak Detection Plan
- ☐ 304.c.(14). Topsoil Protection Plan
- ☐ 304.c.(15). Stormwater Management Plan
- ☐ 304.c.(16). Interim Reclamation Plan
- ☐ 304.c.(17). Wildlife Plan
- ☐ 304.c.(18). Water Plan
- ☐ 304.c.(19). Cumulative Impacts Plan
- ☐ 304.c.(20). Community Outreach Plan
- ☐ 304.c.(21). Geologic Hazard Plan

OPERATOR COMMENTS AND SUBMITTAL

Comments

The Town of Firestone approved a Cooperative Development Agreement for this location in April of2021. Please see the approved agreement attached as Other. Upon entrance of the Cooperative Development Agreement and prior to filing this Application, KMOG presented an alternative location analysis to the Director pursuant to Rule 301.f.(4) and engaged in a Formal Consultation Process with the Director and the Town of Firestone.

Please ensure that all correspondence associated with this permit goes to the analyst and DJ Regulatory email addresses, as listed on this permit.

The alternative locations for the proposed McGavin pad are listed as #1-#4 in the ALA narrative, maps and template.

This location is not proposed within 2,000 feet of a Residential Building Unit, High Occupancy Building Unit, or School Facility located within a Disproportionately Impacted Community, a Rule 304.c.(20) Community Outreach Plan is not required. KMOG's “Community Consultation Plan” attached as Other is intended to provide supplemental information regarding efforts on community outreach and communication.

KMOG is proposing one 50,000bbl MVLT for this location - 12’ tall with 176’ diameter. The proposed manufacturer and vendor are Fab Tech and Well Water Solutions. The MLVT is approximately811' from the nearest RBU and is a temporary piece of equipment (on location for approximately 3 months). Please see additional mitigation measures in the BMP section.

The attached ERP was submitted to the Frederick/Firestone Fire Protection District on 7/6/2021. KMOG has a meeting with the staff on 7/15/2021. An approved copy will be sent to the COGCC OGLA staff.

KMOG`s general Air Monitoring Plan has been approved by the CDPHE and is attached to the 2B. A site-specific Air Monitoring Plan for this location will be submitted to the COGCC and CDPHE for approval of air monitor locations prior to operations.

Temporary above ground polyethylene water pipelines (diameter 10" - 12" with a 60 BPM capacity) will deliver water to location operations from larger trunk lines for completions operations.
Flowlines: 26 flow lines will flow to the production facility location. During production, flow direction in the flow lines is from the wellhead to the production facility. The size of flow lines is typically 2". Flow lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the production facility.

Custody Transfer: Gas custody transfer occurs at the custody transfer meter located on the proposed production facility location. Oil custody transfer occurs at the LACT Unit located on the proposed production facility location.
Two 500 barrel skid-mounted tanks will be temporarily placed onsite for use of the pre-spud rig only. One tank will store water and the other will store water-based mud. A temporary ECD may be utilized during drilling.

Gas Lift Lines: Gas lift lines are also occasionally installed (one per well) from the well head to the production facility. During operation flow direction in the gas lift lines will be from the production facility to the well head. The size of the gas lift lines is typically 2". Gas lift lines will be constructed from steel pipe, buried, and will equal the distance between the well heads and the tank battery.

44 temporary 500 barrel skid-mounted frac tanks will be utilized during flowback and initially for produced water. It is estimated 13 temporary ECDs and the temporary tanks will be on location for 9 - 12 months and will be removed as water production declines. A temporary generator may be placed on location if needed and would be in place until electric power is available. Temporary purge flares may be placed on location for up to 60 days. A temporary 250-gallon propane tank will be used on location to provide fuel gas during facility equipment startup.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.
Signed: _____ Date: 07/12/2021 Email: DJRegulatory@oxy.com

Print Name: Shayelyn Marshall Title: Regulatory Analyst

Based on the information provided herein, this Oil and Gas Location Assessment complies with COGCC Rules, applicable orders, and SB 19-181 and is hereby approved.

COGCC Approved: _____ **Director of COGCC** Date: _____

Conditions Of Approval

All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.

COA Type	Description

Best Management Practices

No	BMP/COA Type	Description
1	Planning	Access Road: KMOG will utilize an existing access road from CR 20 for drilling, completions, and production operations, including maintenance equipment. The road will be properly constructed and maintained to accommodate for emergency vehicle access.
2	Planning	• The MLVT will be in compliance with the following COGCC safety setbacks. 1) Seventy-five (75) feet from a wellhead, fired vessel, heater-treater, or a compressor with a rating of 200 horsepower or more; 2) Fifty (50) feet from a separator, well test unit, or other non-fired equipment. • Signs shall be posted on each MLVT to indicate that the contents are fresh water and that no E&P waste fluids are allowed. Location and additional signage shall conform to Rule 210. • MLVTs will be operated with a minimum of1 foot freeboard at all times. • Access to the tanks shall be limited to operational personnel. • Construction and installation of the tank structure, liner and sub-grade shall meet or exceed the manufacturer specifications. KMOG follows manufacturers Standard Operating Procedures (SOPs) and will provide these SOPs upon request to the COGCC. • KMOG will conduct daily, visual inspections of the exterior wall and general area for any integrity deficiencies before, during, and after filling the MLVTs. If deficiencies are noted, KMOG will repair them as soon as practicable. Records of repairs will be maintained per Rule 205. • KMOG will follow pre-construction risk assessment measures to address safety concerns, and minimize environmental impacts and property damage in the unlikely event of a MLVT release. • In the event of a catastrophic MLVT failure, KMOG shall notify the COGCC as soon as practicable but not more than 24 hours after discovery, submit a Form 22- Accident Report within 10 days after discovery, conduct a root cause analysis´ and provide same to COGCC on a Form 4-Sundry Notice within 30 days of the failure. • All MLVT liner seams shall be welded and tested in accordance with applicable ASTM international standards. Any repairs to liners shall be made using acceptable practices and applicable standards. • The MLVT shall be constructed and operated in accordance with a design package certified and sealed by a Licensed Professional Engineer either in Colorado or the state where the MLVT was designed or manufactured. • KMOG hereby certifies to the Director that the MLVT at this location will be designed and implemented consistent with the Colorado Oil and Gas Conservation Commission policy dated June 13, 2014.
3	Planning	MLVT Noise/Light: KMOG will install portable sound panels around the MLVT pumping operation to minimize noise and light.
4	Planning	Dust: KMOG will proactively deploy fresh water to suppress dust along access road to well pad, facility and MLVT during all phases of pre-production operations. Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach location.
5	Community Outreach and Notification	KMOG held Surface Impact Planning (SIP) meetings for this location. These meetings are attended by KMOG internal teams. This is a multi-disciplinary team including construction, operations, facilities, EHS, stakeholder relations, regulatory, surface land and mitigation. The team reviews potential impacts to the surrounding residents, identify and plan for necessary mitigations, and identify BMPs that should be included in the pad development moving forward. The team reviews noise, odor, lights, traffic, haul routes, rig orientation and visual mitigation and any input we have receivedfrom surrounding communities either from response line calls or community meetings, relative to our operations. The purpose of the meeting is to proactively identify potential concerns, exhaust possible options and provide best in class solutions in order to have compatible operations.
6	Traffic control	KMOG currently plans to use the water-on-demand system on this location which is a network of over 180 miles of underground pipelines that stretches the length of the 20 -mile by 30-mile field to source and transport water to completions crews. This systemeliminates more than 2,000 truck trips per day, also reducing associated concerns oftraffic, noise, emissions and dust.

7	Traffic control	The operator will obtain access and ROW permits from Firestone and will implement traffic control plans prior to the commencement of operations.
8	General Housekeeping	Loadlines: All loadlines shall be bullplugged or capped.
9	General Housekeeping	Removal of Surface Trash: A commercial size trash bin for removing debris will be located on site. This bin will be for use by all parties affiliated with the operation. Uponcompletion of operations, the commercial trash bin will be removed from the locationand disposed of in an appropriate manner.
10	Material Handling and Spill Prevention	Pit Level Indicators: All storage tanks used for active drilling operations (used in lieu of pits) contain pit level monitors with Electronic Drilling Recorders (EDR). KMG uses EDRs with pit level monitor(s) and alarm(s) for production rigs. Basic level gauges are used on tanks utilized for the surface rig.
11	Construction	Fencing Requirements: The completed wellsites will be surrounded with a fence and gate with adequate lock to restrict access to authorized personnel only. KMOG personnel will monitor the wellsites upon completion of the wells. Authorized representatives and/or KMOG personnel shall be on-site during drilling and completionoperations.
12	Emissions mitigation	All twenty six of the wells are commingled into a bulk and test design. This reduces the total number of separators on location on a per well basis which in turn allows to have a smaller facility footprint. Reducing the total number of separators per well also reduces the total noise and emissions from the separator burners.
13	Emissions mitigation	Temporary ECD(s) will be utilized to mitigate releases of emissions from temporary produced water storage tanks for the duration which the tanks are on location and being used.
14	Drilling/Completion Operations	Green Completions: Test separators and associated flow lines, sand traps and emission control systems shall be installed on-site to accommodate green completions techniques. When commercial quantities of salable quality gas are achieved at each well, the gas shall be immediately directed to a sales line or shut in and conserved. If a sales line is unavailable or other conditions prevent placing the gas into a sales line, KMG shall not produce the wells without an approved variance.
15	Drilling/Completion Operations	KMOG`s Integrated Operations Center is staffed 24-hours per day, seven days per week, 365 days per year providing real-time remote monitoring capabilities for all of KMOG`s wells. Employees in the Integrated Operations Center are able to shut in wells remotely and dispatch personnel to a location within 5-15 minutes.
16	Drilling/Completion Operations	Guy line anchors will not be used. Base Beams will be used to stabilize the rig and removed after drilling.
17	Final Reclamation	Well Site Cleared: The wellsite will be cleared of all non-essential equipment within ninety (90) days after all wells associated with the pad have been plugged and abandoned.
18	Final Reclamation	Identification of Plugged and Abandoned Wells: Once the well has been plugged and abandoned, KMOG will identify the location of the wellbore with a permanent monument that will detail the well name and date of plugging.

Total: 18 comment(s)

Attachment List

Att Doc Num	Name
402703587	FORM 2A SUBMITTED
402733369	OTHER
402739056	ACCESS ROAD MAP
402739060	LOCATION PICTURES
402739065	LOCATION DRAWING
402740183	LOCATION AND WORKING PAD GIS SHP
402743487	OTHER
402798998	ALA DATASHEET
402799009	ALA NARRATIVE SUMMARY
402799012	CULTURAL FEATURES MAP
402799015	DIRECTIONAL WELL PLAT
402799027	GEOLOGIC HAZARD MAP
402799042	HYDROLOGY MAP
402799056	LAYOUT DRAWING
402799058	NRCS MAP UNIT DESC
402799062	PRELIMINARY PROCESS FLOW DIAGRAMS
402799069	RELATED LOCATION AND FLOWLINE MAP
402799081	WILDLIFE HABITAT DRAWING
402828392	OTHER

Total Attach: 19 Files

General Comments

User Group	Comment	Comment Date
OGLA	The following changes were made with Operator concurrence: - updated distance to nearest High Occupancy Building Unit (HOBU) and Child Care Center revised to "2662' N"	10/01/2021
OGLA	The Director has determined this OGDP application is complete. Form pushed to IN PROCESS.	10/01/2021
OGLA	Attachments, Plans, and NRCS map units, and Submit tab comment updated.	10/01/2021
OGLA	The following changes were made with Operator concurrence: - added Firestone meeting attachment as OTHER	09/09/2021
OGLA	Returned to draft for: - missing access road soil units; correct air monitoring plan Submit tab comment - attachment and Plan corrections	08/11/2021

Total: 5 comment(s)

Public Comments

No public comments were received on this application during the comment period.

Section 4

Emergency Response Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

DocuSign Envelope ID: CDAFF138-FADF-4C16-8C69-C4B24B5F4FD4

Location: Near Colorado Boulevard and Pine Cone Avenue
Address: 6240 Pine Cone Avenue

EMERGENCY RESPONSE PLAN

Revised October 2021



1099 18th Street, Suite 1800

Denver, Colorado 80202

McGavin 6-19HZ Pad

Section 19, T2N – R67W

Firestone, Colorado

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LOCAL RESPONDING AGENCIES

Name	Emergency	Office Number
Frederick Firestone Fire Protection District	911	303-833-2742
Firestone Police Department	911	303-833-0811
Colorado State Patrol	911	970-506-4999

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SIGNATURES

Kerr McGee Oil & Gas Onshore, LP			
Name	Signature	Title	Date
Brent Naherny	DocuSigned by: Brent Naherny D81BF2E6EAE74CF...	Director of Operations	10/15/2021
Frederick-Firestone Fire Protection District			
Name	Signature	Title	Date
Steve Iacino		Assistant Chief of Planning	

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LEGAL DISCLAIMER

This plan serves as an overall guidance document and is based on the best information available at the time of its submission. Actual conditions can and will evolve and possibly change between the submission of this plan for permitting purposes and actual operations, which may not occur for several months or even years. As necessary, and in consultation with state and local agencies, this plan can and will be updated to reflect current conditions. In particular, there could be modifications to equipment, layout, and chemicals located on site to reflect current or updated practices and advances in technology. In most cases, these changes will not be material and will not impact public health, safety, welfare, the environment, or wildlife resources. KMOG understands that accurate information is necessary in any emergency situation and if any change is significant or has the potential to impact public health, safety, welfare, the environment, or wildlife resources, the plan will be updated as appropriate.

LOCATION INFORMATION

DIRECTIONS TO OIL & GAS LOCATION

From the intersection of HWY 52 and Colorado BLVD travel north approximately three miles to Pine Cove Avenue. Turn right and travel approximately 0.21 miles. Turn right (south) on the lease access road and proceed to the well pad and production facility.

INGRESS AND EGRESS INFORMATION

Ingress and egress to and from the location will be via the lease access road.

LEGAL DESCRIPTION OF LOCATION

API NUMBER: Pending COGCC Permit Approval

LEGAL DESCRIPTION: NW/4 of Section 19, Township 2 North, Range 67 West, 6th P.M.

ADDRESS: 6240 Pine Cone Avenue

GPS COORDINATES FOR WELL PAD (NAD 83): LAT: 40.129275°, LONG: -104.937539°

GPS COORDINATES FOR ACCESS ROAD (NAD 83): LAT: 40.131307°, LONG: -104.937875°

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EMERGENCY CONTACT NUMBERS

NAME	OFFICE PHONE		EMERGENCY
Kerr McGee Integrated Operations Center IOC	970- 515-1500		970-515-1500
KMOG EMERGENCY MANAGEMENT TEAM	MOBILE PHONE	Function	LOCATION
Moe Felman	303-585-1309	Incident Command	Denver, CO
Brent Naherny	720-284-1112	Incident Command	Denver, CO
Travis Forducey	303-709-4034	Safety Officer	Platteville, CO
Lynna Scranton	303-906-1711	Safety Officer	Denver, CO
Gregory Hamilton	970-590-6256	Environmental Unit Leader	Platteville, CO
Phil Hamlin	707-478-8029	Environmental Unit Leader	Platteville, CO
FIRE OR EXPLOSION OR WELL CONTROL LOSS	EMERGENCY	OFFICE PHONE	STAFFING
Frederick Firestone Fire Protection District	911	303-833-2742	Full Time
Wild Well Control		281-784-4700	Full Time
Carbon Valley Emergency Management Agency		303-319-1008	Full Time
SPILL RESPONSE ORGANIZATIONS	EMERGENCY	OFFICE PHONE	STAFFING
EnviroServe	720-450-1316	800-488-0910	Full Time
EHS –Environmental HAZMAT Services	303-525-3111	720-225-9252	Full Time
Wild Well Control	281-784-4700	281-784-4700	Full Time
Cudd Pressure Control	800-990-2833	303-260-6422	Full Time
REGULATORY CONTACTS	EMERGENCY	OFFICE PHONE	STAFFING
COGCC		303-894-2100	Full Time
CDPHE		877-518-5608	Full Time
Colorado Parks & Wildlife (CPW)		303-291-7227	Full Time
National Response Center		800-424-8802	Full Time
MEDICAL FACILITIES	EMERGENCY	OFFICE PHONE	STAFFING
UCHealth Urgent Care Firestone		720-652-7055	Full Time
North Colorado Medical Center	911	970-810-4121	Full Time
UCHealth Longs Peak Hospital	911	720-718-7000	Full Time
GOVERNMENT AGENCIES	EMERGENCY	OFFICE PHONE	STAFFING
Firestone Police Department	911	303-833-0811	Full Time
Colorado Oil and Gas Conservation Commission (COGCC)		303-894-2100	Full Time

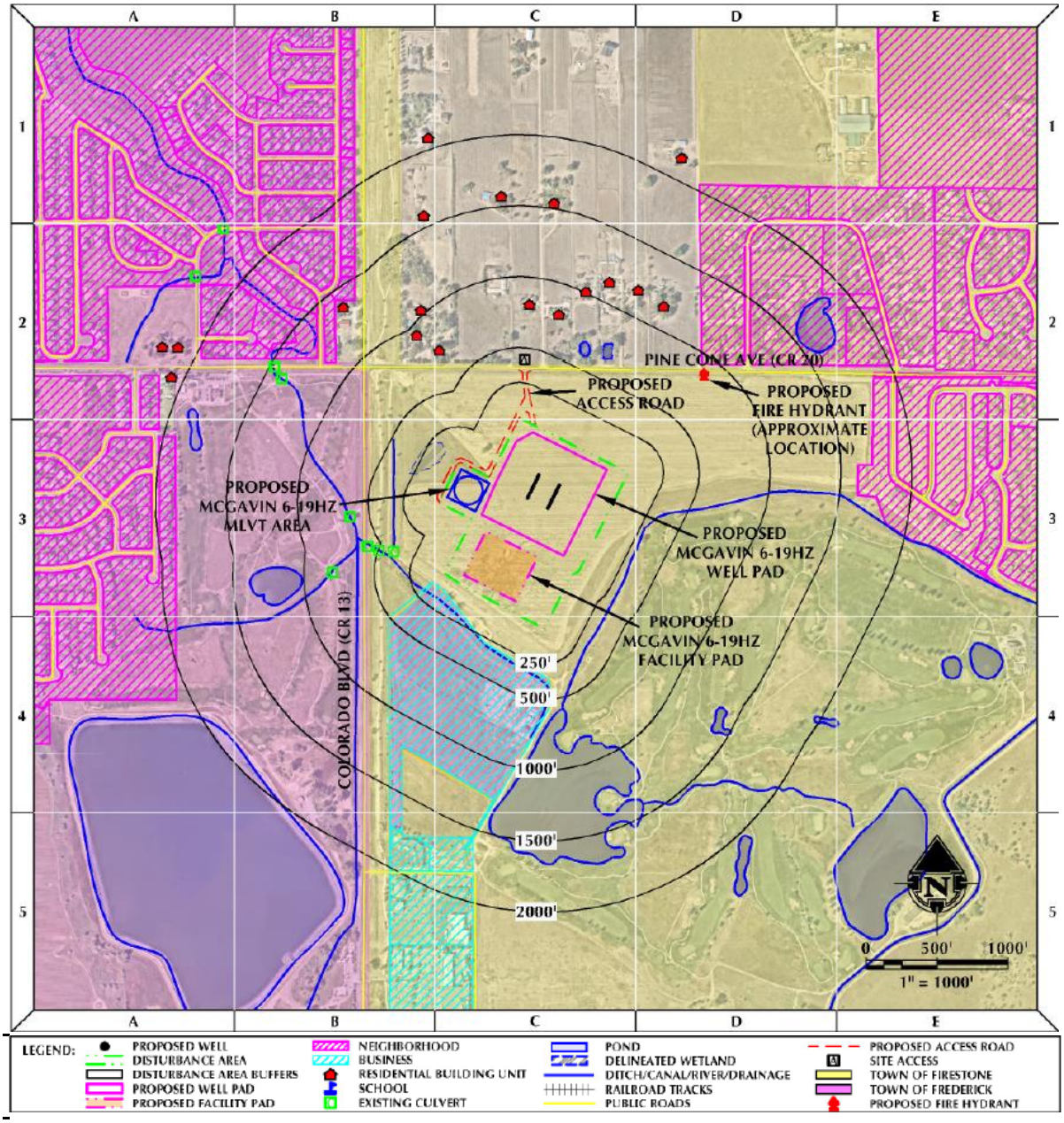
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Colorado Dept. of Health and Environment (CDPHE)		877-518-5608	Full Time
Marty Ostholthoff - Firestone Planning Manager and Local Govt. Designee (LGD		303-531-6275	Full Time
RAILROAD EMERGENCY RESPONSE	EMERGENCY	OFFICE PHONE	STAFFING
BNSF	800-832-5452		Full Time
Great Western Railway	800-533-9416	303-398-4500	Full Time
Union Pacific Railroad	888-877-7267		Full Time

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SITE DESCRIPTION & LAYOUT

The McGavin 6-19HZ well pad and facility are surrounded by agriculture and residential acreage. There will be 26 horizontal wells on the well pad with up to 44 temporary produced water tanks and 2 condensate tanks.



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KEY LOCATION INFORMATION

In the event of an incident it is important to understand what equipment is on location, what types of chemicals are present and where they are stored and where one can quickly access safety equipment.
Depending on the operations taking place on location, the equipment, chemicals and safety equipment on location will vary. The sections below will show the anticipated quantities and locations during each major phase of the ODGP location. Safety Data Sheets (SDSs) will be available from the Company Representative present or the contractor performing work on location. KMOG does not maintain any response equipment beyond the insipient stage. All response equipment is intended for incidental release mitigation only.

An incidental release is considered to be a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee tasked with mitigating the released product, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up.

Incidental Situations include, but are not limited to, the following examples:

- No significant safety or health hazard to workers in immediate area
- Limited in quantity, exposure potential, toxicity, etc.
- Release that can be absorbed, neutralized or otherwise controlled immediately by onsite workers

All personnel responding to an incident will satisfy the applicable Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements of 29 CFR 1910.120. Additional information may be found in Annex 1 HAZWOPER Program and Training Guidance of the Emergency Preparedness and Response Plan.

CONSTRUCTION PHASE

EQUIPMENT

During construction operations the following fuel powered equipment is anticipated to be on location.

INITIAL PAD BUILD	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Cat 815 Compactor	1	132	132
Belly dump semi	15	240	3600
Mini Excavator	1	12	12
Skid Steer	1	27	27
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	4	130	520
Total			**5217**
CONDUCTOR SETTING OPERATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Conductor Rig	1	80	80
Cement truck	1	120	120
Low Boy Semi	1	120	120
Pump	1	20	20
Skid	1	27	27
Pickup w/ 100 Gallon Transfer Tank	2	130	260
Total			**627**

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MITIGATION INSTALL AND REMOVAL	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Man-lift	1	26	26
8-10k All terrain forklift	1	26	26
Skid Steer	1	27	27
Truck mounted crane	1	120	120
Excavator/vibe hammer or conductor rig	1	80	80
Flatbed semi	2	120	240
Pickup w/ 100 Gallon Transfer Tank	1	130	130
Total			**649**
INTERIM RECLAMATION	QTY	FUEL VOLUME (GAL)	TOTAL (GAL)
Cat 140 Motor Grader	1	104	104
Cat 627 Scraper	2	336	672
Belly dump semi	15	240	3600
Hydrovac	1	150	150
Pickup w/ 100 Gallon Transfer Tank	3	130	390
Total			**4916**

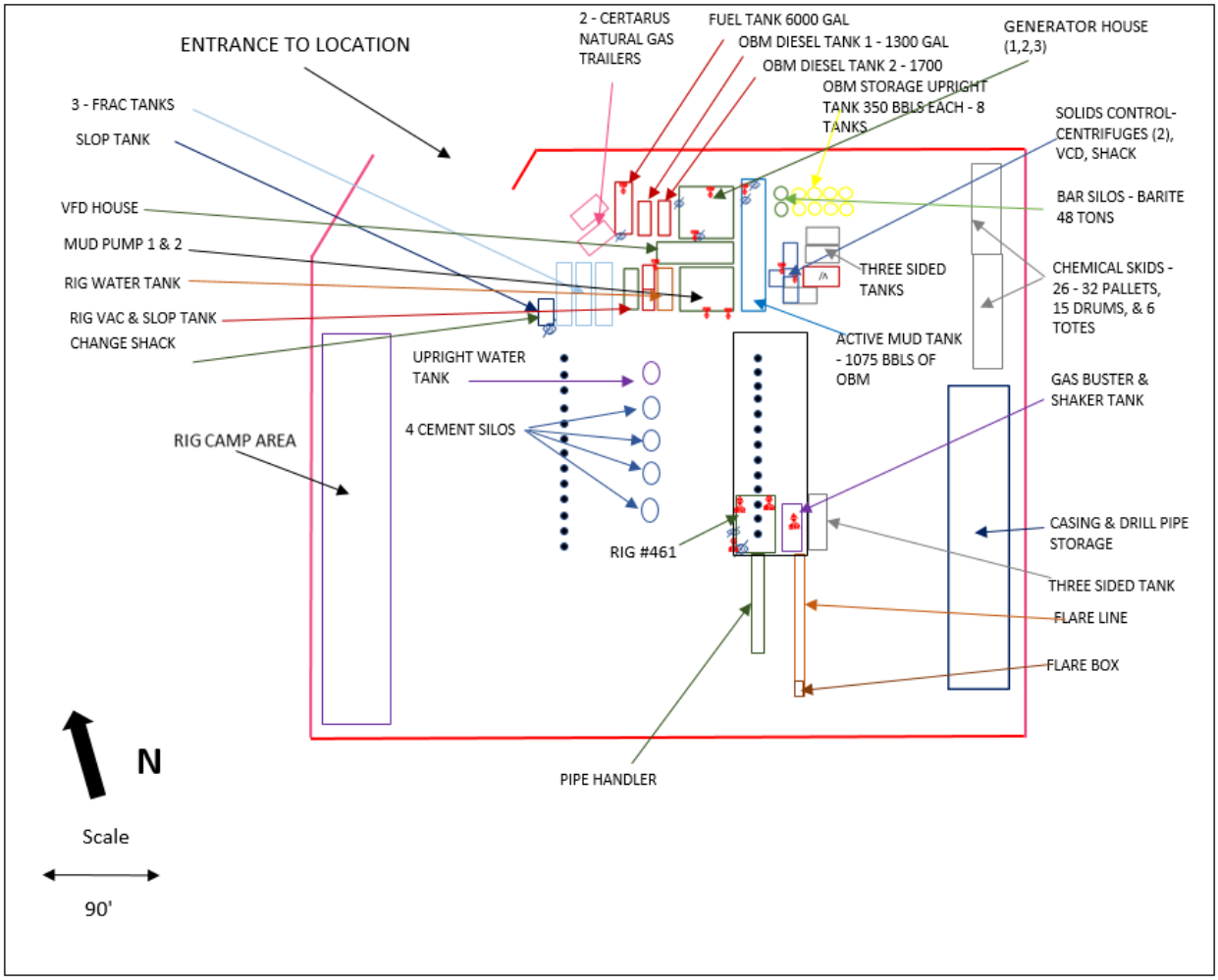
SAFETY EQUIPMENT

During construction operations each piece of construction equipment, heavy duty truck and light duty pickups are all equipped with a dedicated fire extinguisher and spill response kit. There will not be any safety equipment stored on location during these operations.

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DRILLING PHASE:

TYPICAL DRILLING LAYOUT



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EQUIPMENT LIST				
COLOR CODE	EQUIPMENT	DIMENSIONS	# OF UNITS	ADDITIONAL COMMENTS
	RIG		1	
	PIPE HANDLER		1	
	MUD PUMP #1		1	
	MUD PUMP #2		1	
	VFD HOUSE		1	
	GENERATOR HOUSE		1	
	BOILER TANK		1	
	ACTIVE MUD TANKS	12.6' x 45'	3	1075 bbls of OBM
	SHAKER TANK	12.6' x 30'	1	326 bbls of OBM
	FUEL TANK	8' x 40'	1	6000 GAL
	OBM DIESEL TANK 1	8' x 20'	1	1300 GAL
	OBM DIESEL TANK 2	8' x 25'	1	1700 GAL
	CERTARUS NAT GAS TRAILER	8.6' x 40'	2	380 MCF
	RIG WATER TANK	12' x 45'	1	400 bbls Fresh Water
	FRAC TANKS	12' x 45'	3	500 bbls each
	SLOP TANK	8' x 12'	1	200 bbls
	THREE SIDED TANK	10' x 36'	4	150 yards of cuttings
	UPRIGHT WATER TANK	12' x 11.5'	1	350 bbls for Cement job
	CEMENT SILOS	7.8' x 7.5'	4	450 sks per silo
	BAR SILOS	7.8' x 7.5'	2	48 tons barite
	OBM UPRIGHT STORAGE TANK	12' x 11.5'	8	350 bbls each tank
	CENTRIFUGE		2	
	VCD		1	
	SOLIDS CONTROL SHACK		1	
	CHEMICAL SKID	10' x 40'	2	26-32 pallets, 15 drums, 6 totes
	FLARE LINE		1	
	FLARE BOX		1	
	GUARD SHACK		1	
	CASING & DRILL PIPE STORAGE			
	RIG CAMP AREA			
	SOUND WALL			

EMERGENCY EQUIPMENT	
Eye Wash stations	
Fire Extinguishers	

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CHEMICALS

During drilling operations, the following chemicals are anticipated to be on location:

CHEMICALS ON LOCATION	
NAME	**UNITS**
ADAPTA	25 kg bag
BA.STOPPIT	50 lb BA
BARAKLEAN	5 gal CA
BAROID 41	100 lmb bag
BAROID 41 (ST)	1 Uston bulk
BARO-SEAL CLASSIC	40 lbm bag
CAL CHLORIDE POWDER	50 lb bag
DILTREAT	55 gal drum
FORTI-MUL	55 gal drum
GRAPHITE	50 lbm bag
LIME	50 lbm bag
ODOR ARMOR	1 gal tote
RHEMOD L	55 gal drum
SALT	50 lbm bag
SAWDUST FINE	5.5 cuft bag
WALL-NUT MEDIUM	50 lbm bag

SAFETY EQUIPMENT

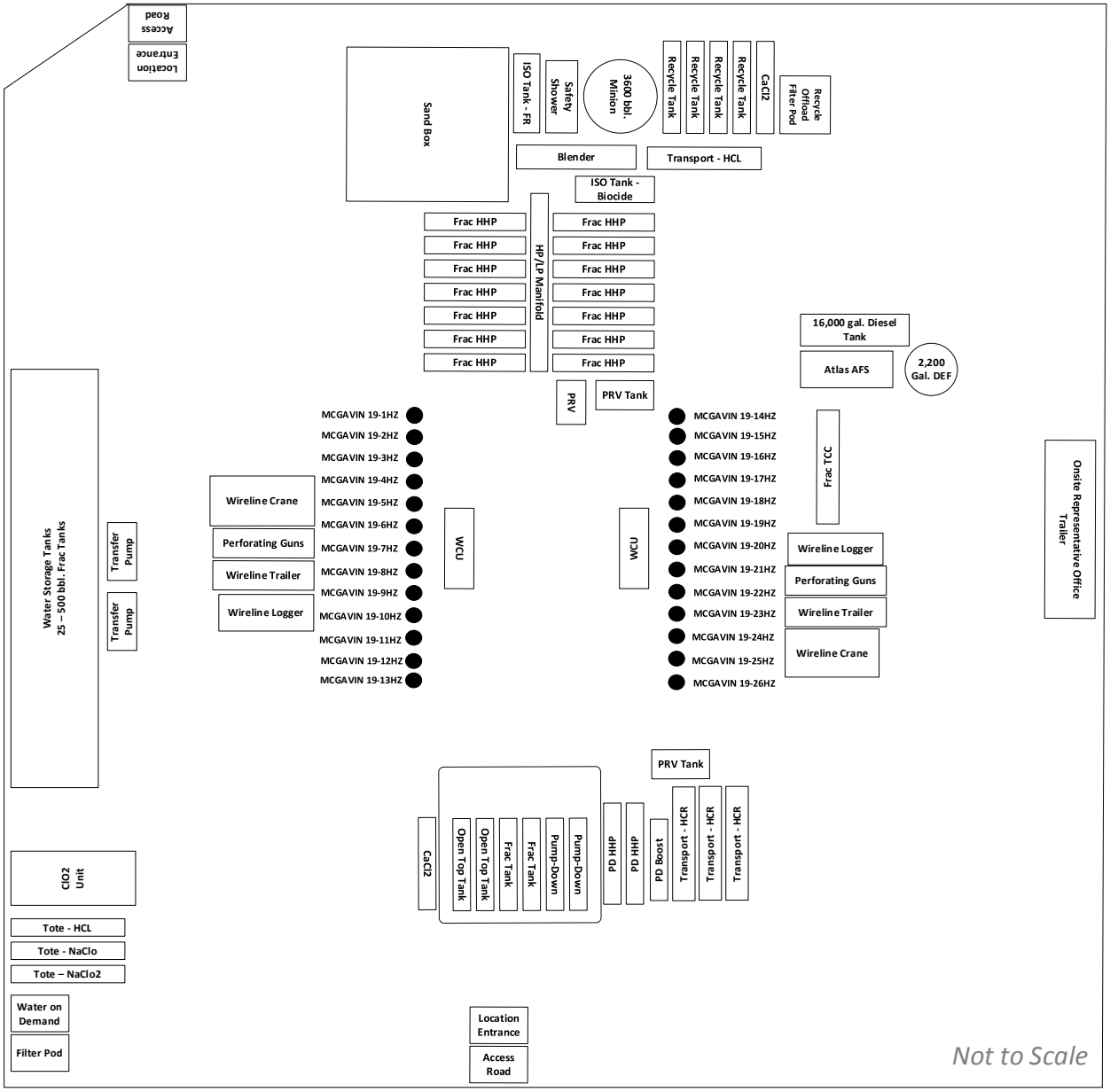
During drilling operations, the following response equipment is staged on location as depicted in the drilling layout shown above

SAFETY EQUIPMENT DETAILS	LOCATION	COMMENTS
Fire Extinguishers	Rig	3
	Shaker Tank	1
	Mud Pump 1	1
	Mud Pump 2	1
	Fuel Tank	1
	Boiler Tank	1
	Generator House	2
	Solids Control/Centrifuges	2
	Active Mud Tank	1
Eye Wash Stations	Rig	2
	Mud Pump 1	1
	Fuel Tank	1
	Generator House	2
	Active Mud Tank	2
	Slop Tank	1

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HYDRAULIC FRACTURING PHASE:

TYPICAL HYDRAULIC FRACTURING LAYOUT



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EQUIPMENT

During hydraulic fracturing the following equipment is expected to be on location:

EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
FRAC HHP	16	FIRE SUPRESSION BUILT INTO EACH UNIT
BLENDER	1	FIRE SUPRESSION BUILT INTO THE BLENDER TUB
FRAC TCC	1	
FRAC HP/LP MANIFOLD	1	
ACID TRANSPORTS	1	4000 GAL CAPACITY
HCR SYNTHETIC ACID TRANSPORT	2	4000 CAPACITY EACH
FRICTION REDUCER ISO	1	4500 GAL CAPACITY
BIOCIDE ISO	1	6000 GAL CAPACITY
WELLHEAD CONNECTION UNIT (WCU)	1	
WL PERFORATING GUN TRAILER	1	
WL CRANE (W/ OUTRIGGERS)	1	
WL TRAILER	1	
WL LOGGER	1	
FUEL TRAILER	1	16000 GAL CAPACITY DIESEL TANK
DEF TANK	1	2200 GAL DEF TANK
ONSITE REPRESENTATIVE OFFICE TRAILER	1	
MINION TANK	1	3600 BBL CAPACITY
STORAGE TANKS	25	500 BBL CAPACITY EACH
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH
SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
BIOCIDE TREATMENT TRAILER	1	REFER TO CHEMICAL TABLE FOR INFO
GREASE SKID	1	
PRV / PRV TANK	1	
SAND FORKLIFT	1	
TRANSFER PUMPS	2	
BOOST PUMPS	2	
WOD FILTER PODS	2	
FORKLIFT/MANLIFT	2	TYPICALLY 1 OF EACH ON LOCATION
FLAMELESS HEATERS	5	WINTER OPS ONLY
GLYCOL HEATERS	2	WINTER OPS ONLY
GENERATORS	4	
AIR COMPRESSORS	2	
VAC TRUCK	1	
DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
GATE GUARD SHACK	1	

CHEMICALS

During hydraulic fracturing operations the following hydrocarbons, hazardous, reactive and flammable materials are anticipated to be in on location:

CHEMICAL	# OF UNITS	VOLUME	COMMENTS
HYDROCHLORIC ACID	1	4000 GAL TRANSPORT	
HCR SYNTHETIC ACID	2	4000 GAL TRANSPORT	
SODIUM BICARBONATE		200-300 LB	ACID NEUTRALIZER
CALCIUM CHLORIDE (BRINE)	1	500 BBL CAPACITY	WINTER OPS
FRICTION REDUCER (FR)	1	4500 GAL CAPACITY ISO	
HYDROCHLORIC ACID (BIOCIDE TRAILER)	1	4000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM CHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
SODIUM HYPOCHLORITE	1	2000 GAL CAPACITY	BIOCIDE TREATMENT TRAILER
PREVENTATIVE BIOCIDE (TTPC)	1	4500 GAL CAPACITY ISO	
RECYCLE WATER TANKS	4	500 BBL CAPACITY EACH	PRODUCED WATER ORIGINATES AT ARF FACILITY (FACILITY ID 456644). TYPICALLY 800-1200 BBL PER DAY
DIESEL FUEL TANK	1	16000 GAL CAPACITY	
DEF TANK	1	2200 GAL CAPACITY	

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SAFETY EQUIPMENT

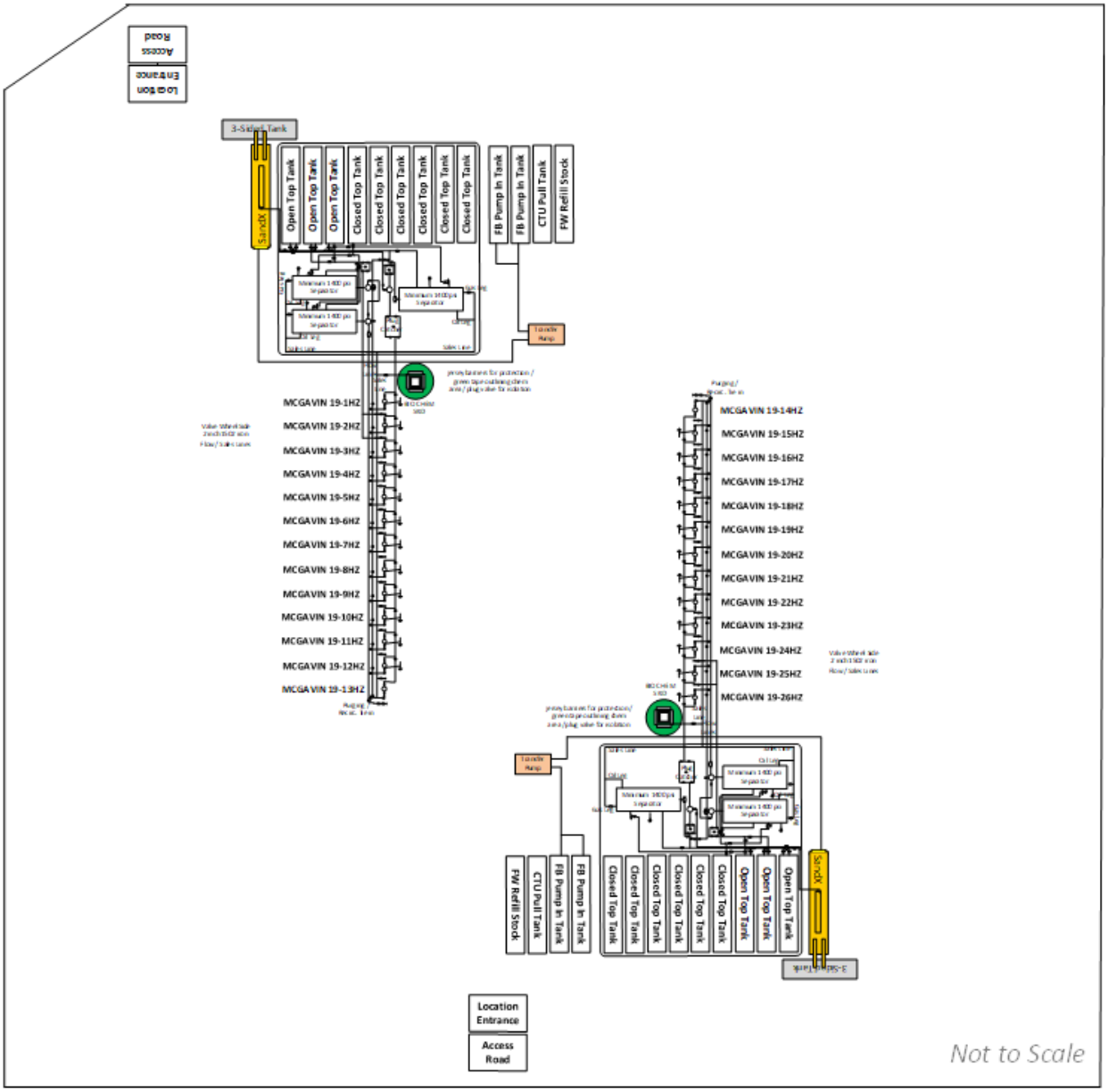
During hydraulic fracturing operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
FIRE SUPRESSION SYSTEM	BUILT INTO XLE PUMPS AND BLENDER TUB
ACID NEUTRALIZER PALLET	200-300 LB SODIUM BICARBONATE
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS AND FLOWBACK OPERATORS
RADIOS	FRAC, CONSULTANTS, WL OPERATOR, FLOWBACK OPERATOR
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

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WELL PREPARATION PHASE:

TYPICAL FLOWBACK LAYOUT



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EQUIPMENT

During preparation, coil and flowback operations the following equipment is expected to be on location:

EQUIPMENT LIST (COMPLETIONS OPERATIONS)			
COMPLETIONS ACTIVITY	EQUIPMENT	TYPICAL # OF UNITS	ADDITIONAL COMMENTS
COIL	COILED TUBING UNIT	1	
	COIL EQUIPMENT SUPPORT TRAILER	1	
	CRANE (AND OUTRIGGER MATS)	1	
	PUMP TRUCKS	2	
	N2 PUMP	1	
	N2 TRANSPORT	1	120 BBL TRANSPORT
	1502 HARDLINE	VARIES	
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
	MIXING PLANT (CHEMICAL TRAILER)	1	REFER TO CHEMICAL LIST TABLE
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	COIL BHA	1	TYPICALLY STORED ON PALLET ON PAD
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	GENERATORS	5	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	DUMPSTERS/TOILETS/LIGHT PLANTS/RIG MATS	VARIES	
	AIR COMPRESSORS	2	
	CENTRIFUGAL TRANSFER PUMP	1	
	VAC TRUCK	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
FLOWBACK (COIL)	3" DRILLOUT LINE	1	
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	SEPARATORS	3	4-PHASE SEPARATION
	PLUG CATCHER	1	
	SAND KNOCKOUTS	3	
	VX METER	1	NOT USED ON EVERY PAD
	MANIFOLD	1	
	CHEMICAL INJECTION CUBE	2	350 GAL CAPACITY EACH
	SAND X W/ 3-SIDED SAND BIN	1	
	SANDX CONTROL PANEL	1	
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
RIG/SNUB	WORKOVER RIG	1	
	BASE BEAM	1	
	RIG PUMP	1	
	PUMP MANIFOLD & 1502 HARDLINE	1	
	RIG TANK	1	
	PIPE WRANGLER	1	
	PIPE RACKS	1	
	SNUBBING UNIT & BASKET	1	
	SNUBBING TRAILER & CONTROL PANEL	1	
	BOP STACK	1	
	ACCUMULATORS & CONTROL PANELS	2	1 FOR BSR & 1 FOR PIPES/BLINDS
	TUBING & TUBING TRAILER	1	
	TORQUE & TEST UNIT	1	
	TORQUE UNIT	1	
	/DRAULIC LUBRICATOR & EQUALIZING HOSE/MANIFOL	1	
	BOBTAIL	1	TYPICALLY TRANSPORTS 40-60 BBL PER WELL
	WINCH TRUCK	1	
	ONSITE REPRESENTATIVE OFFICE TRAILER	1	
	GATE GUARD SHACK	1	SIGN IN/OUT OF LOCATION
	SAFETY TRAILER	1	REFER TO SAFETY EQUIPMENT TABLE FOR INFO
	GENERATORS	4	
	FLAMELESS HEATERS	4	WINTER OPS ONLY
	GLYCOL HEATERS	2	WINTER OPS ONLY
	AIR COMPRESSORS	2	
	CHEMICAL INJECTION CUBE	2	350 BBL CAPACITY EACH
	OPEN TOP TANKS	3	500 BBL CAPACITY EACH
	CLOSED TOP TANKS	11	500 BBL CAPACITY EACH
	STEEL DIESEL TANKS	2	500 GAL CAPACITY EACH
	FORKLIFT/MANLIFT	4	TYPICALLY 2 OF EACH ON PAD
FLOWBACK (RIG/SNUB)	SEPARATORS	3	4-PHASE SEPARATION
	SAND KNOCKOUTS	3	1 FOR EACH SEPARATOR
	2" FLOW LINES	2	
	2" SALES LINE	1	
	2" PANIC LINE	1	
	FLOWBACK SHACK	1	

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CHEMICALS

During preparation, coil workover and flowback operations the following hydrocarbons, hazardous, reactive, and flammable materials are anticipated to be in on location:

COMPLETIONS ACTIVITY	CHEMICAL	# OF UNITS	VOLUME	COMMENTS
COIL	FRICTION REDUCER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	BIOCIDE	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	DEFOAMER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	NANO BEADS	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	H2S SCAVENGER	1	330 GAL CAPACITY	MIXING PLANT (CHEMICAL TRAILER)
	FRICTION REDUCER	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	PIPE ON PIPE LUBRICANT	1	330 GAL CAPACITY	COIL PROVIDER (NOT ALWAYS ON PAD)
	LIQUID N2	1	120 BBL TRANSPORT	COIL PROVIDER (NOT ALWAYS ON PAD)
	OIL ON PAD	N/A	20 BBL MAX ALLOWED	HAUL OFF OIL BEFORE IT REACHES 20 BBL
	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
RIG/SNUB	STEEL DIESEL TANKS	2	500 GAL CAPACITY	
	50/50 METHANOL	1	500 GAL CAPACITY	WINTER OPS ONLY
	BIO WATER	N/A	TYPICALLY 60 BBL/WELL	BROUGHT OUT IN BOBTAIL TRUCK
	BIOCIDE	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)
	OXYGEN SCAVENGER	1	350 GAL CAPACITY	CHEMICAL INJECTION CUBE (STAINLESS STEEL TUB)

SAFETY EQUIPMENT

During preparation, coil workover and flowback operations the following response equipment is staged on location:

SAFETY EQUIPMENT DETAILS	COMMENTS
FIRE EXTINGUISHERS	IN FRONT OF ALL UNITS AND NEAR ALL POTENTIAL SOURCES
MUSTER AREAS	PRIMARY/SECONDARY MUSTER AREAS IDENTIFIED
WIND FLAGS	MULTIPLE STAGED ACROSS LOCATION FOR REFERENCE
4-PHASE MONITORS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RADIOS	CONSULTANTS, COIL OPERATOR AND FLOWBACK OPERATORS
RED ZONE BUFFER	CLEARLY IDENTIFIED WITH TAPE/CHAINS
CLASS 1 DIV 1 AREAS CLEARLY IDENTIFIED	FLOWBACK BERM
CONTAINMENTS	MULTIPLE USED ON LOCATION FOR VARIOUS UNITS/SOURCES
SAFETY TRAILER	VARIOUS APPLICATION FIRST AID KITS
	SDS SHEETS FOR ALL CHEMICALS STORED ON LOCATION
	DETAILS FOR ALL NEARBY EMERGENCY RESPONSE FACILITIES
	FIRE EXTINGUISHERS
	SPILL ABSORBENT PADS
	PORTABLE DEFIBRILLATOR (AED)
	EYE WASH STATION
	SAFETY SHOWER

PRODUCTION PHASE:

Once drilling and completion activities are finalized, the site will transition to its production phase and the primary chemicals stored on site will be crude oil stored in the condensate storage tank and produced water stored in the water storage tanks.

During production there is no emergency response equipment stored on location. Well operators will wear the proper PPE and will have a fire extinguisher in their vehicle.

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NEARBY SENSITIVE AREAS

Following a wetland delineation performed in 2020, the nearest wetland was identified 124' west of the Project Area. This freshwater emergent wetland was not mapped on the National Wetland Inventory (NWI). This wetland is assumed to have connectivity to an unnamed ditch 420' west of the Project Area, as mapped on the National Hydrology Dataset (NHD). This wetland is dominated by Baltic rush (Juncus balticus), creeping spike rush (Eleocharis palustris), and salt grass (Distichlis spicata). List B and C Colorado Noxious Weeds were also documented in this wetland. Existing disturbance near this wetland feature includes agricultural practices, a dirt access road, and a gravel pedestrian path (i.e., Firestone Trail).

Unnamed, perennial, soft-bottom ditch, paralleling the Firestone Trail approximately 110' SW. The banks of the ditch exhibit freshwater emergent wetlands. No disturbance was observed within this feature.

MITIGATION OF POTENTIAL IMPACTS TO THE ENVIRONMENT

If a spill is found reportable, it will be mitigated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and Environment (CDPHE) requirements. Once a release has been identified, it will be immediately stopped and contained if possible and safe to do so. When containing a spill; pig blankets, snakes, absorbent materials, or earthen berms will be constructed around the release to keep material from spreading. These materials will be provided by KMOG and the contract company as applicable.

Diligent efforts will be made to minimize contact with live vegetation or open water if release is outside of secondary containment structures.

In the event of a large incident requiring outside assistance, KMOG has contracted with EHS. EHS possesses a working knowledge of oil and gas operations, emergency response and Incident Command. Once notified EHS personal can be on location with two hours.

Spills deemed as emergency will include notification to the local fire department using 911.

MITIGATION OF POTENTIAL IMPACTS TO THE NEARBY POPULATION

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail. In the event of an actual emergency, the following steps will be immediately taken:

The KMOG representative will immediately notify proper authorities, including the sheriff's office, Colorado State Patrol, and any other public officials and will enlist their assistance in warning people in the calculated radius of exposure. The KMOG representative will coordinate with local authorities to warn residents down-wind of the location and within radius of exposure from the well site. Additional evacuation zones may be necessary as the situation warrants

The KMOG representative will coordinate with appropriate emergency personnel to divert traffic in the vicinity away from the potentially dangerous area

The area included within the radius of exposure is considered to be the zone with the maximum potential hazard. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated.

In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public. KMOG will fully cooperate with these authorities and will provide careful advice to such authorities.

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KMOG will dispatch appropriate personnel to the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as necessary.

DETERMINATION OF INCIDENT TYPE & APPROPRIATE RESPONSE

The following initial response actions and mitigation procedures shall be conducted immediately, or as soon as it is safe to do so, upon discovery of an emergency or threat of an emergency:

INITIAL RESPONSE CHECKLIST		
	Secure the source	As quickly as possible, safely shut down the operation responsible for the emergency **IF SAFE TO DO SO, PROPERLY TRAINED & HAVE PROPER PPE**
	Notify	Pull an alarm, push an evacuation button, use radio or *call 911* **EVACUATE IF NECESSARY**
	The first person on scene will assume the duties of the On-Scene Incident Commander until assistance arrives in the form of a more qualified person, if needed	
	Conduct a Hazard Assessment to determine the potential for fire, explosion, and hazardous/toxic vapors as well as to define Personal Protective Equipment (PPE) needed by responders. Identify source and volume; characterize oxygen levels, explosive character, toxicity of air on scene, splash and ingestive hazards	
	Shut off ignition sources: motors, open flames, electrical circuits	
	Identify and evacuate an exclusion zone in vicinity of the emergency site until the Hazard Assessment is completed	
	Conduct a Personnel Accountability Report (PAR) to accurately determine the location and status of personnel	
	Initiate notification of management personnel	
	Request Response Team activation or escalation as appropriate	
	Initiate notification to required government agencies as promptly as possible and within the required timeframe	
	Coordinate rescue and medical response actions	
	Use explosion proof equipment in high concentration vapor areas and monitor for flammable vapors until the response operation is completed	

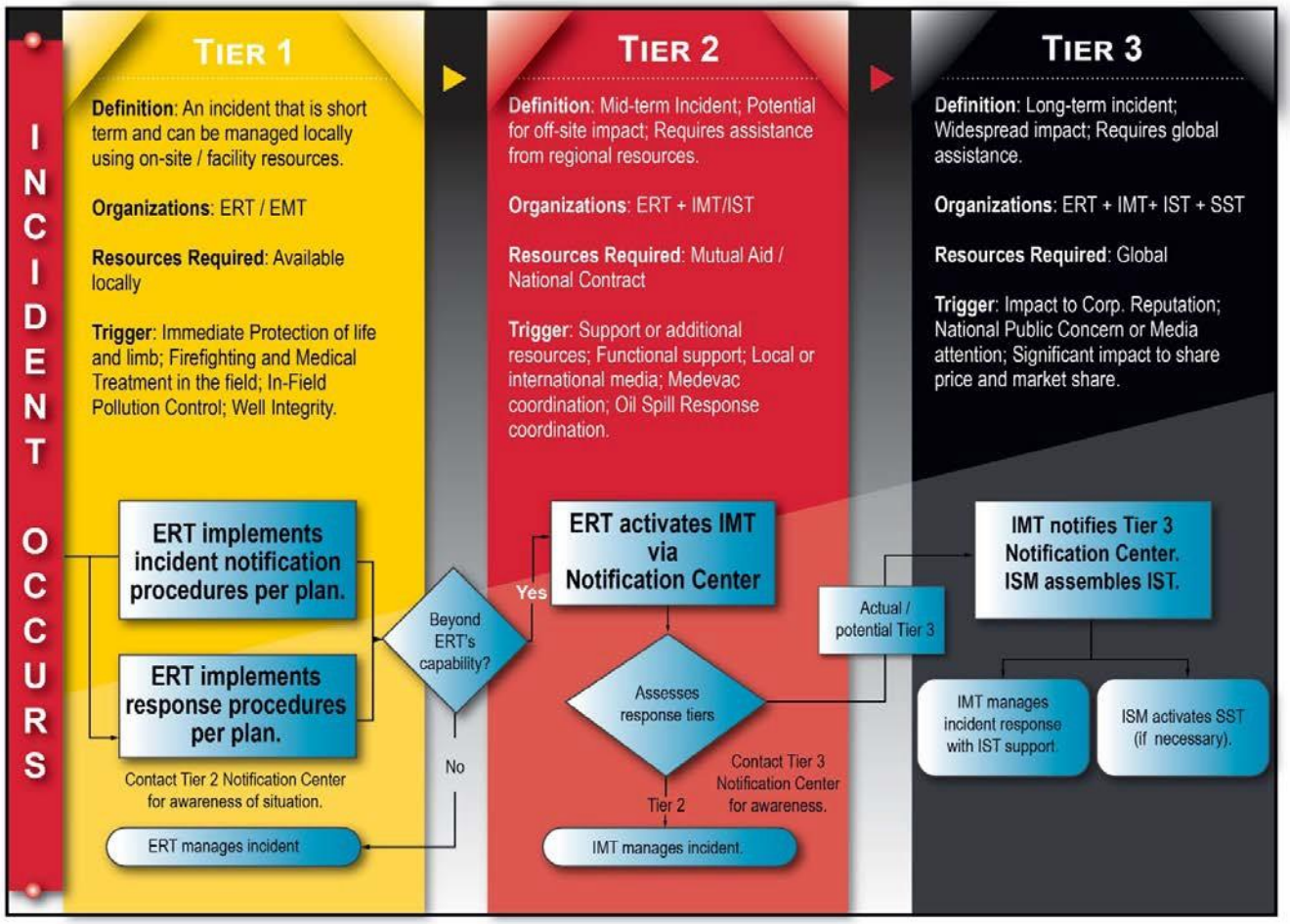
	The PEAS priorities will be utilized throughout the duration of the emergency response
	• People – ensure safety of all responders and impacted persons
	• Environment – protect the environment from further damage
	• Assets – protect non-damaged assets and minimize additional damage where possible
	• Stakeholders – reduce additional impacts and coordinate with to respond and recover effectively including:
	  ○ Effective cooperation with affected regulatory agencies
	  ○ Effective communication with Non-governmental Organizations (NGOs)
	  ○ Effective communication with other stakeholders
	  ○ Safe and effective restoration of business	

	Initiate evacuation of third parties: Contact local and state law enforcement as necessary to coordinate evacuation	
	Initiate containment if necessary and safe to do so. Contact Oil Spill Removal Organization if needed	

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INCIDENT TIER CLASSIFICATION

Incidents are classified in tiers according to their severity, either potential or realized.



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NOTIFICATION

Notifying the appropriate organizations that an incident has occurred is the first step in the initial response for all incidents

Notification efforts should include verification of the type of incident and its exact geographic location, or as close a proximity as can be readily discerned

The accountability of potentially impacted personnel is critical to determine a proper response when the health or safety of individuals are likely to occur

In no instance shall internal notifications take precedent over the safety of people or the request and mobilization of critical safety or medical resources, such as Emergency Medical, Fire, or Police assistance

Internal and external notification procedures shall be implemented immediately after discovering an incident has occurred, or as soon as it is safe to do so.

Upon discovery of or initial notification of an incident, the person in charge will attempt to identify the following information:

- The safety of the reporting party and others in the vicinity
- Name of the reporting party and contact information
- Status of any persons injured
- Accurate Personnel Accountability Report (PAR)
- Location of the incident, either address or global positioning system (GPS) location
- Time of discovery
- Incident description (source, assets involved, fire, etc.)
- Product type and estimated volume released
- Impacts to environmentally sensitive areas, population, waterways, etc.
- Immediate risks or exposures
- Current response actions
- Initial remedial actions, such as source control
- Name and contact of on-scene emergency agencies
- Weather conditions

The HSE Department will make all immediate initial incident notifications to the applicable agencies, including releases or spills, injuries, air emissions or air quality issues or permit variations. Any agency notification related to a deviation to a permit, such as drilling, will be coordinated by the various departments, such as Regulatory, HSE, and Drilling, as set forth in established procedures and are outside the scope of this process. Subsequent, follow-up, or amended notifications to external agencies, partners, joint ventures, or others outside of KMOG shall be made by the Liaison Officer function of the Incident Management Team (IMT) or similar function of the Emergency Management Team (EMT), as established.

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RESPONSE ACTIONS DEPENDING ON INCIDENT TYPE

INJURY / MEDICAL

MEDICAL EMERGENCY CHECKLIST

CONTAMINATED VICTIM

On-site emergency medical response for a contaminated patient requires the same rapid assessment of the patient as any other situation but be aware of other considerations that may affect the patient. The potential for contamination of the personnel, and equipment should be mitigated. Patient treatment should be conducted AFTER the injured party has been decontaminated.

IF	THEN
A responder requires medical attention	Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness. If the treatment needed is critical care or lifesaving treatment.
The need for full decontamination is less than the need for prompt medical treatment.	Refer to the Site Safety Plan for steps to be taken in an abbreviated decontamination for medical treatment
Medical Treatment is needed	The Incident Commander or his designee will request assistance from trained medical personnel
Transportation to a medical facility is needed	The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant.
	SDS information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.

NOTE: **Evacuation of seriously ill or injured persons should be conducted by ground or air ambulance only.** Transportation by company or private vehicle should be discouraged, unless advised to do so by medical authorities. All medical emergencies should be documented on appropriate company reports.

NON-CONTAMINATED VICTIM

Provide BASIC LIFE SUPPORT Stabilize the victim at the scene if necessary		
Maintain airway/breathing/Administer CPR	Control bleeding	Treat for shock
Activate professional medical care for the victim by: Call 911 to arrange for ground or air ambulance support.		
Provide the 911 dispatch the following information		
Your name and location and contact phone number	Type of medical emergency	
Name and location of the injured	Condition of injured	
Assess the situation and contact the Field Office or Safety Department		
Determine the level of medical attention needed - first aid or outside professional assistance.		
Administer first aid if necessary or **Transport the victim to a local hospital or physician**		

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FIRE / EXPLOSION

	FIRE / EXPLOSION CHECKLIST
	Notify the Foreman or supervisor on duty
	Shutdown/ESD facility
	Call 911 for emergency fire services
	Shutdown the Facility, evacuate personnel and move to a muster area or other safe distance to direct the fire department to the scene of the fire
	Keep other personnel and vehicles from entering the danger area
	Each person onsite should evacuate if necessary, to protect themselves from harm

HAZARDOUS SPILL

	LINE BREAK OR LEAK CHECKLIST
	Shutdown pumping and equipment
	Drain the line section, as the situation demands
	Coordinate rescue and medical response actions
	Initiate spill response and containment process
	Clean up spilled product to eliminate any possible environmental problems
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Request local authorities to establish traffic control in the area, as the situation demands
	Make all necessary repairs
	Return the line to service once repairs are completed
	STORAGE TANK LEAK
	Notify the Foreman or supervisor on duty
	Shut down all tank battery product movement operations and isolate the tank
	Initiate Confined Space Entry procedures, as applicable
	Ensure that the containment area drainage valve is closed
	If near tank bottom, consider filling the tank with water and maintain water bottom to suspend the discharge
	Block all drainage of spilled material from travelling offsite
	Request local authorities to establish traffic control in the area, as necessary
	Determine which environmentally sensitive areas may be threatened by the spill and direct the response operation to these locations
	Remove product from containment area with an explosion proof pump, oil skimmer, and/or vacuum truck with skimmer attachments
	If floating roof tank is submerged and tank must be drained, follow the facility operating procedures for landing floating roof and draining any liquids contained upon the floating roof

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VAPOR CLOUD

VAPOR CLOUD CHECKLIST	
	Sound the alarm and notify the foreman or supervisor on duty. Vacate the area.
	The only proper action in the presence of a vapor cloud is to get away from it. **Do not shut off electrical equipment.**
	All personnel should report to the muster point for roll call and further instructions.
	Contact the appropriate agencies and potentially affected neighbors.

DECONTAMINATION

Eyewash stations and safety showers provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing. Contaminated clothing should be disposed of properly. Contaminated personal protective equipment (PPE) must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

DECONTAMINATION CHECKLIST	
	Establish "Exclusion – Hot", "Decontamination – Decon", and "Support – Safe" zones to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.
	Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
	Decontamination facilities should be positioned prior to employee/contractor entrance areas where the potential for exposure to contamination exists. The appropriate Safety Data Sheets (SDS) are available to aid health professionals treating theinjured parties.
	Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
	Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

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SEVERE WEATHER

	TORNADO OR SEVERE STORMS CHECKLIST
	Upon notification by weather monitoring of impending severe weather conditions, notify the person in charge or the appropriate office of the situation Be aware of changing weather conditions: • *Tornado watch* – conditions are right for the formation of a tornado. • *Tornado warning* – a tornado has been seen in area or is imminent. Take cover immediately.
	Personnel will be instructed to shut down all nonessential activities and take shelter where available until the storm has passed.
	Immediately bring personnel off tanks, pipe racks, and other elevated work areas. Suspend product loading operations and close all tank openings.
	Take shelter in a low-level area away from glass until the storm has passed.
	Stay in the shelter until "ALL CLEAR" has been issued.

EVACUATION

The decision to evacuate should always be based upon a prudent analysis of the risks involved in any incident, and/or a response to an incident.

EVACUATION PROCEDURES

Depending upon the hazard, personnel will evacuate either via the access road and meet at muster points.

In case of emergency, the primary command center will be established at the IOC at the Platteville Office. The Denver Office may be used as an alternate command center if necessary.

If determined necessary, local response personnel (fire, police, etc.) would coordinate all community evacuation procedures utilizing existing community evacuation plans.

	EVAUATION PROCEDURES CHECKLIST
	Sound an alarm or give verbal alarm
	Call 911
	Shut down loading/unloading and pipeline operations
	Evacuate trucks from the location
	Divert incoming trucks to a safe distance away
	Evacuate all personnel to designated staging areas

TRAINING AND COORDINATION WITH LOCAL GOVERNMENT AND RESPONDERS

KMOG is a member of the CPRN (Colorado Preparedness Response Network), an industry collaboration with local responders working to enhance emergency preparedness and response. KMOG is committed to preparedness and minimizing impacts of incidents requiring emergency response should they occur. KMOG recognizes the importance of knowledge sharing within the industry and with emergency responders through drills and exercises.

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Trainings and drills will be offered and facilitated regularly through CPRN as well as KMOG will facilitate internal exercises and extend invites to emergency responders annually, at minimum, but often more frequently.

If KMOG staff or contractors are contacted by the OEM or a Fire Protection District, they will provide the necessary information to assess the hazards onsite and coordinate with first responders during all phases of development of the site.

In the event of an emergency requiring first responders, Unified Command will be established between the KMOG appointed company man on location and first responders present.

Address: 6240 Pine Cone Avenue

KerrMcGee

MCGAVIN 6-19HZ

Weld County, Colorado

Firestone, Colorado

GPS Coordinates: NAD 83

Pad Site: LAT: 40.127518° LONG:-104.938519°

Access Road: LAT: 40.131307° LONG:-104.937875°

All Emergencies will be reported through 911

NOTIFICATIONS

1. National Response Center: 800-424-8802
2. Kerr McGee/Emergency Response Coordinator
   - Integrated Operations Center (IOC)
     970-515-1500
3. COGCC: 719-343-0130, 970-573-1277
4. EPA Region VIII: 303-312-6312
5. Carbon Valley Emergency Management Agency: 303-319-1008
6. Frederick/Firestone Fire Protection District: 303-833-2742

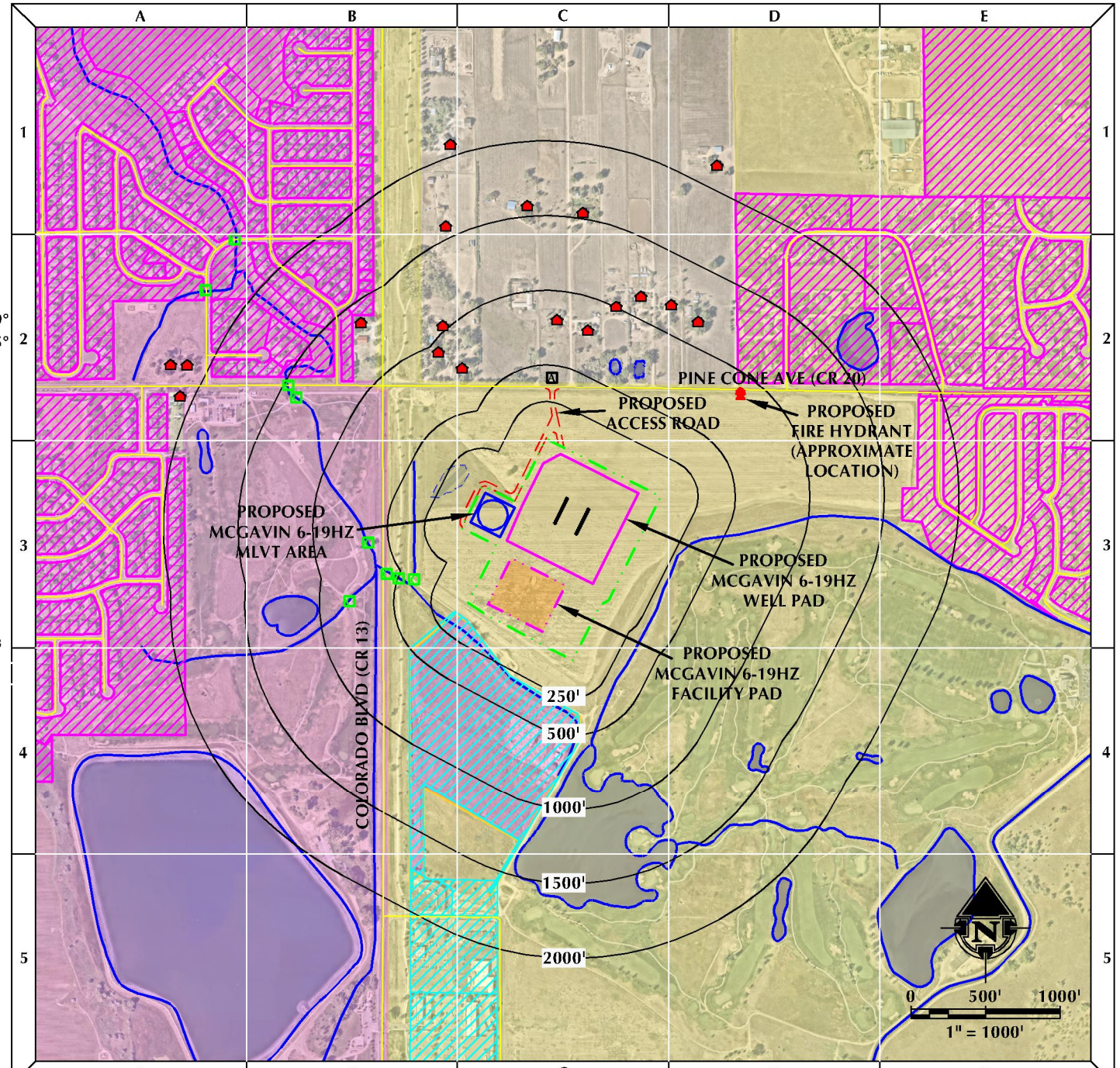
RESPONSE OBJECTIVES

Minimize the impact to the environment and local community. Contain and recover released product to the extent possible

CRITICAL RECEPTORS

1. DRAINAGES, PONDS AND WETLANDS
2. SURROUNDING RESIDENTIAL PROPERTIES
3. SURROUNDING BUSINESSES
4. GOLF COURSES

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.



LEGEND:
- PROPOSED WELL
- DISTURBANCE AREA
- DISTURBANCE AREA BUFFERS
- PROPOSED WELL PAD
- PROPOSED FACILITY PAD
- NEIGHBORHOOD
- BUSINESS
- RESIDENTIAL BUILDING UNIT
- SCHOOL
- EXISTING CULVERT
- POND
- DELINEATED WETLAND
- DITCH/CANAL/RIVER/DRAINAGE
- RAILROAD TRACKS
- PUBLIC ROADS
- PROPOSED ACCESS ROAD
- SITE ACCESS
- TOWN OF FIRESTONE
- TOWN OF FREDERICK
- PROPOSED FIRE HYDRANT

609 CONSULTING, LLC
SHERIDAN OFFICE
1095 Sabertoo Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SCALE: 1" = 1000ft		NAD83 CO-Nft	
DRAWN:	GLK	DATE:	6/24/21
REVISED:	SRS	DATE:	10/15/21

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TACTICAL RESPONSE CHECKLIST

After assessing the incident level and contacting the appropriate parties, the following steps will need to be taken for the tactical response:

1. Implement National Incident Management System (NIMS) Incident Command System (ICS)
2. Assess hazards to site, workers, and public
3. Safety Officer should complete form ICS 208 – Safety Message/Plan
4. Conduct Job Safety Briefing
5. Assess property and environmental impacts
6. Develop ICS 201 Incident Briefing and ICS 202 – Incident Objectives
7. Implement response actions:
   a) Confine spills to tanks/vessels
   b) Locate leading edge of spilled material
   c) Contain spills on ground and any surrounding drainage ways
   d) Recover spilled materials
   e) Dispose of recovered materials properly
8. Document site conditions and activities
9. Document impacts to natural, economic, and cultural resources
10. Document site restoration/remediation activities

See the KMG/Emergency Response Plan for the full list of NIMS ICS Forms.

PAD Name and PAD STATS

FLOW STATS – 30 DAY AVERAGE IP

GAS (MCF/D)	OIL (BBL/D)	WATER (BBL/D)
TBD	TBD	TBD

WELL PAD CONTAINTMENT STORAGE

QTY.	TYPE	SIZE (BBL)
8	Water Tanks	285 barrel
2	Condensate Tanks	285 barrell

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.

RESPONSE RESOURCE CONTACT INFORMATION

Name	Main Phone
Kerr McGee Oil & Gas OnShore LP Integrated Operations Center (IOC)	970- 515-1500

STATE, FEDERAL, MUNICIPAL EMERGENCY RESPONDERS

Name	24-Hour Phone
Carbon Valley Emergency Management Agency	303-319-1008
Weld County Sheriff	970-356-4015
Firestone Police Department	303-833-0811
Frederick/Firestone Fire Protection District	303-833-2742
National Response Center	800-424-8802
Colorado Dept of Natural Resources	303-866-3311
EPA Region 8	303-312-6312
Department of Transportation	855-368-4200

RESPONSE CONTRACTORS

Contractor Name	Office #	Alternative #
Emergency Response Contractors		
EnviroServe	800-488-0910	720-450-1316
EHA-Environmental HAZMAT Services	720-225-9252	303-525-3111
Wild Well Control	281-784-4700	
Boots & Coots	281-931-8884	
Cudd Pressure Control	800-990-2833	307-382-6650 713-849-2769
Support - Incident Management Team Consultant		
CTEH	2501-801-8500	317-473-0688
The Response Group	281-880-5000	
Oil Spill Clean Up Services -Wildlife Rehabilitation		
Birds of Prey Foundation	303-460-0674	
Greenwood Wildlife Rehab Ctr.	303-823-8455	303-545-5849
Rocky Mountain Raptor Program	970-484-7756	970-222-0322
Support - Consultants		
AECOM/ENSR	970-493-8878	720-210-7924
LT Environmental	303-962-5504	
GHD First (Fast Incident Response Services Team)(24hr hotline)		866-812-9565
Tasman Geoscience		303-507-8869

RESPONSE OBJECTIVES CHECKLIST

SAFETY – PROTECT LIFE

❖Evaluate and account for all personnel
❖Isolate all potential ignition sources
❖Initiate emergency services immediately, as needed (911, Fire, LEPC)
❖Identify hazard(s) of emitted material (obtain SDS)
❖Establish site control (safe perimeter and evacuation routes)
❖Monitor air in impacted areas
❖Develop Site Safety Plan (ICS 208) and Medical Plan
❖Continually assess site hazards and risks

RESPONSE – INCIDENT STABILIZATION

❖Conduct notifications to external agencies and internal personnel
❖Identify and implement staging areas to support response operations
❖Activate response company for equipment and manpower as needed
❖Activate response tactics to contain and recover product/material
❖Establish command post and field communications
❖Establish flight traffic restriction if required
❖Provide personnel and equipment support as required
❖Implement waste handling and disposal procedures as required
❖Initiate decontamination and demobilization procedures when appropriate

ENVIRONMENTAL – PROTECT THE ENVIRONMENT

❖Identify, prioritize, and protect environmentally sensitive areas
❖Establish wildlife rescue rehabilitation operations if required
❖Verify release if waters are impacted
❖Conduct visual assessments (spill tracking and surveillance)

Revised: 6/2020

Section 5

Phase III Drainage Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Phase III Drainage Report
for
McGavin 6-19HZ

Prepared for:

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

Submitted to:

Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

October 2021
Revised December 2021

609 Consulting, LLC

Engineering, Surveying, Consulting & Design

Sheridan Office
1095 Saberton Avenue
Sheridan, Wyoming 82801
Ph: (307) 674-0609 Fax: (307) 674-0182

Loveland Office
6706 North Franklin Avenue
Loveland, Colorado 80538
Ph: (970) 776-4331 Fax: (970) 776-3301

Letter of Transmittal

To: Town of Firestone
151 Grant Avenue
Firestone, Colorado 80520

cc: Mr. Matt Wiederspahn, PE, Town of Firestone
Mr. Josh Evans, PE, Town of Firestone
Ms. Shayelyn Marshall, Kerr-McGee Oil & Gas Onshore L.P.
Mr. Brian Venn, PE, 609 Consulting

From: Mr. Tyler French, PE
609 Consulting
1095 Saberton Avenue
Sheridan, Wyoming 82801

Date: December 10, 2021

Subject: McGavin 6-19HZ - Phase III Drainage Report - Revised

To the Town of Firestone:

On behalf of Kerr-McGee Oil & Gas Onshore L.P., we are pleased to submit the revised Phase III Drainage Report for McGavin 6-19HZ. The purpose of this report is to discuss and summarize the stormwater drainage analysis and design performed for McGavin 6-19HZ. The proposed project will be located in the northwest quarter of Section 19 in Township 2 North, Range 67 West in Firestone, Colorado.

The drainage analysis and design were prepared using the Town of Firestone Design Standards & Construction Specifications for Public Improvements as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual. The Town of Firestone provided comments and redlines for the Preliminary Phase III Drainage Report for McGavin 6-19HZ in September of 2021. These redlines were incorporated into the Phase III Drainage Report. The Town of Firestone provided additional comments in December of 2021. This revised Phase III Drainage Report has addressed and incorporated all of the comments and redlines provided by Firestone thus far. We believe the analysis and design satisfy all Town of Firestone drainage requirements.

We greatly appreciate your time and consideration in reviewing this submittal. Please contact us with any questions you may have.

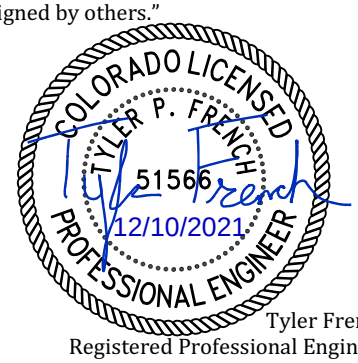
Respectfully,

Tyler French

Tyler French, PE

Certification of Engineering

"I hereby attest that this final report for the drainage design of McGavin 6-19HZ was prepared by me, or under my direct supervision, in accordance with the provisions of the Town of Firestone Storm Drainage Criteria for the responsible parties thereof. I understand that the Town of Firestone does not and shall not assume liability of drainage facilities designed by others."



Tyler French
Registered Professional Engineer
State of Colorado No. 51566

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1.0 PROJECT OVERVIEW

Kerr-McGee Oil & Gas Onshore L.P. is proposing the construction and development of an oil/gas well pad and production facility, McGavin 6-19HZ, located in the northwest quarter of Section 19 in Township 2 North, Range 67 West in Firestone, Colorado. Per the requirements outlined in the Town of Firestone Municipal Code, and through a direct request from the Town of Firestone, this report was prepared to discuss the analysis and design for stormwater drainage at the proposed project site. The Drainage and Erosion Control Plan, found in Appendix A, was developed in conjunction with this report.

1.1 Project Description

The proposed project consists of the construction and operation of the McGavin 6-19HZ well pad and the McGavin 6-19HZ production facility containing infrastructure and operations for 26 oil/gas wells. Combined, the well pad and facility will have a Colorado Oil & Gas Conservation Commission (COGCC) 2A disturbance boundary area of 25.63 acres during the construction phase which includes topsoil stripping and pad earthwork, well drilling and hydraulic fracturing, installation of permanent pipelines and facilities, and setup of temporary equipment and modular large volume tank (MLVT) areas. Construction phase grading and layout for the facility is included in the Drainage and Erosion Control Plan found in Appendix A.

Once all wells have been drilled and completed, the temporary equipment area, MLVT area, and portions of the well pad and facility will be reclaimed back to existing grade for the production phase. The remaining operational area during the production phase will be approximately 7.29 acres. Production phase grading and layout for the well pad and facility is included in the Drainage and Erosion Control Plan found in Appendix A.

1.2 Project Location

The proposed McGavin 6-19HZ project is located on property owned by Anadarko E & P Onshore LLC (Parcel 131119200045). The project area is approximately 0.1 miles south of Pine Cone Avenue (County Road 20) and 0.1 miles east of Colorado Boulevard (County Road 13) within the Town of Firestone jurisdictional boundary. A proposed access road running south from County Road 20 will provide access to the project site. Figure 1 shows the location of McGavin 6-19HZ.

Soils data for the project area were taken from NRCS Soil Data Viewer. The project area is comprised of Olney fine sandy loam (1 to 3 percent slopes) with a Hydrologic Soil Group (HSG) classification of Group B soils, Vona loamy sand (0 to 3 percent slopes) with a HSG classification of Group A soils, and Aquolls and Aquepts (flooded) with a HSG classification of Group D soils. The soils report for the project area can be found in Appendix B. The proposed project will be constructed on undeveloped agricultural land. According to National Land Cover Database (NLCD 2016), the project area is classified as a combination of cultivated crops, herbaceous, and emergent herbaceous wetlands.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 08123C1890E, Effective Date: 1/20/2016 and Panel 08123C1895E, Effective Date: 1/20/2016), the proposed project is in an area of minimal flood hazard (Zone X) and is therefore determined to be outside the 500-year floodplain. The corresponding FIRMette displaying the flood zone classification at the project site can be found in Appendix C.

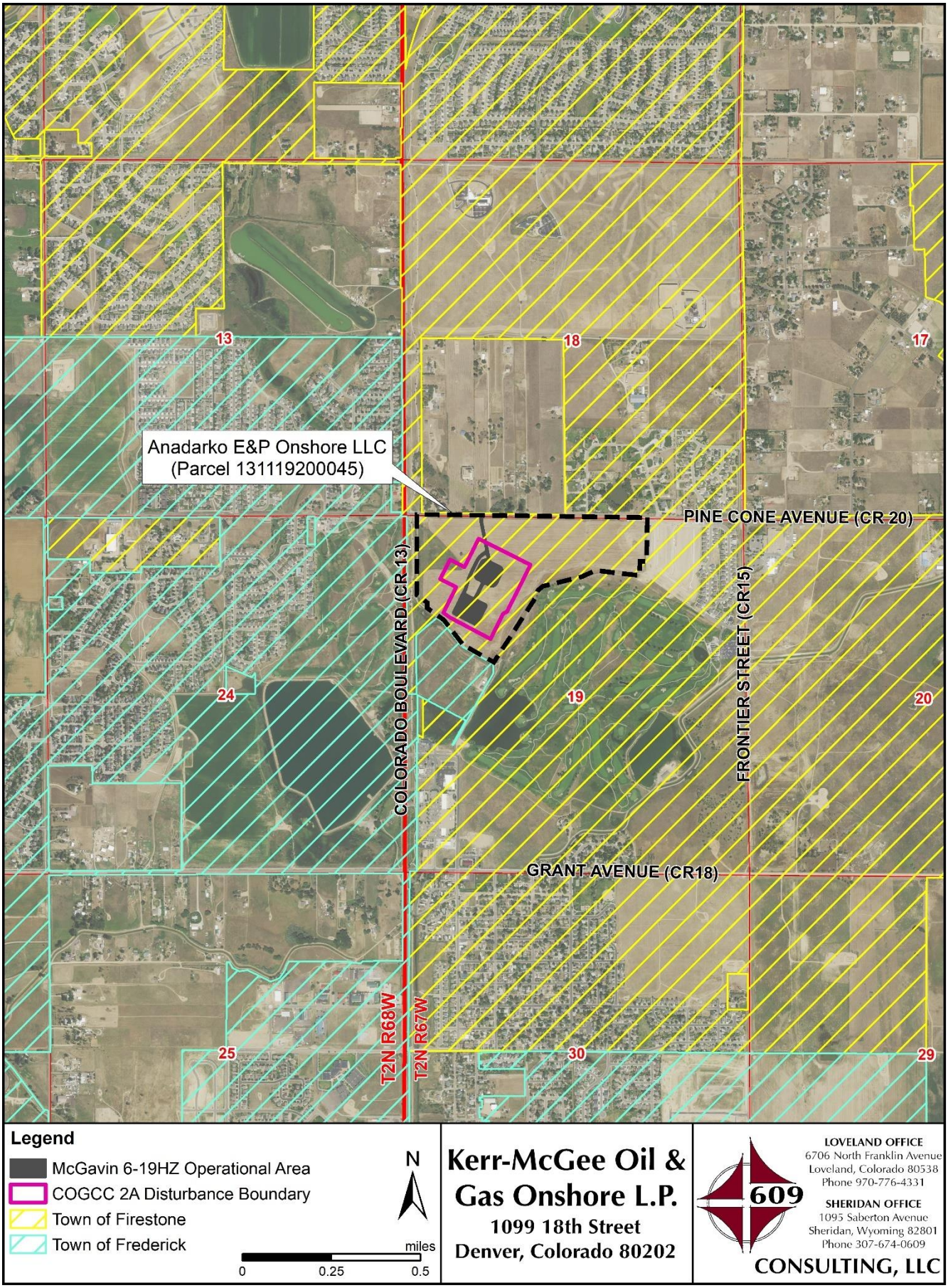


Figure 1. Project Location

1.3 Drainage Summary

The proposed McGavin 6-19HZ project lies within the Firestone Lake – Saint Vrain Creek Hydrologic Unit Code Level 12 (HUC 12): 101900050707. The HUC 12, approximately 69.5 square miles in area, consists of a mixture of agricultural lands and urban development via subdivisions, acreages, and transportation infrastructure that drains to Saint Vrain Creek.

Local drainage to and around the project site generally flows southeast to northwest to a wetland area. From there, the wetland drains south along the Firestone Trail walking path to an unnamed drainage that flows west, under the walking path and under Colorado Boulevard. From there, the drainage flows northwest through several neighborhoods and under several roadways until joining Saint Vrain Creek.

The project site lies within the study area of the *Sump Basin Master Drainage Plan*, published in May of 2010 (Colorado Civil Group, Inc.). According to the report, the Sump Basin has well-drained soils with poorly defined drainageways. Most of the runoff is conveyed via shallow overland flow or sheet flow. Historically, stormwater within the basin generally flows from south to north. Though the Sump Basin contains several existing sumps, there are no existing sumps located near the proposed project site.

The project site also lies within the study area of the *South Weld I-25 Basin Drainage Master Plan*, published in September of 1999 (Anderson Consulting Engineers, Inc.). McGavin 6-19HZ is within the Tri-Town Basin. According to the report, the basin is approximately 12.4 square miles of agricultural land, residential housing developments, parks, golf courses, and light industrial/commercial development. Saint Vrain Creek defines the northern boundary of the basin. The most predominant drainage feature is the Tri-Town Drainageway, also known as the Biederman Draw, with several minor contributing tributaries including the McGavin 6-19HZ project site. The Tri-Town Drainageway is a relatively small channel with the capacity to convey peak flows from small storm events. The Drainage Master Plan recommends improvements to arterial roadway crossings and to the Tri-Town Drainageway.

2.0 HYDROLOGIC ANALYSIS

The following sections outline the methods used and corresponding results for the hydrologic analysis of the project site and drainage design including historic runoff, design flow, and stormwater volume.

2.1 Historic Runoff

Historic runoff, calculated assuming the site is undeveloped with 2.0 percent imperviousness, was calculated for the proposed project site. The rational method was chosen to estimate historic peak flows. As discussed in the Mile High Flood District (MHFD) manual *Urban Storm Drainage Criteria Manual Volume I* (USDCM VI), it is acceptable to use the rational method for design storm analysis of catchments that are not complex and are 90 acres or less in size.

The MHFD spreadsheet model, *Peak Runoff Prediction by the Rational Method, V 2.00* (UD-Rational), was used to calculate peak flows. One-hour point rainfall data were obtained from NOAA Atlas 14 Point Precipitation Frequency Estimates using coordinates for the project site. One-hour point rainfall data are summarized in Table 1 and a copy of the point precipitation frequency estimates obtained from NOAA can be found in Appendix D.

Table 1. Point Rainfall Data (NOAA Atlas 14 Point Precipitation Frequency Estimates)

Storm Event Frequency	One-Hour Point Rainfall, in
2-year	0.820
5-year	1.10
10-year	1.39
25-year	1.84
50-year	2.25
100-year	2.71
500-year	3.97

The COGCC 2A disturbance boundary was used to define the drainage area. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery. HSG was derived from an area-weighted average using NRCS Soil Data Viewer. HSG and soils data for the project area can be found in Appendix B. USDCM VI was referenced for recommended conveyance factor (K). Computed Time of Concentration (Tc) was used since historic conditions have an imperviousness of less than 20 percent. Historic peak flow estimates calculated using the rational method are summarized in Table 2 and spreadsheet model inputs and results can be found in Appendix E.

Table 2. Historic Peak Flow Estimates Using the Rational Method

Storm Event Frequency	Historic Peak Flow, cfs
2-year	0.2
5-year	0.5
10-year	3.0
25-year	13.2
50-year	21.6
100-year	35.5
500-year	69.8

2.2 Design Flow

Design flows for McGavin 6-19HZ were calculated for stormwater derived within the project disturbance area (on-site) as well as the broader drainage to and around the project area. Both the construction phase and the production phase were analyzed and used to aid in the hydraulic design.

The rational method was chosen to estimate design-specific peak flows for the proposed culverts and ditch outlets (sediment traps). Locations for peak flow calculations are summarized in Table 3. Drainage area delineations for sediment traps and culverts during the construction phase are shown in Figure 2 and drainage area delineations for culverts and stormwater storage during the production phase are shown in Figure 3.

One-hour point rainfall data for the project area (Table 1) and the Denver Area Intensity Equation were used for inputs to UD-Rational. Field survey, LiDAR, and site design characteristics were used to delineate drainage areas for culverts (ARC1, ARC2, ARC3, ARC4, ARC5, and ARC6). Drainage areas for the on-site outlets (ST1, ST2, ST3, FS, and WPS) were delineated using the on-site drainage design and grading found in Appendix A. Overland flow length, overland flow slope, channelized flow length, and channelized flow slope parameters were estimated using field survey, LiDAR, and imagery.

Table 3. Summary of Outlets and Drainage Areas

Outlet	Name	Description	Total Drainage Area, acre	
			Construction Phase	Production Phase
ARC1	Access Road Culvert #1	Access road approach culvert conveying off-site stormwater	46.63	50.92
ARC2	Access Road Culvert #2	Diversion ditch conveying on-site stormwater under well pad access road	1.27	-
ARC3	Access Road Culvert #3	Diversion ditch conveying on-site stormwater from sediment trap under facility access road	9.58	-
ARC4	Access Road Culvert #4	Diversion ditch conveying on-site stormwater from sediment trap under facility access road	2.24	-
ARC5	Access Road Culvert #5	Diversion ditch conveying on-site stormwater under facility access road	4.88	-
ARC6	Access Road Culvert #6	Road ditch conveying stormwater under the facility access road	-	2.03
ST1	Sediment Trap #1	Diversion ditch conveying on-site stormwater to a sediment trap	9.08	-
ST2	Sediment Trap #2	Diversion ditch conveying on-site stormwater to a sediment trap	1.89	-
ST3	Sediment Trap #3	Diversion ditch conveying on-site stormwater to a sediment trap	13.49	-
FS	Facility Stormwater Storage	Berm and ditch on facility used for stormwater storage	-	5.37
WPS	Well Pad Stormwater Storage	Berm and ditch on well pad used for stormwater storage	-	3.86

HSG was derived from an area-weighted average using NRCS Soil Data Viewer. Due to the presence of Type A, Type B, and Type D soils, HSG and percent imperviousness were used within the UD-Rational spreadsheet to calculate area-weighted runoff coefficients (C-values) which were used to override the default runoff coefficients. HSG and soils data for the project area can be found in Appendix B and area-weighted runoff coefficient calculations can be found in Appendix E.

USDCM VI was referenced for recommended imperviousness and conveyance factor (K). Computed T_c was used for outlets with imperviousness less than 20 percent. Drainage areas were evaluated for non-contributing area. During both the construction and production phases, facility tanks and separators are bermed to contain spills. This area is considered ineffective and non-contributing area. Calculations for area-weighted averages of percent imperviousness along with effective area are found in Table 4. Peak flow estimates calculated using the rational method are summarized in Table 5 and complete spreadsheet model inputs and results can be found in Appendix E.

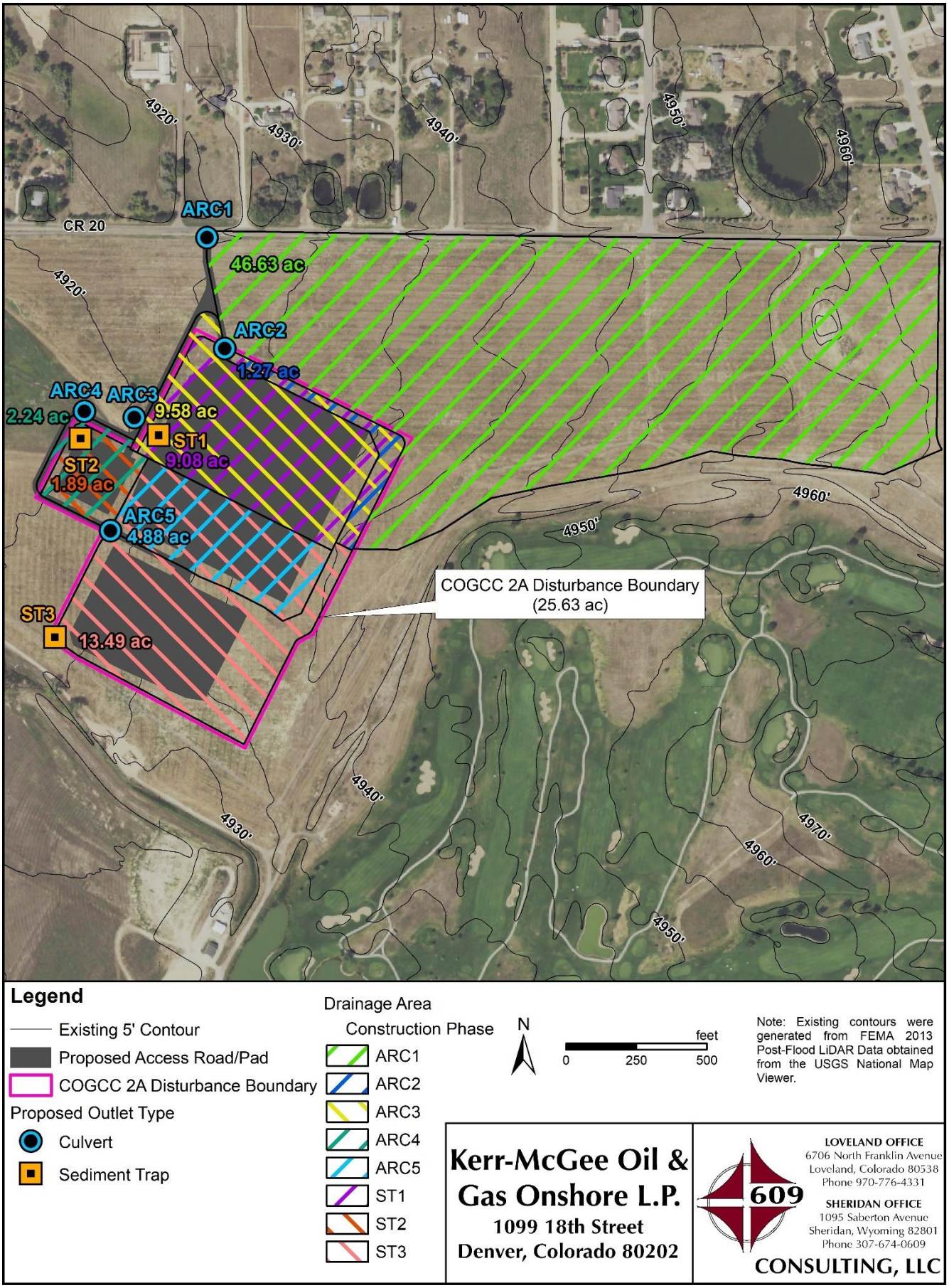


Figure 2. Drainage Areas for the Construction Phase

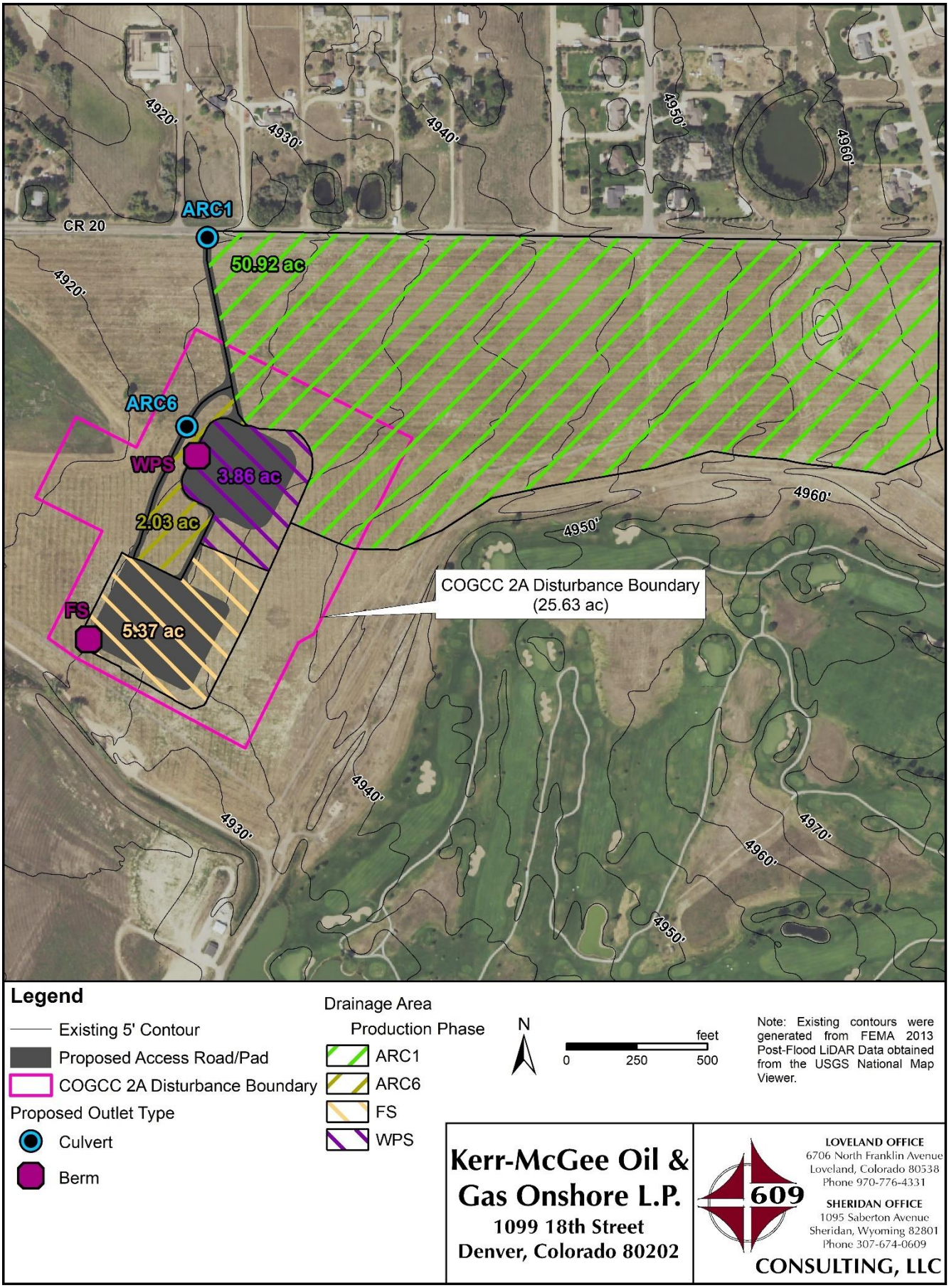


Figure 3. Drainage Areas for the Production Phase

Table 4. Imperviousness and Effective Area

Outlet	Phase	Total Area, acre	Ineffective Area, acre	Effective Area, acre	Open (2% Imperv), acre	Gravel (40% Imperv), acre	Weighted Imperviousness	
							acre	%
ARC1	Construction	46.63	0.00	46.63	45.74	0.89	1.27	2.7
	Production	50.92	0.00	50.92	49.94	0.98	1.39	2.7
ARC2	Construction	1.27	0.00	1.27	1.25	0.02	0.03	2.4
ARC3	Construction	9.58	0.00	9.58	2.78	6.80	2.78	29.0
ARC4	Construction	2.24	0.00	2.24	0.83	1.41	0.58	25.9
ARC5	Construction	4.88	0.00	4.88	1.08	3.80	1.54	31.6
ARC6	Production	2.03	0.00	2.03	1.51	0.52	0.24	11.8
ST1	Construction	9.08	0.00	9.08	2.52	6.56	2.67	29.4
ST2	Construction	1.89	0.00	1.89	0.66	1.23	0.51	27.0
ST3	Construction	13.49	0.42	13.07	4.96	8.11	3.34	25.6
FS	Production	5.37	0.42	4.95	2.09	2.86	1.19	24.0
WPS	Production	3.86	0.00	3.86	1.33	2.53	1.04	26.9

Table 5. Peak Flow Estimates Using the Rational Method

Outlet	Phase	Calculated Peak Flow, cfs					
		2-year	5-year	10-year	25-year	50-year	100-year
ARC1	Construction	0.3	0.5	1.4	4.5	8.9	19.5
	Production	0.4	0.5	1.4	4.6	9.3	20.5
ARC2	Construction	<0.1	<0.1	0.1	0.3	0.6	1.2
ARC3	Construction	2.0	2.9	4.1	6.7	9.7	13.9
ARC4	Construction	0.6	0.9	1.4	2.5	3.5	4.9
ARC5	Construction	1.4	2.0	3.2	6.0	8.3	11.4
ARC6	Production	0.2	0.3	0.6	1.5	2.2	3.4
ST1	Construction	2.4	3.4	4.8	8.1	11.5	16.5
ST2	Construction	0.5	0.8	1.3	2.4	3.3	4.6
ST3	Construction	2.8	4.2	7.0	14.3	20.1	28.1
FS	Production	1.0	1.5	2.5	5.4	7.6	10.6
WPS	Production	0.9	1.3	2.1	3.9	5.6	7.9

2.3 Stormwater Volume

In accordance with Town of Firestone Municipal Code requirements, stormwater falling on the project area will be detained and released at reduced flow rates. The MHFD spreadsheet model *Detention Basin Design Workbook Version 4.03* (MHFD-Detention) was used to calculate storm runoff volumes. One-hour point rainfall data for the project area (Table 1) were used within MHFD-Detention. Watershed parameters including area, length, and slope as well as imperviousness and soil type were calculated based on the site design and site characteristics. Table 6 shows storm runoff volumes calculated for the stormwater storage outlets. MHFD-Detention inputs and results can be found in Appendix F.

Table 6. Calculated Storm Runoff Volumes

Outlet	Phase	Storm Runoff Volume, acre-ft								
		WQCV	EURV	2-year	5-year	10-year	25-year	50-year	100-year	500-year
FS	Production	0.054	0.120	0.056	0.092	0.173	0.374	0.534	0.746	1.273
WPS	Production	0.045	0.104	0.046	0.073	0.113	0.254	0.372	0.536	0.934

3.0 HYDRAULIC ANALYSIS AND DRAINAGE DESIGN

Criteria presented in MHFD's Urban Storm Drainage Criteria Manual outline the capacity, velocity, and slope requirements involved with drainage design and stormwater conveyance. The following sections describe the design recommendations for conveyance during the construction phase and production phase. The recommended drainage design is included in the Drainage and Erosion Control Plan found in Appendix A.

3.1 Stormwater Storage

During the production phase, stormwater will be stored in two locations: on the facility and on the well pad. Each storage location will hold its own required stormwater volume and control releases through individual outlets and spillways.

Facility

The facility will drain southwest to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the facility. During the 10-year event, stormwater will back up out of the ditch onto the facility and will pond to a maximum depth of 0.31 feet above the edge of the facility. During the 100-year event, stormwater will pond to a maximum depth of 0.65 feet above the edge of the facility creating a stored volume of 0.289 acre-feet.

The outlet for the facility storage berm consists of a 10-inch diameter high-density polyethylene (HDPE) pipe with an orifice cap used to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (9/16 inch diameter) at the invert of the outlet pipe and a second orifice (2-1/4 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 4.0 feet, 4:1 side slopes, and a crest invert at 1.3 feet above the ditch/outlet pipe invert (0.2 feet above the edge of the facility). It will take approximately 40 hours to drain 99 percent of the water quality capture volume (WQCV) with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 32 hours to drain 99 percent of the inflow with peak flow release of 5.1 cubic feet per second (cfs). Buoyancy calculations were performed for the outlet pipe. Using a factor safety of 1.5, it was found that a minimum cover of 0.8 feet is needed to anchor the 10-inch outlet pipe during fully saturated conditions. Buoyancy calculations can be found in Appendix G. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the facility storage berm, overlapping the weir. The spillway was designed with a crest length of 10.0 feet, 4:1 side slopes, and a crest invert at 1.75 feet above the ditch/outlet pipe invert (0.65 feet above the edge of the facility) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.48 feet. A berm height of 1.65 feet (2.75 feet above the bottom of the ditch) will provide 1.0 feet of freeboard above the spillway and 0.52 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater volume, outlet sizing, and spillway design details for the facility are included in the Drainage and Erosion Control Plan found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

Well Pad

The well pad will drain west to a storage ditch, berm, and outlet. During the 2-year event, stormwater will collect within the ditch without spilling out onto the well pad. During the 10-year event, stormwater will back up out of the ditch onto the well pad and will pond to a maximum depth of 0.16 feet above the edge of the well pad. During the 100-year event, stormwater will back up out of the ditch onto the well pad and pond to a maximum depth of 0.43 feet above the ditch creating a stored volume of 0.344 acre-feet.

The outlet for the well pad storage consists of a 10-inch diameter HDPE pipe with an orifice cap to control release rates and drain times for smaller events and a weir to control release rates for larger events. The orifice cap will have an orifice (9/16 inch diameter) at the invert of the outlet pipe and a second orifice (2-1/4 inch diameter) at the top of the outlet pipe. The weir will have a crest length of 2.0 feet, 4:1 side slopes, and a crest invert at 1.1 feet above the ditch/outlet pipe invert (0.1 feet above the edge of the well pad). It will take approximately 40 hours to drain 99 percent of the WQCV with outflow controlled by the orifice plate. During the 100-year event, outflow is controlled by the weir and it will take approximately 40 hours to drain 99 percent of the inflow with peak flow release of 1.9 cfs. A minimum cover of 0.8 feet over the outlet pipe is needed to avoid buoyancy issues. Outlet slopes should be protected using geotextile fabric or riprap in order to prevent erosion along the embankment.

An emergency spillway will be installed along the well pad storage berm, overlapping the weir. The spillway was designed with a crest length of 5.2 feet, 4:1 side slopes, and a crest invert at 1.5 feet above the ditch/outlet pipe invert (0.5 feet above the edge of the well pad) allowing adequate storage for the 100-year volume before stormwater can reach the spillway. The spillway was designed to convey the 100-year peak flow at a depth of 0.48 feet. A berm height of 1.5 feet (2.5 feet above the bottom of the ditch) will provide 1.0 feet of freeboard above the spillway and 0.52 feet of freeboard above the 100-year peak flow depth through the spillway.

Stormwater volume, outlet sizing, and spillway design details for the well pad are included in the Drainage and Erosion Control Plan found in Appendix A. Supporting calculations using MHFD-Detention can be found in Appendix F.

3.2 Culverts

Six proposed culvert locations will ensure proper on-site and off-site drainage. MHFD's *Culvert Hydraulics Version 4.00* (MHFD-Culvert) was used to calculate conveyance, sizing, and performance characteristics for the recommended culvert designs. Peak flows used for culvert designs are found in Table 5 and spreadsheet calculations can be found in Appendix H.

Access Road Culvert #1 (ARC1) will convey off-site runoff from the area northeast of the project site (south of County Road 20) under the access road and to the west during both the construction phase (Figure 2) and the production phase (Figure 3). One 15-inch reinforced concrete pipe (RCP) culvert is recommended for this location. Characteristics for the recommended culvert at ARC1 are found in Table 7. The maximum design conveyance before overtopping the access road is 7.3 cfs; therefore, the proposed culvert can adequately convey more than the 25-year peak flow during the construction phase (4.5 cfs) and more than the 25-year peak flow during the production phase (4.6 cfs).

Table 7. Culvert Performance Characteristics for Recommended Culvert Designs

Site	Recommended Culvert Design	2-year Peak Flow			Full Barrel Flow			Max Conveyance		
		Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D	Q, cfs	Vel, fps	HW/D
ARC1	15-inch RCP	0.4	3.2	0.2	3.9	3.2	1.0	7.3	5.9	1.8
ARC2	12-inch CMP	0.1	1.1	0.2	1.7	2.2	1.0	3.3	4.2	2.0
ARC3	12-inch CMP	2.0	2.5	1.1	1.9	2.4	1.0	3.4	4.3	2.0
ARC4	12-inch CMP	0.6	2.4	0.4	2.3	2.9	1.0	3.7	4.7	2.0
ARC5	12-inch CMP	1.4	2.7	0.6	2.1	2.7	1.0	3.6	4.6	2.0
ARC6	12-inch CMP	0.2	2.3	0.2	2.3	2.9	1.0	4.2	5.3	2.0

Access Road Culvert #2 (ARC2) will convey on-site runoff from the northern part of the well pad under the well pad access road and to the west during the construction phase. One 12-inch corrugated metal pipe (CMP) culvert is recommended for this location. Characteristics for the recommended culvert at ARC2 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.3 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow during the construction phase (1.2 cfs). The 2-year peak flow velocity is below 3.0 feet per second (fps). Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #3 (ARC3) will convey on-site runoff from ST1 under the facility access road and to the west during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC3 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.4 cfs; therefore, the proposed culvert can adequately convey more than the 5-year peak flow during the construction phase (2.9 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #4 (ARC4) will convey on-site runoff from ST2 under the facility access road and to the west during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC4 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.7 cfs; therefore, the proposed culvert can adequately convey more than the 50-year peak flow during the construction phase (3.5 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #5 (ARC5) will convey on-site runoff from the southern part of the well pad south under the facility access road and into the external ditch and berm during the construction phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC5 are found in Table 7. The maximum design conveyance before overtopping the access road is 3.6 cfs; therefore, the proposed culvert can adequately convey more than the 10-year peak flow during the construction phase (3.2 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

Access Road Culvert #6 (ARC6) will convey runoff from between the well pad and facility, as well as the well pad stormwater storage releases, under the facility access road and to the west during the production phase. One 12-inch CMP culvert is recommended for this location. Characteristics for the recommended culvert at ARC6 are found in Table 7. The maximum design conveyance before overtopping the access road is 4.2 cfs; therefore, the proposed culvert can adequately convey more than the 100-year peak flow during the production phase (3.4 cfs). The 2-year peak flow velocity is below 3.0 fps. Routine maintenance may be required to ensure sedimentation does not occur.

3.3 Ditching

Temporary diversion ditches and berms will be used to collect and direct on-site stormwater to outlets while also deflecting and redirecting off-site flows around the disturbance area during the construction phase. Per recommendations from the MHFD Urban Storm Drainage Criteria Manual, all temporary diversion ditches were designed with slopes between 0.5 percent and 2.0 percent. Temporary diversion ditch slopes are identified in the Drainage and Erosion Control Plan found in Appendix A.

Manning's equation was used to calculate conveyance based on typical temporary diversion ditch design. Using a ditch slope of 0.5 percent (lowest proposed ditch slope for the project), the typical design was found to convey 5.6 cfs at a depth of 1.0 feet and 16.5 cfs at a depth of 1.5 feet (maximum capacity assuming 2:1 ditch slope is carried onto pad). The typical design at a depth of 1.0 feet will convey more than the largest 5-year peak flow (ST3, 4.2 cfs) and the typical design at a depth of 1.5 feet will convey more than the largest 25-year peak flow (ST3 14.3 cfs). Manning's calculations for typical temporary diversion ditch conveyance can be found in Appendix I.

3.4 Sediment Traps

Sediment traps and outlets will be installed at the end of temporary diversion ditches. Sediment traps were sized according to the Kerr-McGee BMP Manual which uses modified MHFD typicals. Total ditch length draining the fill portion of the pad and ditch length along topsoil stockpiles were added together for the ditch length design parameter. In order to provide additional capture volume and treatment, sediment traps are designed to be oversized when possible. The results of the sediment trap sizing are found in Table 8. Sediment trap sizing calculations can be found in Appendix J and typical sediment trap details are included in the Drainage and Erosion Control Plan found in Appendix A.

Table 8. Sediment Trap Sizing Design

Outlet	Minimum Design Area, ft^2	Recommended Design Size
ST1	400	20 ft x 20 ft (400 ft^2)
ST2	100	15 ft x 15 ft (225 ft^2)
ST3	380	20 ft x 20 ft (400 ft^2)

4.0 SITE MAINTENANCE AND UPKEEP

Kerr-McGee's site monitoring program ensures site conditions stay in compliance. Sedimentation, culvert and access road condition, vegetation health, and several other safety and maintenance items are routinely monitored and evaluated to ensure the site is in workable and drainable order.

In addition to monitoring during regular operations, a formal monitoring plan has been developed for the project site. During the construction phase, the site will be inspected a minimum of every 14 calendar days as well as following any rain or snowmelt events that are able to cause surface erosion. After the construction phase, areas not needed for production operations within the disturbance area will be reclaimed and site inspections will occur at a minimum of every 30 calendar days until the site is fully stabilized. Once the site is stabilized and has achieved interim reclamation standards, inspections will occur annually. More frequent, informal inspections will continue to occur during routine operations.

Routine maintenance and required repairs of access roads, culverts, ditches, berms, and the berm outlet structures will be handled by the operations team. Cleaning and removal of sediment and debris from ditches, culverts, and berm outlets as well as vegetation maintenance and specific manufacturer maintenance will also be handled by the operations team during regular operations and maintenance checks.

5.0 CONCLUSION

The information and analysis presented in this report display the adequacy and effectiveness of the design and planning associated with the McGavin 6-19HZ Drainage and Erosion Control Plan. The design protects public health, safety, and general welfare and has no adverse impacts on public rights-of-way or off-site properties. Furthermore, the report demonstrates that the design adheres to the Town of Firestone Municipal Code as well as the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual.

6.0 REFERENCES

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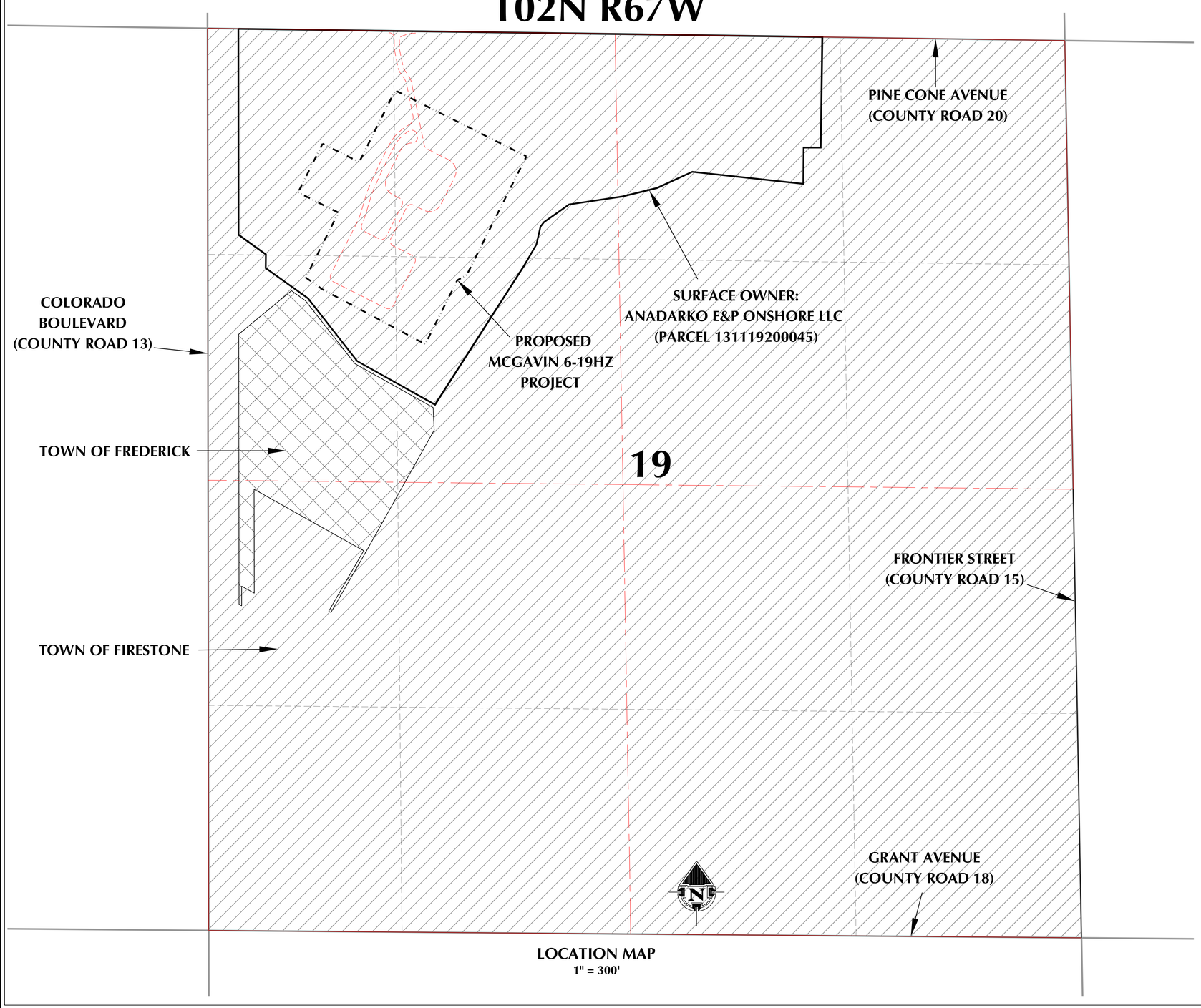
APPENDICES

Appendix A:

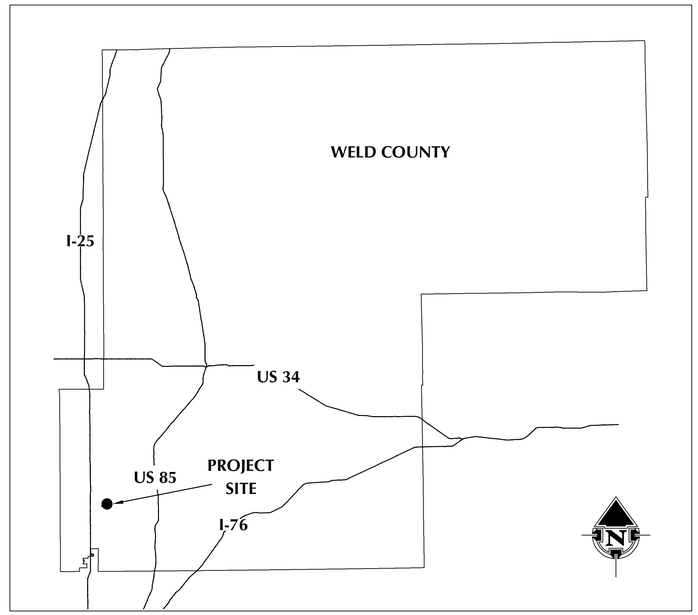
Drainage and Erosion Control Plan

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'



VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - FACILITY STORMWATER STORAGE
6 - WELL PAD STORMWATER STORAGE
7 - BMP TYPICALS (A)
8 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

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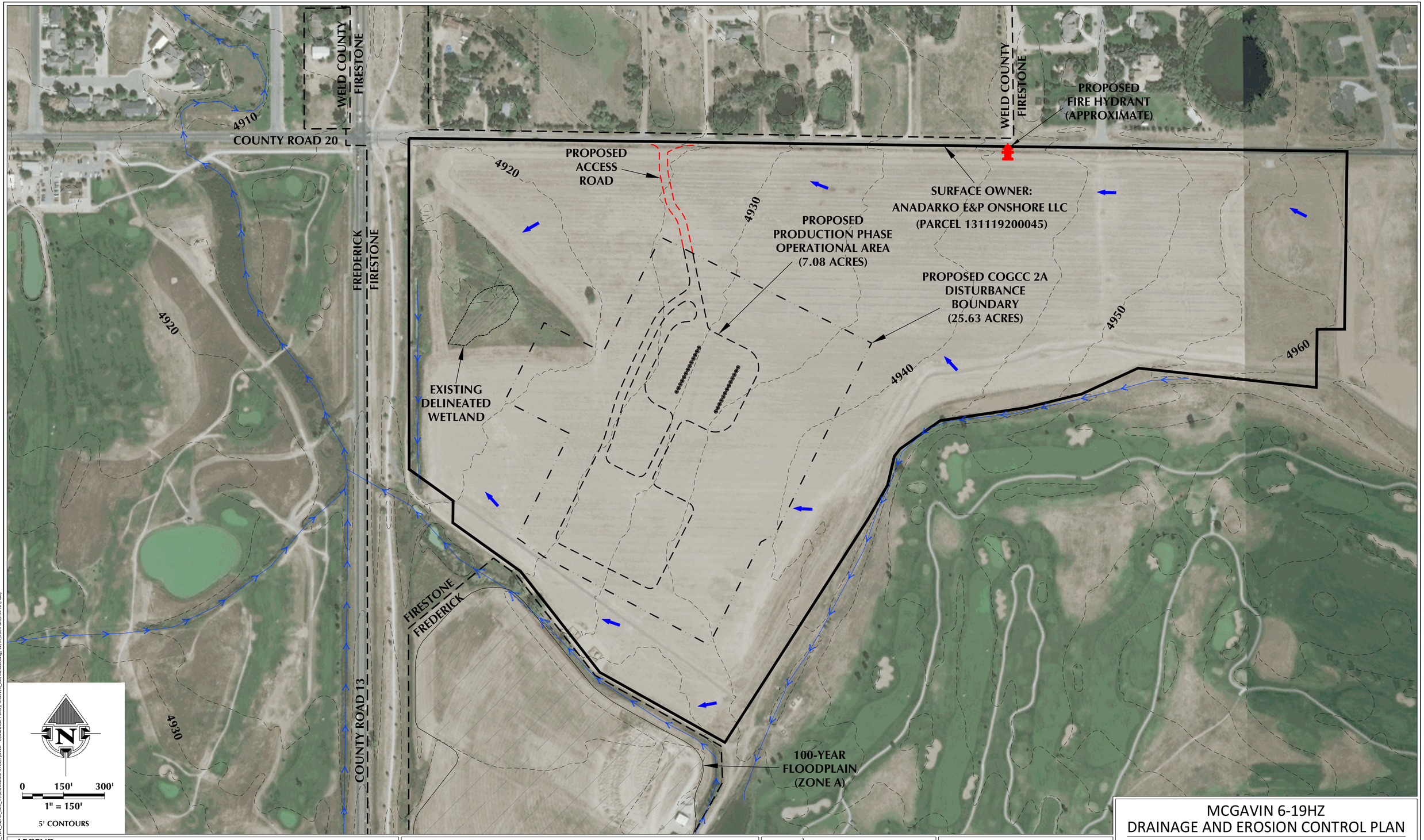
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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

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2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 8
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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC2	12" CMP	30	4927.1	4927.0	0.3%
ARC3	12" CMP	30	4920.4	4920.2	0.7%
ARC4	12" CMP	30	4917.3	4916.9	1.3%
ARC5	12" CMP	30	4923.2	4922.9	1.0%

COUNTY ROAD 13
BIKE PATH
100-YEAR FLOODPLAIN (ZONE A)
EXISTING PRIVATE ROAD
DELINEATED WETLAND
15' X 15' X 3' SEDIMENT TRAP (ST2)
ACCESS ROAD CULVERT #4 (ARC4)
ACCESS ROAD CULVERT #3 (ARC3)
20' X 20' X 3' SEDIMENT TRAP (ST1)
ACCESS ROAD CULVERT #5 (ARC5)
20' X 20' X 3' SEDIMENT TRAP (ST3)
ACCESS ROAD CULVERT #1 (ARC1)
ACCESS ROAD CULVERT #2 (ARC2)
COUNTY ROAD 20
POWER POLE (TYP.)
OVERHEAD POWER LINE
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
MCGAVIN 6-19HZ MLVT
FLAT GRADED ELEVATION = 4919.3'
MCGAVIN 6-19HZ FACILITY
FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'
MCGAVIN 6-19HZ WELL PAD
FLAT GRADED ELEVATION = 4929.9'
TEMPORARY EQUIPMENT AREA
TOPSOIL STOCKPILE
4915
4920
4925
4930
4935
4940
1.1% DITCH SLOPE
1.8% DITCH SLOPE
2.0% DITCH SLOPE
1.2% DITCH SLOPE
1.3% DITCH SLOPE
1.4% DITCH SLOPE
0.5% DITCH SLOPE
0.5% SLOPE
1.0% SLOPE
0.8% SLOPE
0.6% SLOPE
CUT
FILL
SP

0 75' 150'
1" = 75'
1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

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ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC6	12" CMP	30	4923.8	4922.9	3.0%

COUNTY ROAD 13

BIKE PATH

4915

DELINEATED WETLAND

4920

4920

EXISTING PRIVATE ROAD

100-YEAR FLOODPLAIN (ZONE A)

FACILITY WEIR & SPILLWAY

FACILITY OUTLET PIPE 4925

FACILITY STORAGE BERM

2-YEAR STORMWATER STORAGE FOOTPRINT

ACCESS ROAD CULVERT #6 (ARC6)

WELL PAD OUTLET PIPE

WELL PAD WEIR & SPILLWAY

WELL PAD STORAGE BERM

PROPOSED 6' MASONRY WALL

FILL

CUT

0.5% SLOPE

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ FACILITY

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'

0.8% SLOPE

0.5% SLOPE

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.9'

0.6% SLOPE

FILL

CUT

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ WELL PAD

WELL ELEVATION = 4929.9'

0.5% SLOPE

0.5% SLOPE

4930

4930

4930

4925

ACCESS ROAD CULVERT #1 (ARC1)

COUNTY ROAD 20

POWER POLE (TYP.)

OVERHEAD POWER LINE

4935

4935

4940

4940

PRODUCTION PHASE OPERATIONAL AREA (7.08 ACRES)

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

N

0 75' 150'

1" = 75'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

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2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
PRODUCTION PHASE DRAINAGE PLAN

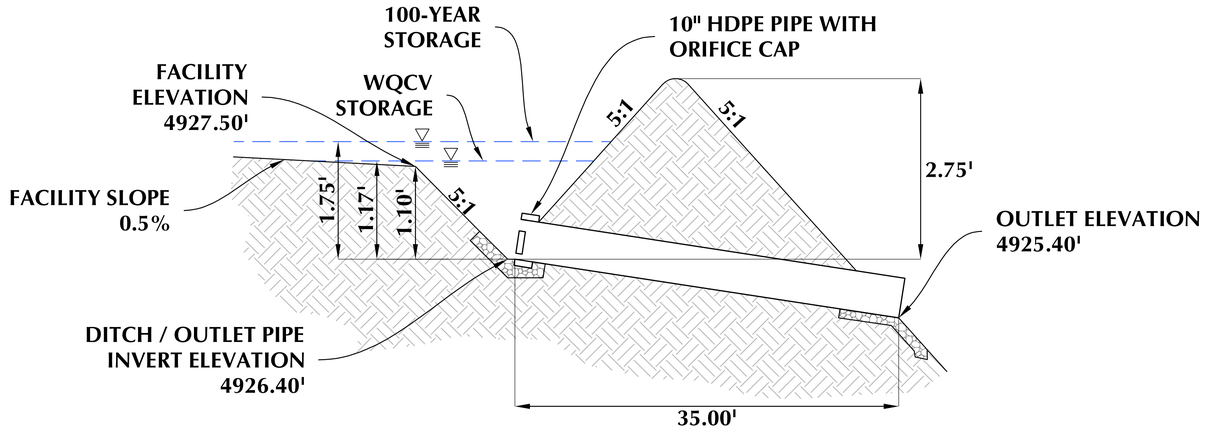
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FACILITY STORMWATER STORAGE

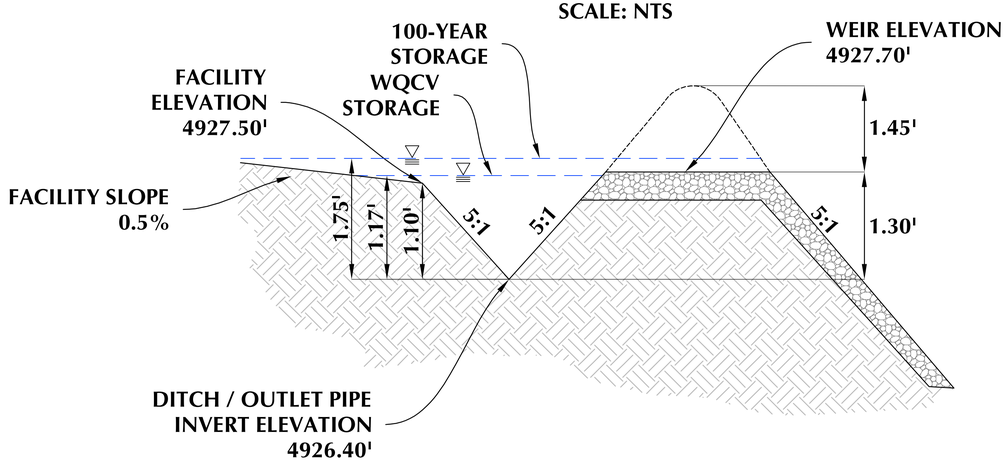
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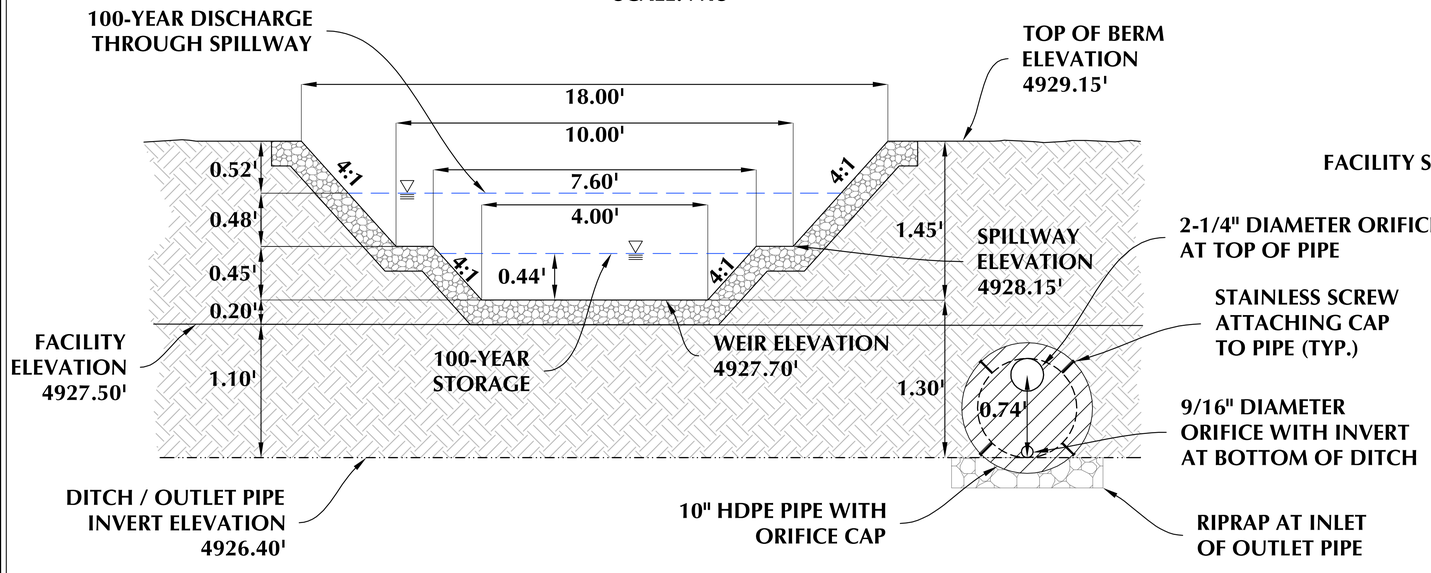
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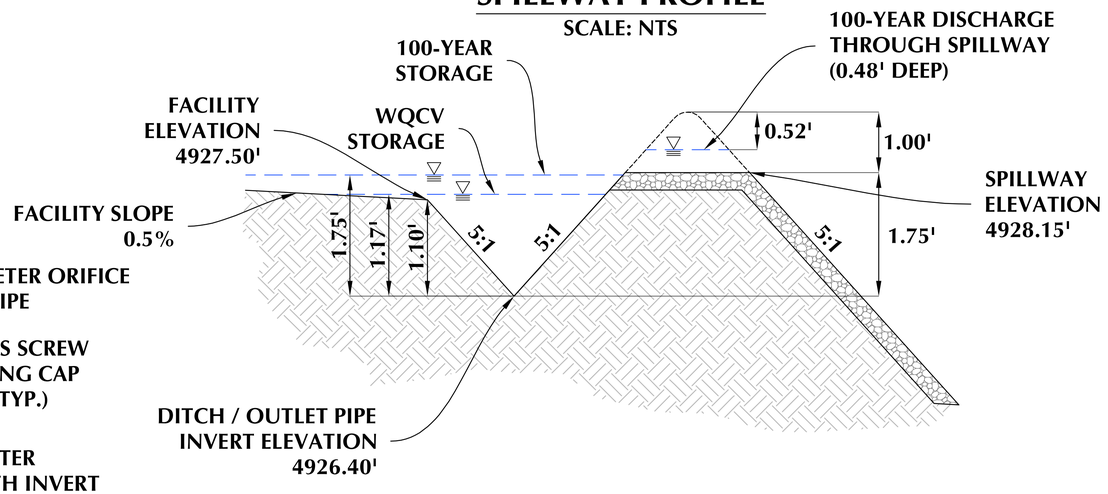
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SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
FACILITY STORMWATER STORAGE

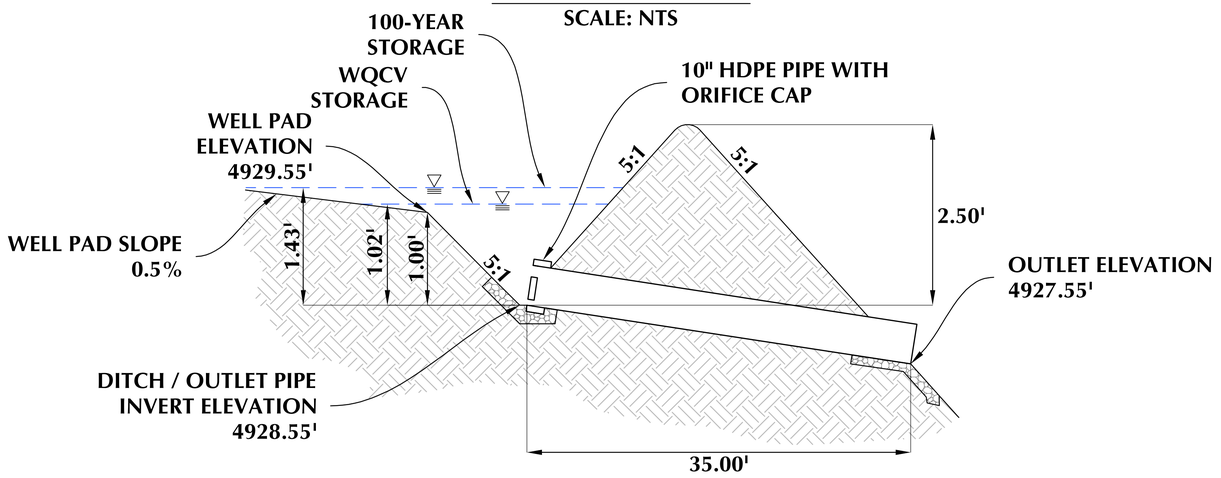
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WELL PAD STORMWATER STORAGE

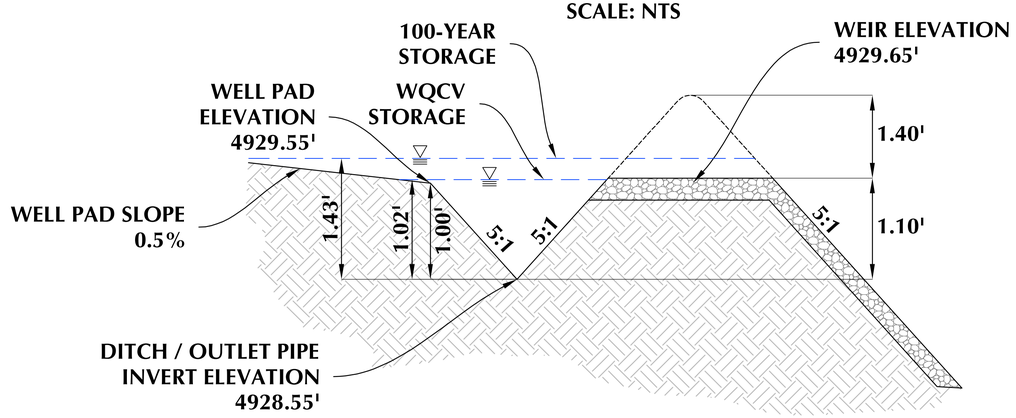
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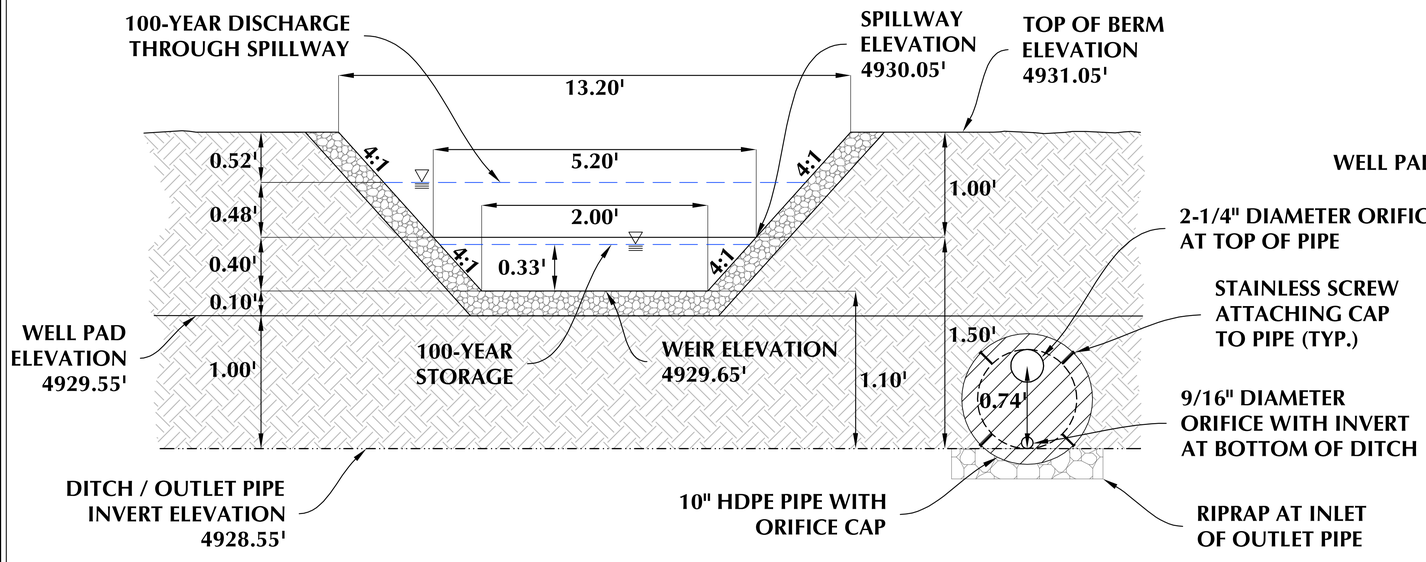
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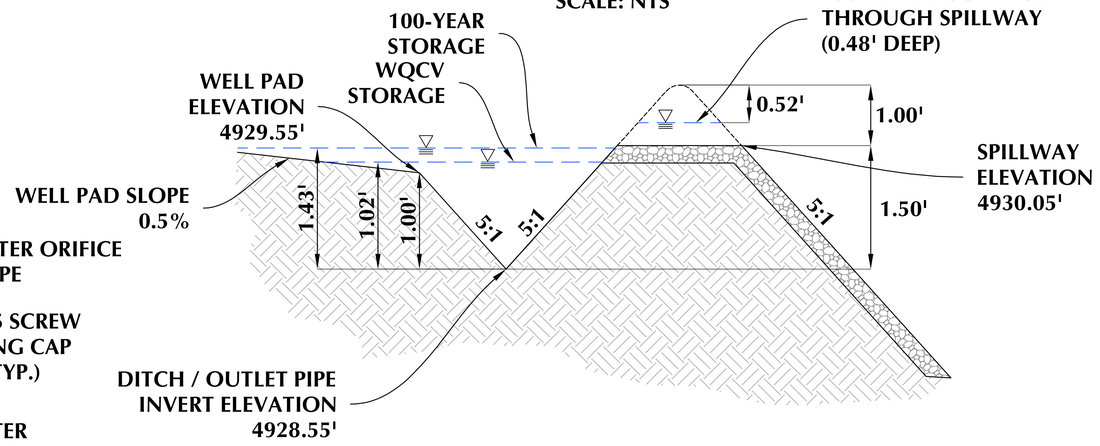
WEIR & SPILLWAY SECTION

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SPILLWAY PROFILE

SCALE: NTS



GENERAL NOTES:

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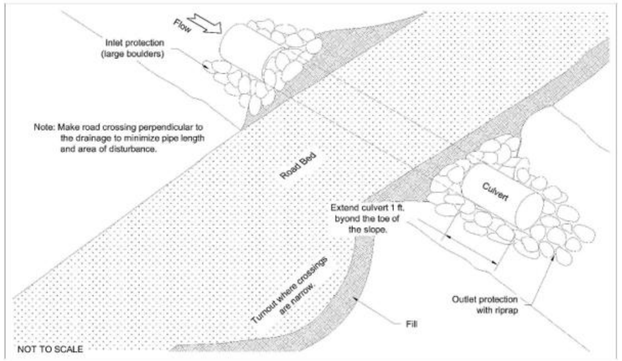
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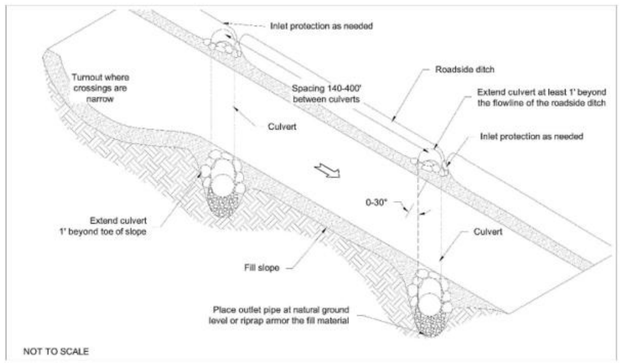
MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
WELL PAD STORMWATER STORAGE

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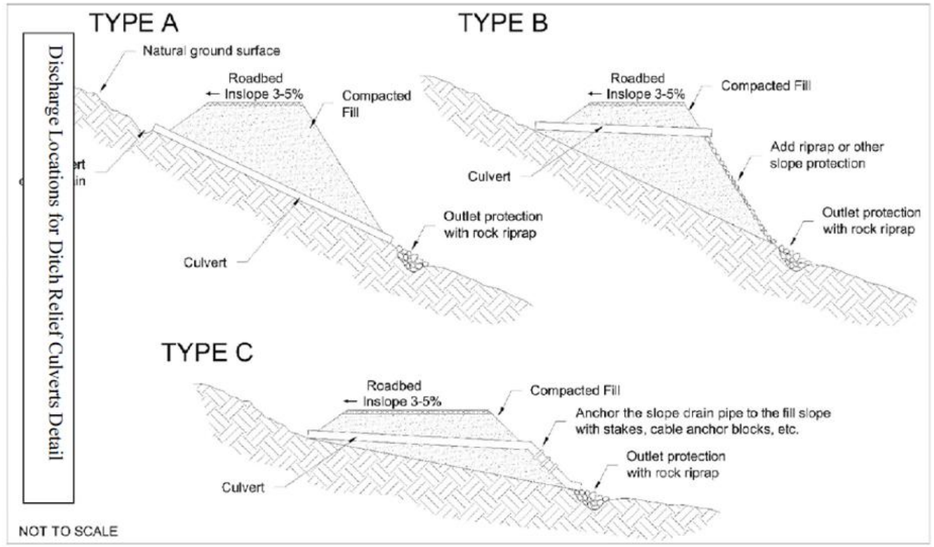
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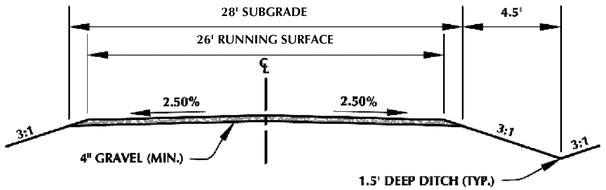
Culvert





Culvert

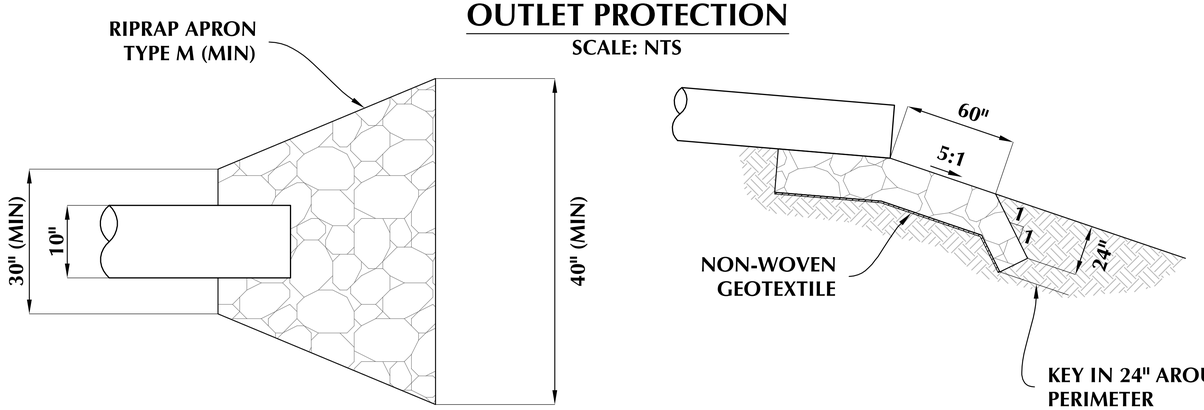




ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

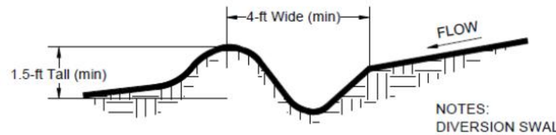
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Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

GENERAL NOTES:

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Denver, Colorado 80202

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

SCALE:	VARIES	PAGE:	7 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

K:\ANDARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DRAINAGE STUDY\DWG - DRAINAGE PLAN\MCGAVIN_COMBINED.dwg, 12/13/2021 9:25:13 AM, Kiley

Sediment Trap

ST

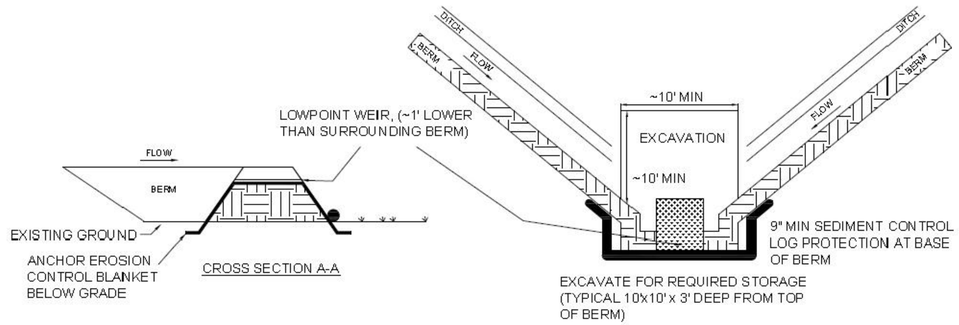
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

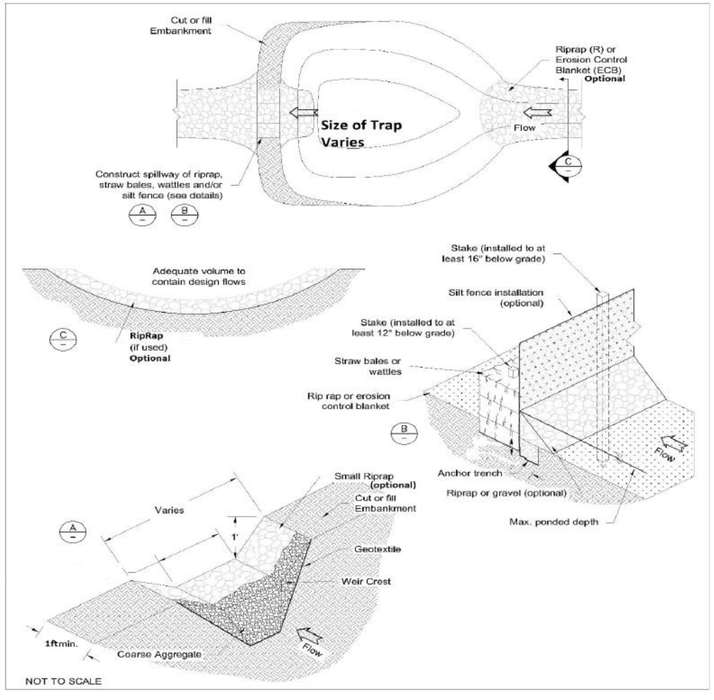
Sediment Trap

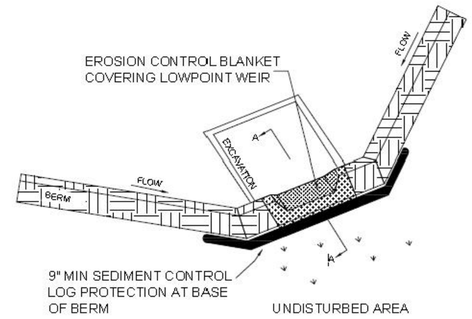
ST



Sediment Trap

ST





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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (B)

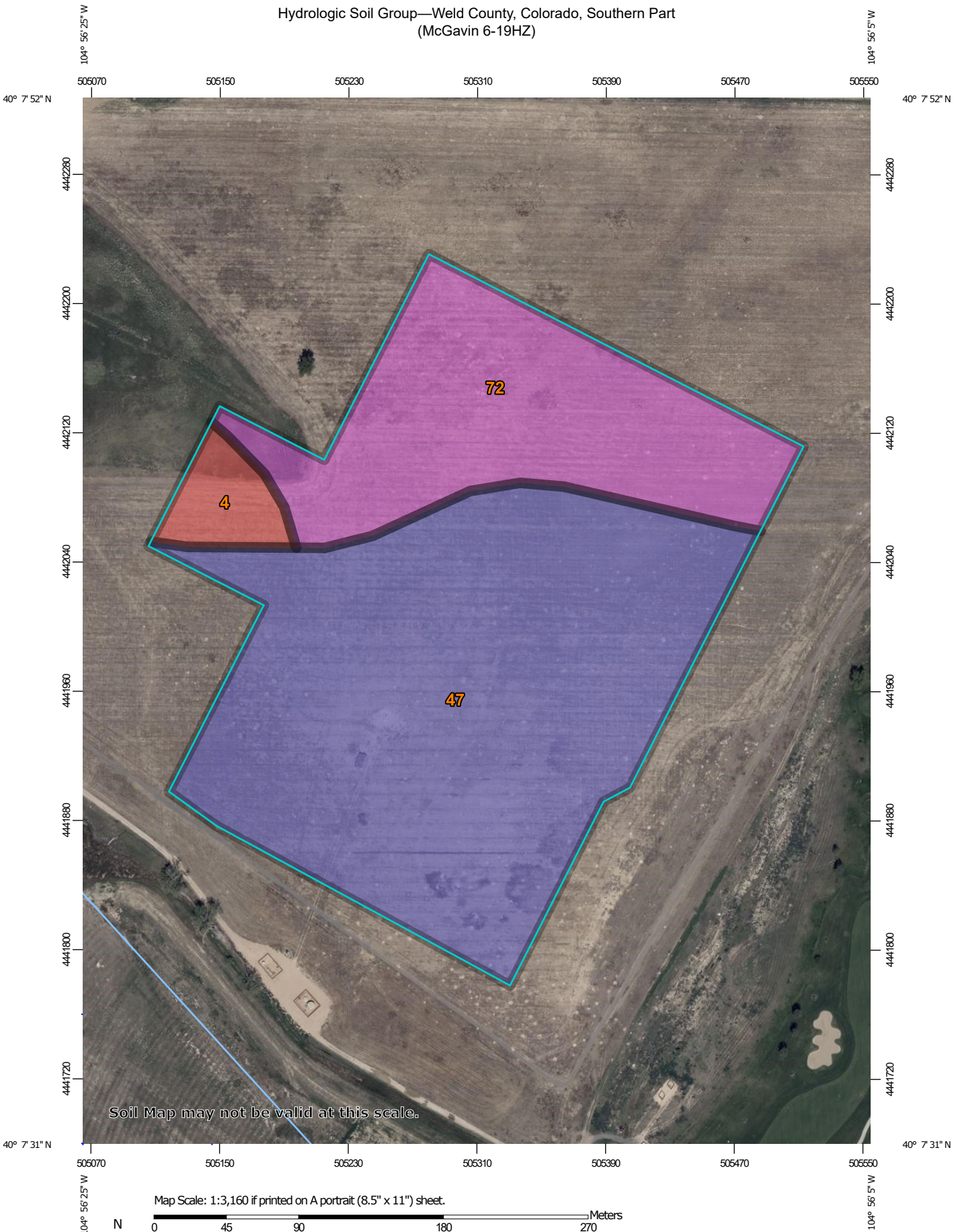
SCALE:	VARIES	PAGE:	8 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	

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Appendix B:

NRCS Web Soil Survey – Soils Report

Hydrologic Soil Group—Weld County, Colorado, Southern Part
(McGavin 6-19HZ)



Map Scale: 1:3,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquolls and Aquepts, flooded	D	1.0	3.9%
47	Olney fine sandy loam, 1 to 3 percent slopes	B	16.9	66.0%
72	Vona loamy sand, 0 to 3 percent slopes	A	7.7	30.1%
Totals for Area of Interest			**25.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C:

FEMA Flood Insurance Rate Map FIRMette

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/5/2020 at 4:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D:

NOAA Atlas 14 Point Precipitation Frequency Estimates

NOAA Atlas 14, Volume 8, Version 2
Location name: Firestone, Colorado, USA*
Latitude: 40.129°, Longitude: -104.9379°
Elevation: 4926.92 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.229 (0.176-0.297)	0.278 (0.213-0.361)	0.374 (0.287-0.488)	0.469 (0.358-0.615)	0.623 (0.471-0.877)	0.759 (0.556-1.08)	0.911 (0.645-1.32)	1.08 (0.735-1.61)	1.33 (0.871-2.04)	1.54 (0.973-2.36)
10-min	0.335 (0.258-0.435)	0.406 (0.313-0.528)	0.547 (0.420-0.714)	0.687 (0.524-0.900)	0.912 (0.689-1.28)	1.11 (0.814-1.57)	1.33 (0.945-1.94)	1.58 (1.08-2.36)	1.95 (1.27-2.99)	2.25 (1.43-3.46)
15-min	0.408 (0.314-0.530)	0.496 (0.381-0.644)	0.668 (0.512-0.871)	0.838 (0.639-1.10)	1.11 (0.841-1.57)	1.36 (0.993-1.92)	1.63 (1.15-2.36)	1.93 (1.31-2.88)	2.38 (1.56-3.64)	2.75 (1.74-4.22)
30-min	0.554 (0.427-0.720)	0.671 (0.516-0.872)	0.901 (0.691-1.18)	1.13 (0.861-1.48)	1.50 (1.13-2.11)	1.83 (1.34-2.59)	2.19 (1.55-3.18)	2.60 (1.77-3.88)	3.20 (2.10-4.91)	3.70 (2.34-5.69)
60-min	0.677 (0.521-0.880)	0.820 (0.631-1.07)	1.10 (0.846-1.44)	1.39 (1.06-1.82)	1.84 (1.40-2.60)	2.25 (1.65-3.19)	2.71 (1.92-3.93)	3.22 (2.19-4.80)	3.97 (2.60-6.08)	4.59 (2.91-7.05)
2-hr	0.800 (0.623-1.03)	0.970 (0.754-1.25)	1.31 (1.01-1.68)	1.64 (1.27-2.13)	2.19 (1.67-3.05)	2.67 (1.98-3.74)	3.22 (2.31-4.61)	3.83 (2.63-5.64)	4.73 (3.13-7.15)	5.48 (3.50-8.29)
3-hr	0.868 (0.681-1.11)	1.05 (0.823-1.34)	1.41 (1.10-1.81)	1.77 (1.38-2.28)	2.36 (1.82-3.26)	2.88 (2.15-4.00)	3.47 (2.50-4.93)	4.13 (2.86-6.02)	5.09 (3.39-7.63)	5.90 (3.79-8.85)
6-hr	1.03 (0.817-1.30)	1.23 (0.977-1.55)	1.64 (1.29-2.06)	2.03 (1.60-2.58)	2.67 (2.08-3.63)	3.24 (2.45-4.43)	3.88 (2.83-5.43)	4.59 (3.21-6.60)	5.64 (3.79-8.32)	6.50 (4.23-9.61)
12-hr	1.27 (1.01-1.57)	1.50 (1.20-1.86)	1.94 (1.55-2.41)	2.37 (1.88-2.96)	3.05 (2.39-4.06)	3.64 (2.77-4.89)	4.30 (3.16-5.92)	5.03 (3.55-7.11)	6.10 (4.14-8.84)	6.98 (4.59-10.2)
24-hr	1.51 (1.23-1.85)	1.80 (1.46-2.21)	2.33 (1.88-2.86)	2.81 (2.26-3.47)	3.54 (2.78-4.60)	4.15 (3.18-5.45)	4.81 (3.57-6.48)	5.53 (3.93-7.65)	6.55 (4.49-9.32)	7.38 (4.90-10.6)
2-day	1.72 (1.42-2.08)	2.10 (1.72-2.54)	2.74 (2.24-3.33)	3.30 (2.68-4.01)	4.09 (3.23-5.19)	4.73 (3.64-6.07)	5.39 (4.02-7.09)	6.08 (4.35-8.23)	7.02 (4.85-9.78)	7.77 (5.22-11.0)
3-day	1.88 (1.55-2.25)	2.27 (1.87-2.72)	2.92 (2.40-3.51)	3.48 (2.85-4.21)	4.29 (3.41-5.39)	4.93 (3.83-6.28)	5.60 (4.20-7.31)	6.30 (4.54-8.45)	7.25 (5.03-10.0)	8.00 (5.41-11.2)
4-day	2.01 (1.67-2.39)	2.39 (1.98-2.85)	3.04 (2.52-3.64)	3.61 (2.97-4.33)	4.41 (3.53-5.51)	5.06 (3.95-6.40)	5.74 (4.33-7.44)	6.44 (4.67-8.59)	7.41 (5.17-10.2)	8.17 (5.55-11.3)
7-day	2.31 (1.93-2.71)	2.70 (2.27-3.19)	3.38 (2.82-3.99)	3.96 (3.28-4.70)	4.78 (3.85-5.89)	5.44 (4.28-6.79)	6.12 (4.66-7.83)	6.83 (5.00-8.98)	7.80 (5.49-10.6)	8.56 (5.87-11.7)
10-day	2.56 (2.16-2.99)	2.98 (2.51-3.49)	3.68 (3.09-4.32)	4.28 (3.58-5.04)	5.12 (4.15-6.25)	5.79 (4.59-7.17)	6.48 (4.96-8.22)	7.19 (5.29-9.37)	8.16 (5.77-10.9)	8.90 (6.14-12.1)
20-day	3.28 (2.80-3.78)	3.76 (3.21-4.34)	4.55 (3.87-5.26)	5.21 (4.41-6.05)	6.13 (5.01-7.34)	6.84 (5.47-8.31)	7.55 (5.85-9.40)	8.29 (6.16-10.6)	9.26 (6.62-12.2)	10.0 (6.98-13.4)
30-day	3.85 (3.31-4.40)	4.40 (3.78-5.03)	5.29 (4.53-6.07)	6.02 (5.13-6.94)	7.03 (5.79-8.33)	7.80 (6.28-9.37)	8.56 (6.67-10.5)	9.33 (6.98-11.8)	10.3 (7.44-13.5)	11.1 (7.80-14.7)
45-day	4.53 (3.93-5.14)	5.19 (4.50-5.89)	6.25 (5.39-7.11)	7.11 (6.10-8.12)	8.26 (6.84-9.68)	9.13 (7.39-10.9)	9.98 (7.81-12.2)	10.8 (8.13-13.5)	11.9 (8.61-15.3)	12.7 (8.97-16.6)
60-day	5.09 (4.44-5.74)	5.86 (5.10-6.61)	7.09 (6.15-8.02)	8.07 (6.96-9.16)	9.38 (7.79-10.9)	10.3 (8.41-12.2)	11.3 (8.87-13.6)	12.2 (9.20-15.1)	13.3 (9.70-17.0)	14.2 (10.1-18.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

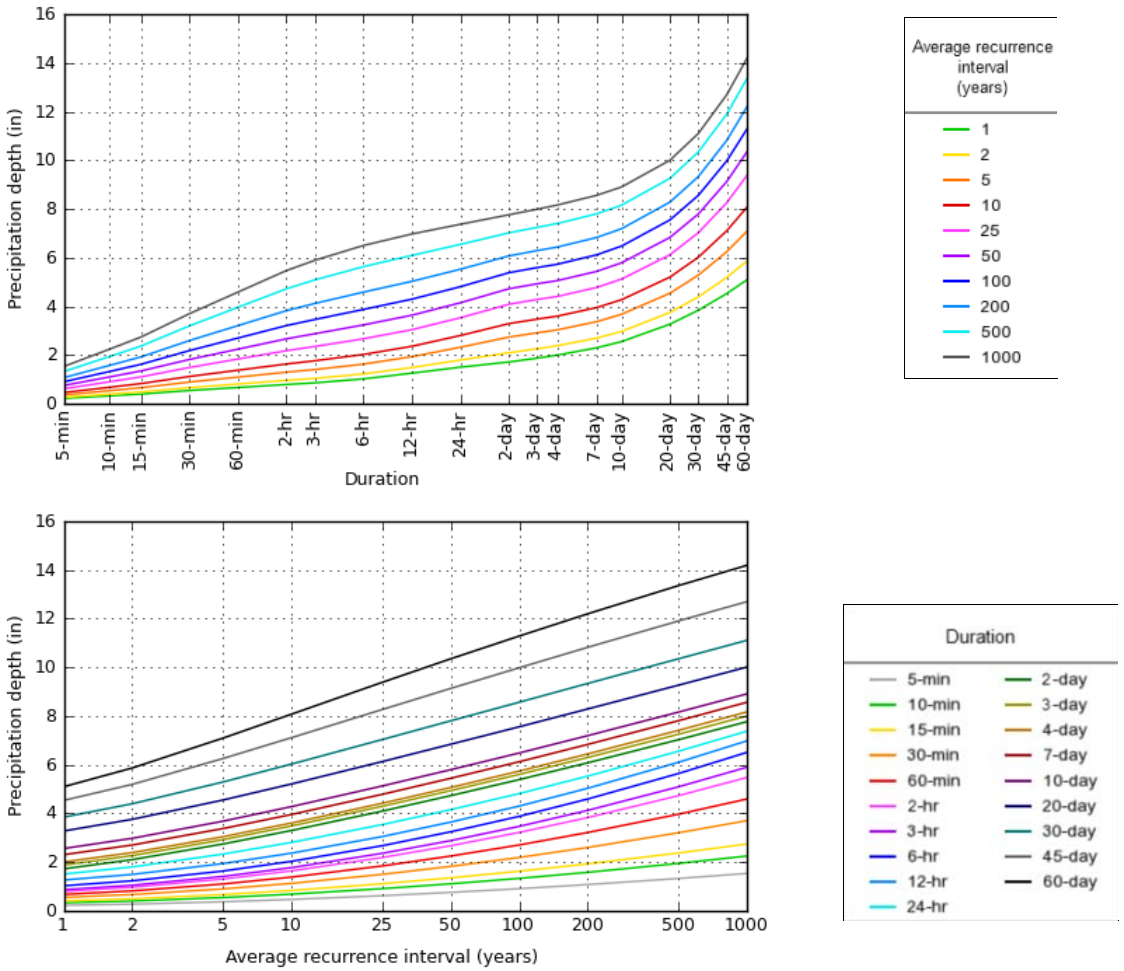
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.1290°, Longitude: -104.9379°

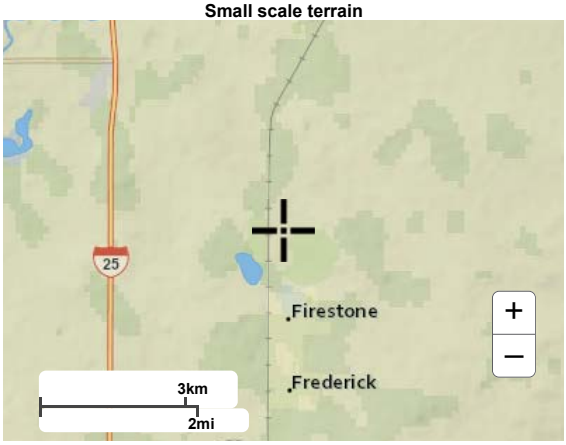


NOAA Atlas 14, Volume 8, Version 2 Created (GMT): Mon Oct 5 20:55:42 2020

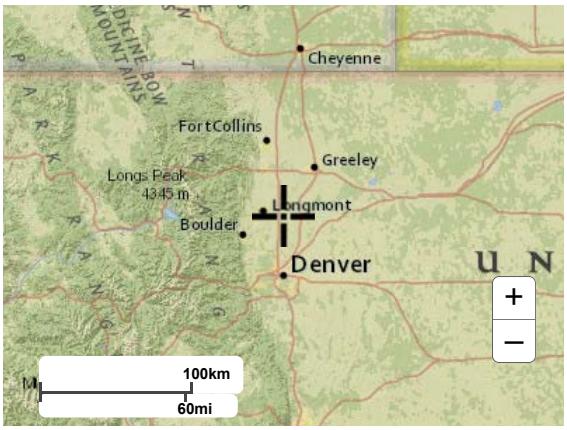
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Maps & aerials

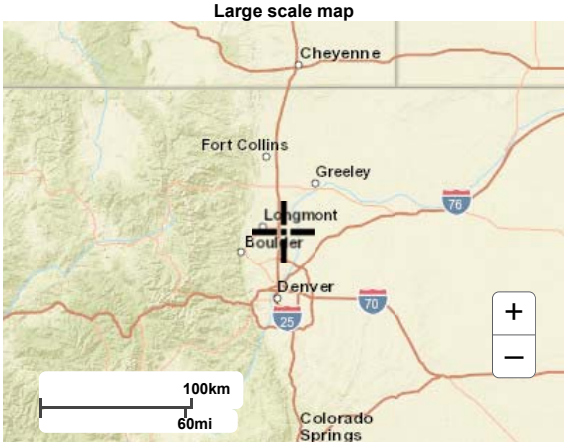
Small scale terrain



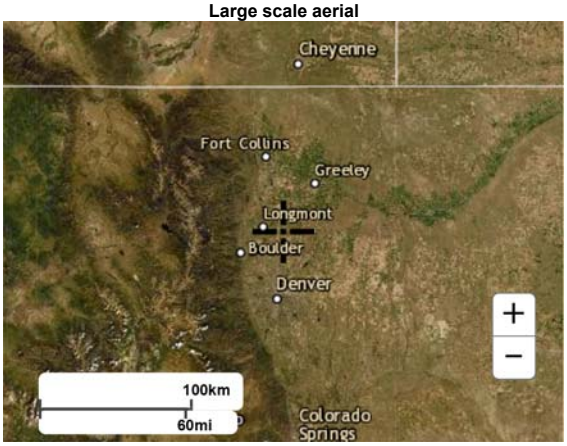
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix E:

UD-Rational Spreadsheet Inputs and Results

Calculation of Peak Runoff using Rational Method

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$ = 5 (urban)
$t_{minimum}$ = 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.820	1.10	1.39	1.84	2.25	2.71	3.97
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

$$I(in/hr) = \frac{a + P_1}{(b + t_c)^c}$$

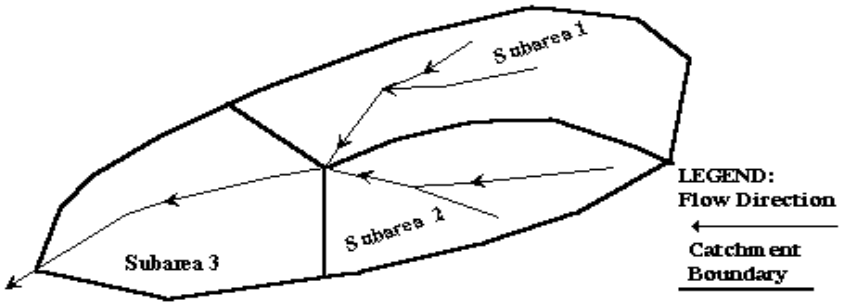
$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time				Channelized (Travel) Flow Time						Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_t (ft/ft)	Overland Flow Time t_t (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Disturbance Boundary - Historical	25.63	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54	500			0.024	32.90								32.90	25.66	25.66	1.4	1.9	2.4	3.2	3.9	4.7	6.8	0.3	0.6	4.5	21.2	33.6	51.9	94.9
				0.01	0.01	0.06	0.19	0.25	0.34	0.46					32.91								32.91		32.91	1.2	1.6	2.1	2.7	3.3	4.0	5.9	0.2	0.5	3.0	13.2	21.6	35.5	69.8
ARC1 - CON	46.63	A	2.7	0.01	0.01	0.01	0.02	0.05	0.13	0.27	500			0.021	34.49	2600			0.017	7	0.91	47.48	81.97	60.98	60.98	0.8	1.1	1.4	1.8	2.2	2.7	4.0	0.3	0.4	0.7	1.3	5.0	16.6	50.2
				0.01	0.01	0.03	0.06	0.10	0.19	0.32					34.36								81.84		81.84	0.7	0.9	1.1	1.5	1.8	2.2	3.2	0.3	0.5	1.4	4.5	8.9	19.5	48.8
ARC1 - PRO	50.92	A	2.7	0.01	0.01	0.01	0.02	0.05	0.13	0.27	500			0.021	34.49	2800			0.017	7	0.91	51.13	85.62	63.71	63.71	0.8	1.1	1.3	1.8	2.2	2.6	3.9	0.3	0.5	0.7	1.4	5.3	17.5	53.2
				0.01	0.01	0.02	0.06	0.10	0.19	0.32					34.38								85.51		85.51	0.6	0.9	1.1	1.5	1.8	2.1	3.1	0.4	0.5	1.4	4.6	9.3	20.5	51.5
ARC2 - CON	1.27	A	2.4	0.01	0.01	0.01	0.01	0.05	0.13	0.27	80			0.020	14.04	1000			0.014	10	1.18	14.09	28.12	40.68	28.12	1.3	1.8	2.3	3.0	3.7	4.4	6.5	0.0	0.0	0.0	0.1	0.2	0.7	2.2
				0.01	0.01	0.03	0.09	0.13	0.22	0.35					13.98								28.07		28.07	1.3	1.8	2.3	3.0	3.7	4.4	6.5	0.0	0.0	0.1	0.3	0.6	1.2	2.9
ARC3 - CON	9.58	A	29.0	0.17	0.18	0.19	0.22	0.27	0.34	0.44	300			0.005	36.27	1580			0.013	10	1.14	23.10	59.36	38.75	38.75	1.1	1.5	1.9	2.5	3.0	3.6	5.3	1.8	2.5	3.4	5.2	7.9	11.7	22.5
				0.19	0.20	0.23	0.28	0.33	0.40	0.50					35.30								58.40										2.0	2.9	4.1	6.7	9.7	13.9	25.4
ARC4 - CON	2.24	D	25.9	0.18	0.25	0.32	0.46	0.52	0.59	0.67	200			0.005	27.41	300			0.005	10	0.71	7.07	34.48	27.20	27.20	1.4	1.8	2.3	3.1	3.7	4.5	6.6	0.6	1.0	1.7	3.2	4.4	5.9	9.9
				0.18	0.21	0.26	0.36	0.42	0.48	0.58					28.43								35.50										0.6	0.9	1.4	2.5	3.5	4.9	8.5
ARC5 - CON	4.88	B	31.6	0.22	0.24	0.31	0.45	0.50	0.57	0.65	300			0.005	33.62	640			0.006	10	0.77	13.77	47.39	30.89	30.89	1.3	1.7	2.1	2.8	3.5	4.2	6.1	1.3	2.0	3.3	6.2	8.5	11.7	19.5
				0.22	0.25	0.31	0.43	0.49	0.56	0.64					33.56								47.33										1.4	2.0	3.2	6.0	8.3	11.4	19.1
ARC6 - PRO	2.03	B	11.8	0.07	0.08	0.15	0.32	0.39	0.48	0.58	180			0.039	15.71	650			0.015	7	0.86	12.64	28.35	32.30	28.35	1.3	1.8	2.3	3.0	3.6	4.4	6.4	0.2	0.3	0.7	2.0	2.9	4.3	7.6
				0.07	0.08	0.12	0.24	0.30	0.38	0.49					15.77								28.40		28.40	1.3	1.8	2.3	3.0	3.6	4.4	6.4	0.2	0.3	0.6	1.5	2.2	3.4	6.4
ST1 - CON	9.08	A	29.4	0.17	0.18	0.19	0.22	0.28	0.34	0.44	300			0.005	36.14	360			0.005	10	0.71	8.49	44.63	27.47	27.47	1.4	1.8	2.3	3.0	3.7	4.5	6.6	2.1	3.0	4.0	6.2	9.3	13.8	26.4
				0.19	0.21	0.23	0.29	0.34	0.41	0.50					35.15								43.64										2.4	3.4	4.8	8.1	11.5	16.5	30.0
ST2 - CON	1.89	D	27.0	0.19	0.26	0.33	0.47	0.53	0.59	0.67	200			0.005	27.12	100			0.005	10	0.71	2.36	29.48	23.25	23.25	1.5	2.0	2.5	3.3	4.1	4.9	7.2	0.5	1.0	1.6	3.0	4.1	5.5	9.2
				0.19	0.22	0.27	0.38	0.43	0.50	0.59					28.19								30.55										0.5	0.8	1.3	2.4	3.3	4.6	8.0
ST3 - CON	13.07	B	25.6	0.17	0.19	0.26	0.41	0.47	0.55	0.63	300			0.005	35.59	980			0.012	10	1.10	14.91	50.50	33.50	33.50	1.20	1.62	2.04	2.70	3.31	3.98	5.83	2.7	4.1	7.0	14.5	20.3	28.4	48.0
				0.18	0.20	0.26	0.40	0.47	0.54	0.62					35.39								50.30										2.8	4.2	7.0	14.3	20.1	28.1	47.6
FS - PRO	4.95	B	24.0	0.16	0.18	0.25	0.40	0.46	0.54	0.62	230			0.005	31.62	600			0.005	7	0.49	20.20	51.82	33.36	33.36	1.21	1.62	2.05	2.71	3.31	3.99	5.85	0.9	1.5	2.5	5.4	7.6	10.6	18.1
				0.17	0.19	0.25	0.40	0.46	0.54	0.62					31.40								51.60										1.0	1.5	2.5	5.4	7.6	10.6	18.0
WPS - PRO	3.86	B	26.9	0.18	0.21	0.27	0.42	0.48	0.55	0.63	165			0.005	26.08	450			0.005	7	0.49	15.15	41.23	29.74	29.74	1.29	1.73	2.19	2.90	3.55	4.27	6.26	0.9	1.4	2.3	4.7	6.5	9.1	15.3
				0.18	0.20	0.24	0.35	0.41	0.48	0.57					26.29								41.44										0.9	1.3	2.1	3.9	5.6	7.9	13.8

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
DB-Historical

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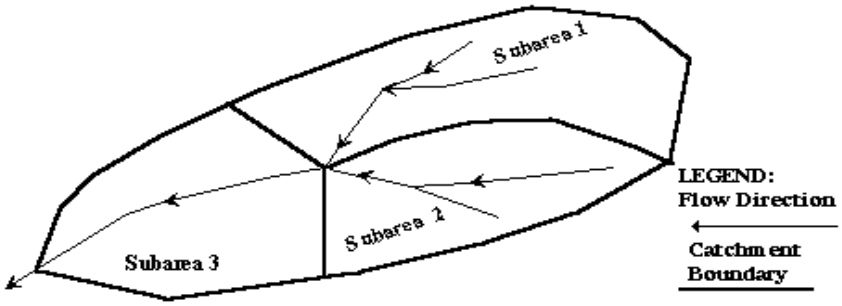
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
4	1.01	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
47	16.90	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
72	7.72	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	25.63		Area-Weighted C	0.01	0.01	0.06	0.19	0.25	0.34	0.46
			Area-Weighted Override C	0.01	0.01	0.06	0.19	0.25	0.34	0.46

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



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Subcatchment Name
ARC1 - CON

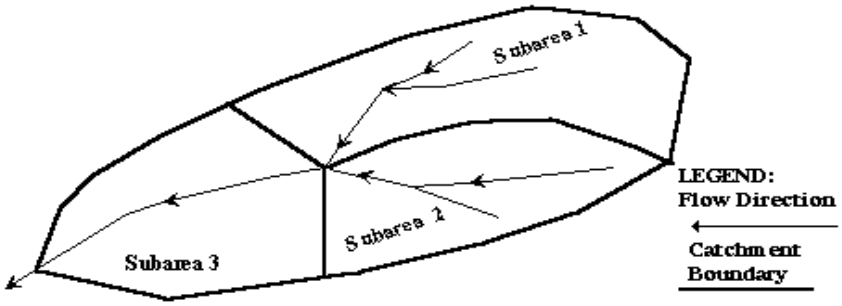
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
D	0.15	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.55	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	7.79	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
A	0.55	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	37.40	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
Total Area (ac)	**46.63**		**Area-Weighted C**	**0.01**	**0.01**	**0.03**	**0.06**	**0.10**	**0.19**	**0.32**
			Area-Weighted Override C	**0.01**	**0.01**	**0.03**	**0.06**	**0.10**	**0.19**	**0.32**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC1 - PRO

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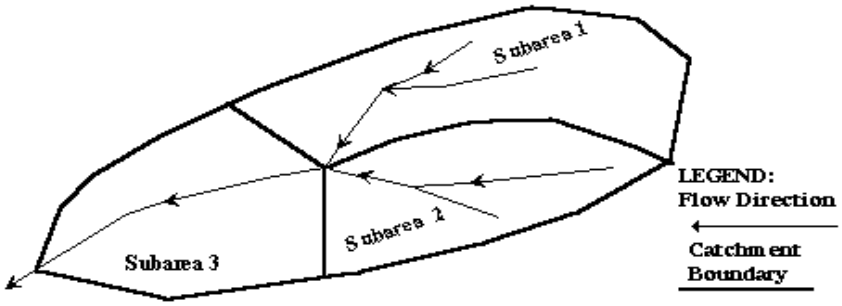
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.80	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	40.86	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	9.07	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	50.92		Area-Weighted C	0.01	0.01	0.02	0.06	0.10	0.19	0.32
			Area-Weighted Override C	0.01	0.01	0.02	0.06	0.10	0.19	0.32

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC2

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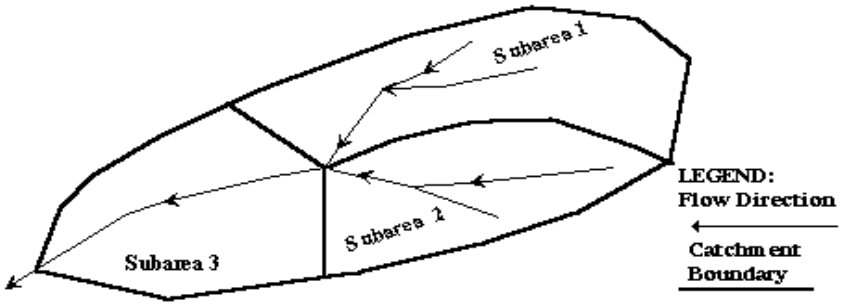
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.02	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.88	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.37	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	**1.27**		**Area-Weighted C**	**0.01**	**0.01**	**0.03**	**0.09**	**0.13**	**0.22**	**0.35**
			Area-Weighted Override C	**0.01**	**0.01**	**0.03**	**0.09**	**0.13**	**0.22**	**0.35**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC3

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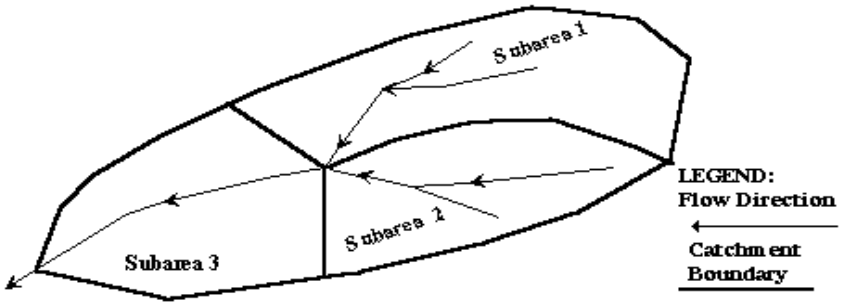
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	4.86	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	2.00	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.94	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.78	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	9.58		Area-Weighted C	0.19	0.20	0.23	0.28	0.33	0.40	0.50
			Area-Weighted Override C	0.19	0.20	0.23	0.28	0.33	0.40	0.50

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC4

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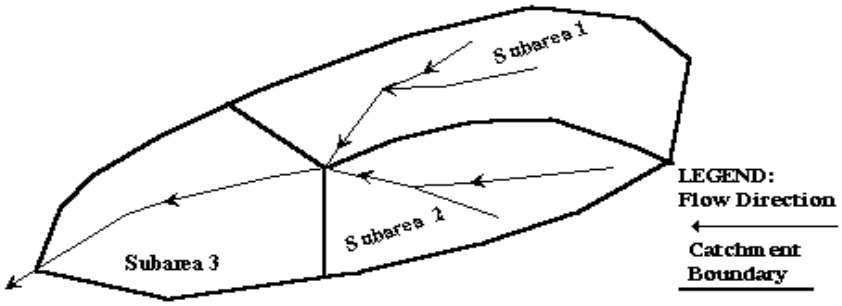
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.39	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.35	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.25	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.20	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
D	0.77	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.28	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
Total Area (ac)	**2.24**		**Area-Weighted C**	**0.18**	**0.21**	**0.26**	**0.36**	**0.42**	**0.48**	**0.58**
			Area-Weighted Override C	**0.18**	**0.21**	**0.26**	**0.36**	**0.42**	**0.48**	**0.58**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC5

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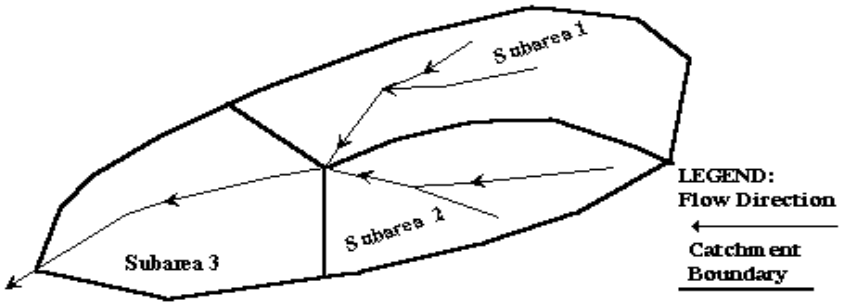
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.33	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.02	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	3.48	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.05	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	4.88		Area-Weighted C	0.22	0.25	0.31	0.43	0.49	0.56	0.64
			Area-Weighted Override C	0.22	0.25	0.31	0.43	0.49	0.56	0.64

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ARC6

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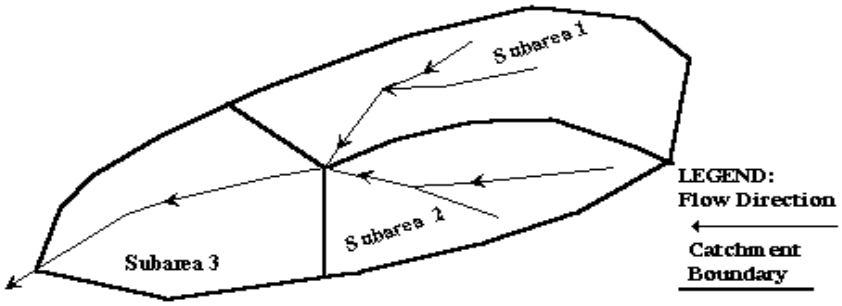
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.30	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.44	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.21	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.08	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	2.03		Area-Weighted C	0.07	0.08	0.12	0.24	0.30	0.38	0.49
			Area-Weighted Override C	0.07	0.08	0.12	0.24	0.30	0.38	0.49

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST1

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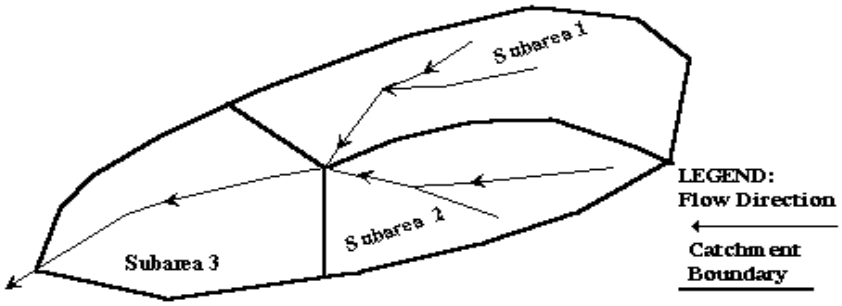
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	4.62	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	1.74	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.94	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.78	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	9.08		Area-Weighted C	0.19	0.21	0.23	0.29	0.34	0.41	0.50
			Area-Weighted Override C	0.19	0.21	0.23	0.29	0.34	0.41	0.50

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST2

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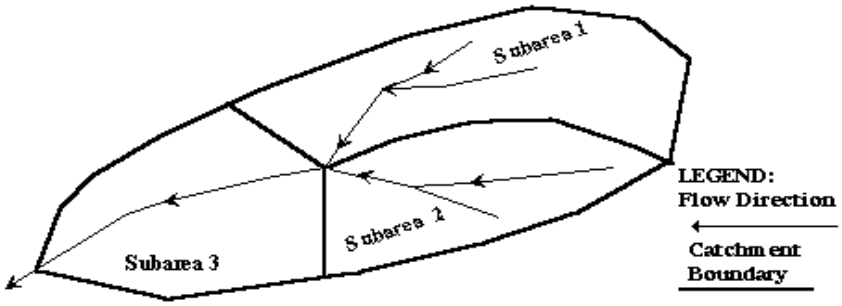
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.29	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.27	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	0.19	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	0.20	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
D	0.74	D	40.0	0.30	0.36	0.43	0.54	0.59	0.65	0.71
D	0.20	D	2.0	0.01	0.05	0.15	0.33	0.40	0.49	0.59
Total Area (ac)	**1.89**		**Area-Weighted C**	**0.19**	**0.22**	**0.27**	**0.38**	**0.43**	**0.50**	**0.59**
			Area-Weighted Override C	**0.19**	**0.22**	**0.27**	**0.38**	**0.43**	**0.50**	**0.59**

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
ST3

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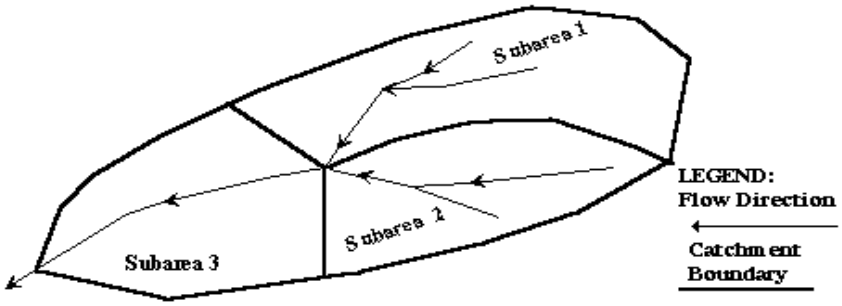
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.33	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.02	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	7.78	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	4.94	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	13.07		Area-Weighted C	0.18	0.20	0.26	0.40	0.47	0.54	0.62
			Area-Weighted Override C	0.18	0.20	0.26	0.40	0.47	0.54	0.62

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
FS

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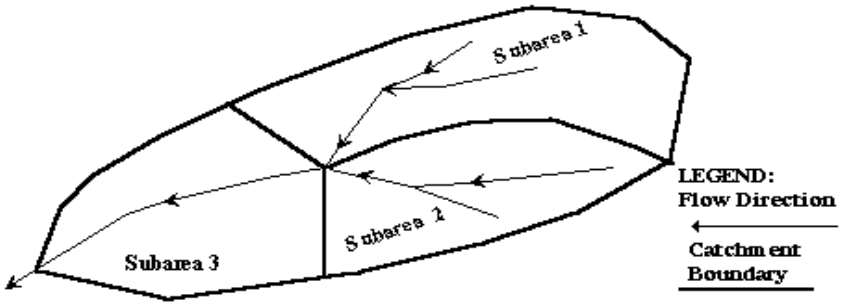
See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
B	2.86	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	2.09	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	4.95		Area-Weighted C	0.17	0.19	0.25	0.40	0.46	0.54	0.62
			Area-Weighted Override C	0.17	0.19	0.25	0.40	0.46	0.54	0.62

Area-Weighted Runoff Coefficient Calculations

Version 2.00 released May 2017

Designer: TPF
Company: 609 Consulting
Date: 10/18/2021
Project: McGavin 6-19HZ
Location: S19 T2N R67W Firestone, CO



Subcatchment Name
WPS

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See sheet "Design Info" for imperviousness-based runoff coefficient values.

Sub-Area ID	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	1.02	A	40.0	0.25	0.27	0.28	0.32	0.37	0.42	0.51
A	0.26	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27
B	1.51	B	40.0	0.29	0.32	0.38	0.50	0.55	0.61	0.68
B	1.07	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54
Total Area (ac)	3.86		Area-Weighted C	0.18	0.20	0.24	0.35	0.41	0.48	0.57
			Area-Weighted Override C	0.18	0.20	0.24	0.35	0.41	0.48	0.57

Appendix F:

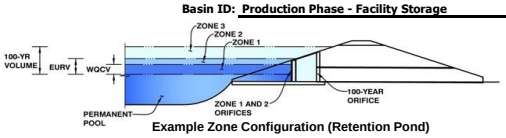
MHFD-Detention Spreadsheet Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Facility Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	4.95	acres
Watershed Length =	600	ft
Watershed Length to Centroid =	230	ft
Watershed Slope =	0.005	ft/ft
Watershed Imperviousness =	24.0%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.054	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.120	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.056	acre-feet	0.820	inches
5-yr Runoff Volume (P1 = 1.1 in.) =	0.092	acre-feet	1.10	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.173	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.374	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.534	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	0.746	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.97 in.) =	1.273	acre-feet	3.97	inches
Approximate 2-yr Detention Volume =	0.058	acre-feet		
Approximate 5-yr Detention Volume =	0.090	acre-feet		
Approximate 10-yr Detention Volume =	0.149	acre-feet		
Approximate 25-yr Detention Volume =	0.207	acre-feet		
Approximate 50-yr Detention Volume =	0.238	acre-feet		
Approximate 100-yr Detention Volume =	0.309	acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

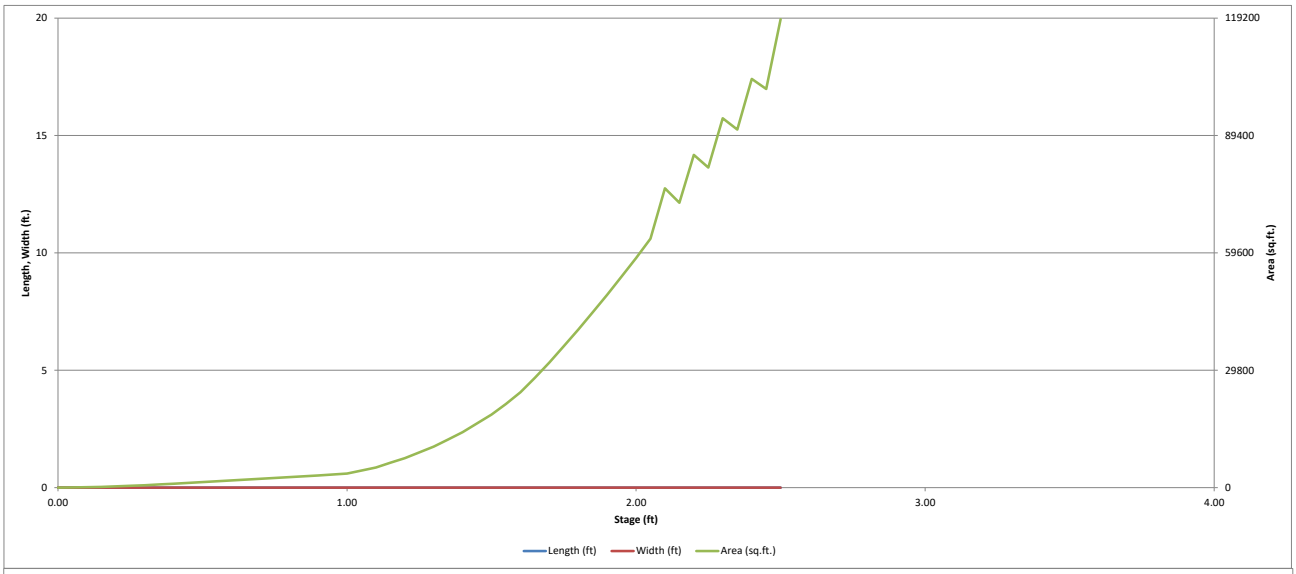
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

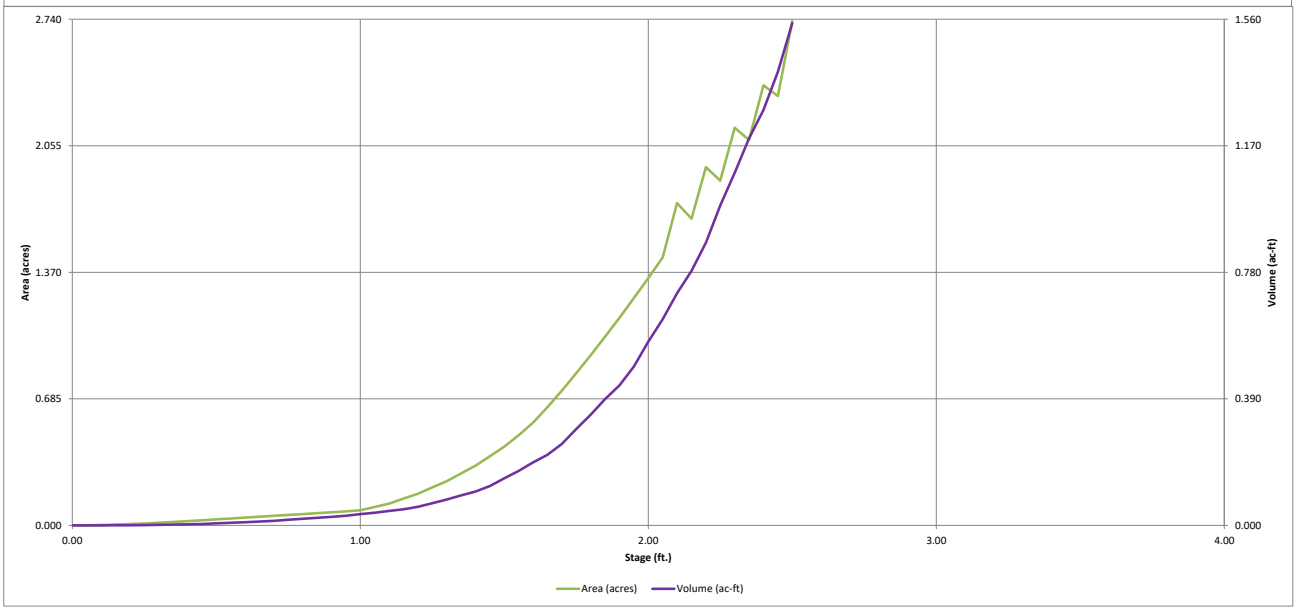
Depth Increment = 0.10 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	40	0.001	1	0.000
	--	0.10	--	--	--	104	0.002	5	0.000
	--	0.15	--	--	--	196	0.004	10	0.000
	--	0.20	--	--	--	309	0.007	22	0.000
	--	0.25	--	--	--	450	0.010	44	0.001
	--	0.30	--	--	--	612	0.014	70	0.002
	--	0.35	--	--	--	797	0.018	105	0.002
	--	0.40	--	--	--	995	0.023	141	0.003
	--	0.45	--	--	--	1,210	0.028	194	0.004
	--	0.50	--	--	--	1,416	0.032	271	0.006
	--	0.55	--	--	--	1,631	0.037	347	0.008
	--	0.60	--	--	--	1,836	0.042	434	0.010
	--	0.65	--	--	--	2,051	0.047	511	0.012
	--	0.70	--	--	--	2,256	0.052	616	0.014
	--	0.75	--	--	--	2,472	0.057	757	0.017
	--	0.80	--	--	--	2,677	0.061	886	0.020
	--	0.85	--	--	--	2,892	0.066	1,025	0.024
	--	0.90	--	--	--	3,098	0.071	1,144	0.026
	--	0.95	--	--	--	3,313	0.076	1,302	0.030
	--	1.00	--	--	--	3,572	0.082	1,507	0.035
	--	1.05	--	--	--	4,342	0.100	1,705	0.039
Edge of Facility	--	1.10	--	--	--	5,128	0.118	1,942	0.045
	--	1.15	--	--	--	6,321	0.145	2,166	0.050
	--	1.20	--	--	--	7,471	0.172	2,499	0.057
	--	1.25	--	--	--	8,956	0.206	2,983	0.068
	--	1.30	--	--	--	10,410	0.239	3,467	0.080
	--	1.35	--	--	--	12,255	0.281	4,034	0.093
	--	1.40	--	--	--	14,086	0.323	4,553	0.105
	--	1.45	--	--	--	16,327	0.375	5,292	0.121
	--	1.50	--	--	--	18,560	0.426	6,325	0.145
	--	1.55	--	--	--	21,257	0.488	7,320	0.168
	--	1.60	--	--	--	24,223	0.556	8,457	0.194
	--	1.65	--	--	--	27,883	0.640	9,485	0.218
	--	1.70	--	--	--	31,776	0.729	10,938	0.251
	--	1.75	--	--	--	35,909	0.824	12,943	0.297
	--	1.80	--	--	--	40,105	0.921	14,844	0.341
	--	1.85	--	--	--	44,506	1.022	16,959	0.389
	--	1.90	--	--	--	48,948	1.124	18,810	0.432
	--	1.95	--	--	--	53,599	1.230	21,328	0.490
	--	2.00	--	--	--	58,292	1.338	24,656	0.566
	--	2.05	--	--	--	63,206	1.451	27,694	0.636
	--	2.10	--	--	--	75,982	1.744	31,173	0.716
	--	2.15	--	--	--	72,334	1.661	34,154	0.784
	--	2.20	--	--	--	84,498	1.940	37,969	0.872
	--	2.25	--	--	--	81,269	1.866	42,946	0.986
	--	2.30	--	--	--	93,783	2.153	47,322	1.086
	--	2.35	--	--	--	90,899	2.087	51,939	1.192
	--	2.40	--	--	--	103,758	2.382	55,781	1.281
	--	2.45	--	--	--	101,220	2.324	60,915	1.398
	--	2.50	--	--	--	118,933	2.730	67,433	1.548
	--		--	--	--				
	--		--	--	--				
	--		--	--	--			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



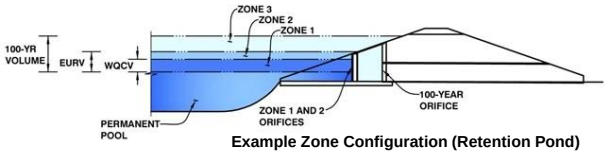


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: **McGavin 6-19HZ**

Basin ID: **Production Phase - Facility Storage**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1	#N/A		Orifice Plate
Zone 2			Weir (No Pipe)
Zone 3			
Total (all zones)			

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.74						
Orifice Area (sq. inches)	0.249	3.976						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.30		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	4.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	1.75	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	10.00	feet	Stage at Top of Freeboard =	2.75	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.73	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	1.55	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

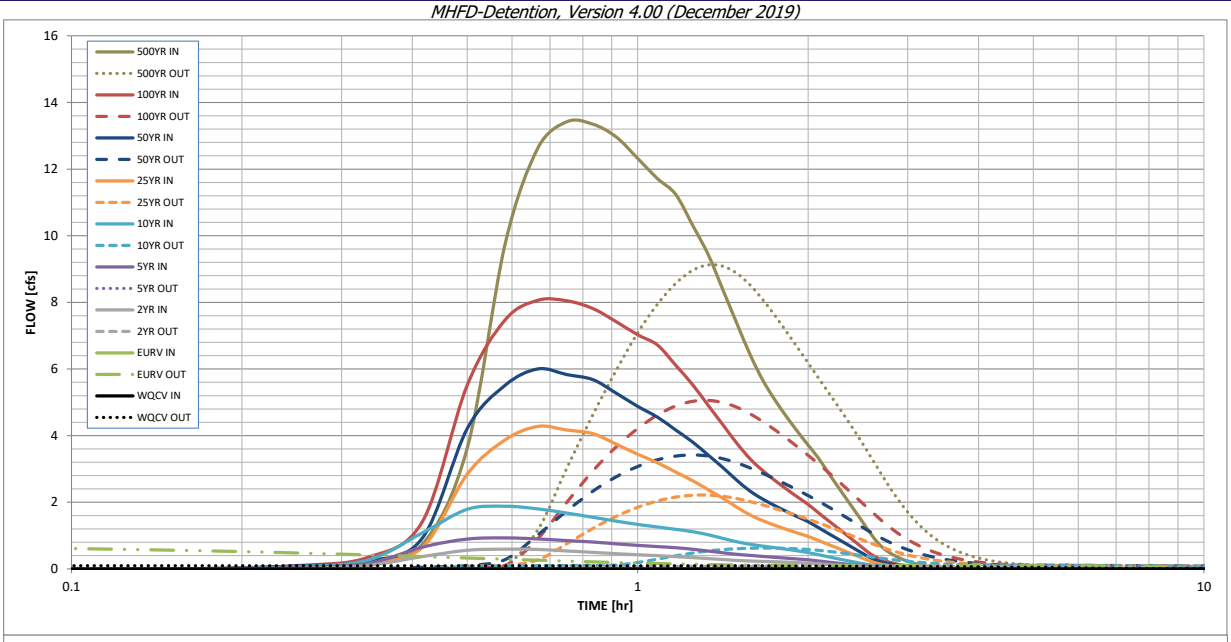
Routed Hydrograph Results

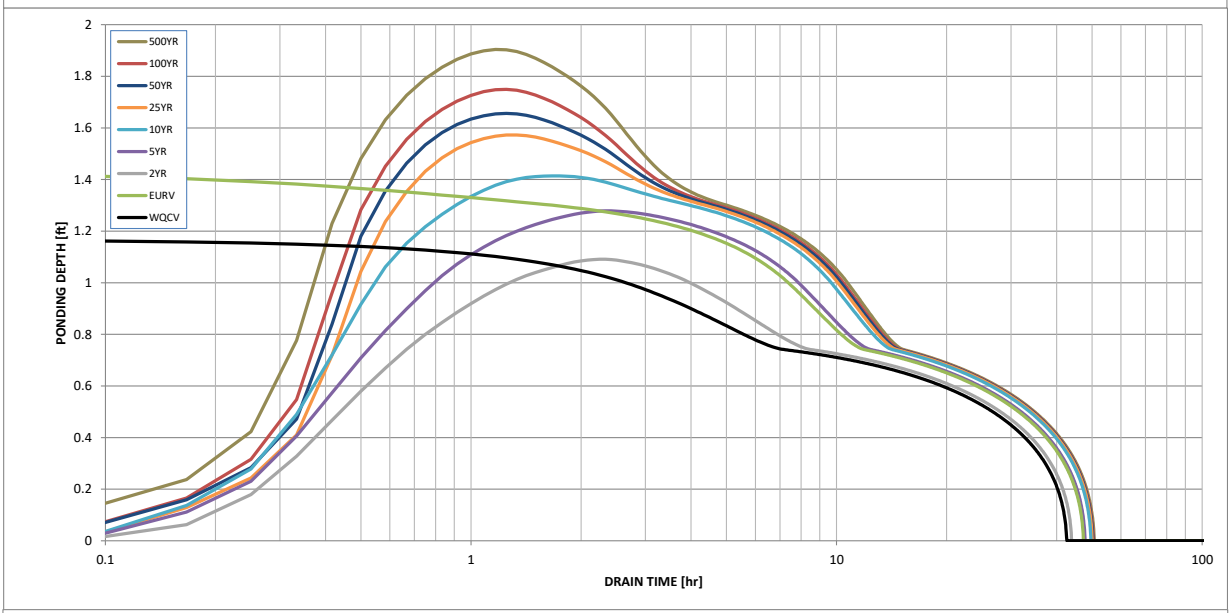
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

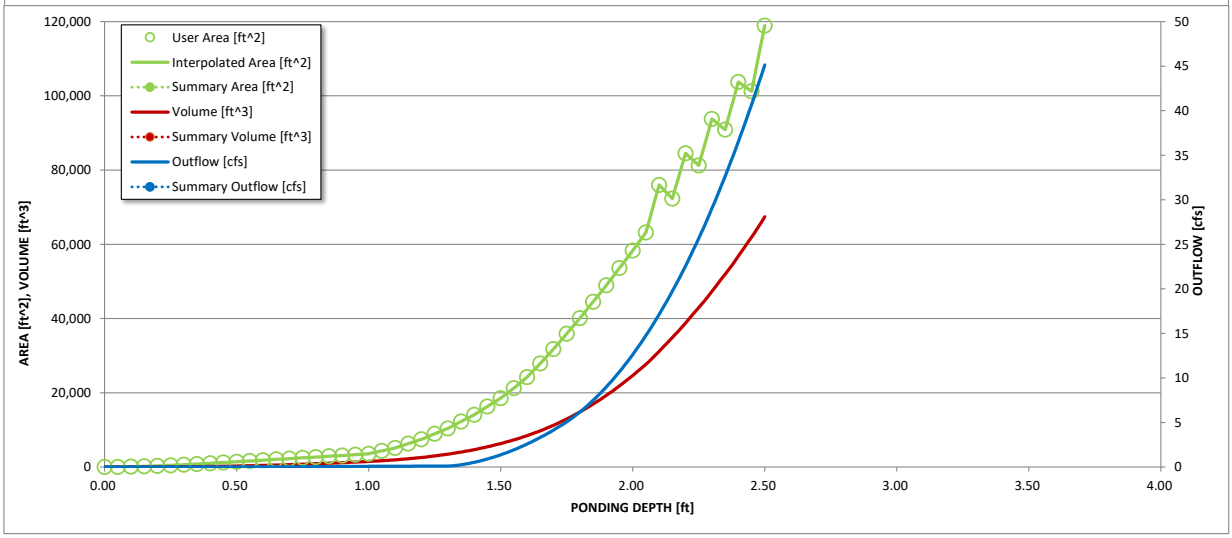
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.10	1.39	1.84	2.25	2.71	3.97
CUHP Runoff Volume (acre-ft) =	0.054	0.120	0.056	0.092	0.173	0.374	0.534	0.746	1.273
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.056	0.092	0.173	0.374	0.534	0.746	1.273
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.9	3.1	4.7	6.8	11.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.18	0.63	0.95	1.36	2.37
Peak Inflow Q (cfs) =	N/A	N/A	0.6	0.9	1.9	4.3	6.0	8.1	13.4
Peak Outflow Q (cfs) =	0.1	0.7	0.1	0.1	0.6	2.2	3.4	5.1	9.1
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.5	0.7	0.7	0.7	0.7	0.8
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	37	38	40	36	25	16	13	10
Time to Drain 99% of Inflow Volume (hours) =	**40**	43	42	44	44	40	36	32	23
Maximum Ponding Depth (ft) =	1.17	1.44	1.09	1.28	1.41	1.57	1.66	1.75	1.90
Area at Maximum Ponding Depth (acres) =	0.16	0.36	0.11	0.22	0.33	0.52	0.64	0.81	1.12
Maximum Volume Stored (acre-ft) =	0.054	0.121	0.043	0.073	0.111	0.178	0.224	0.289	0.443

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







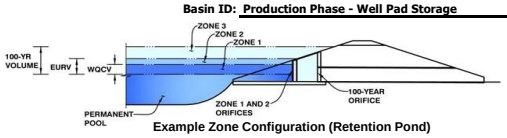
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Well Pad Storage



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	3.86	acres
Watershed Length =	450	ft
Watershed Length to Centroid =	165	ft
Watershed Slope =	0.005	ft/ft
Watershed Imperviousness =	26.9%	percent
Percentage Hydrologic Soil Group A =	33.0%	percent
Percentage Hydrologic Soil Group B =	67.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.045	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.104	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.82 in.) =	0.046	acre-feet	0.820	inches
5-yr Runoff Volume (P1 = 1.1 in.) =	0.073	acre-feet	1.10	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	0.113	acre-feet	1.39	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	0.254	acre-feet	1.84	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.372	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	0.536	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.97 in.) =	0.934	acre-feet	3.97	inches
Approximate 2-yr Detention Volume =	0.049	acre-feet		
Approximate 5-yr Detention Volume =	0.073	acre-feet		
Approximate 10-yr Detention Volume =	0.114	acre-feet		
Approximate 25-yr Detention Volume =	0.158	acre-feet		
Approximate 50-yr Detention Volume =	0.186	acre-feet		
Approximate 100-yr Detention Volume =	0.242	acre-feet		

Define Zones and Basin Geometry

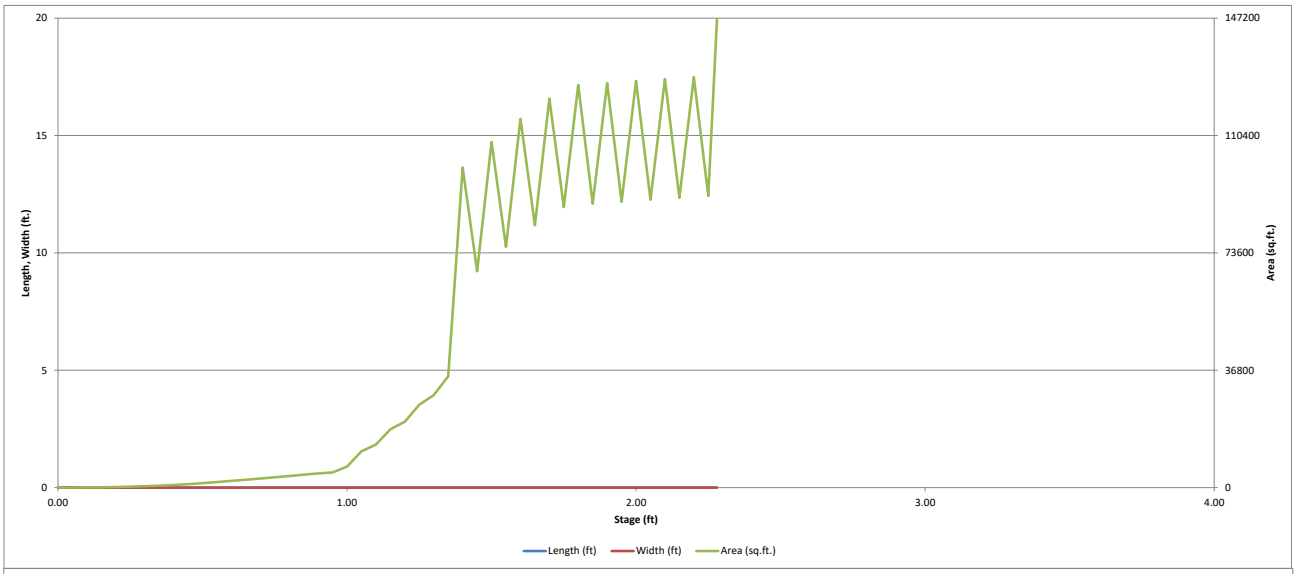
Zone 1 Volume (WQCV) =	0.045	acre-feet
Zone 2 Volume (100-year - Zone 1) =	0.197	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.242	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

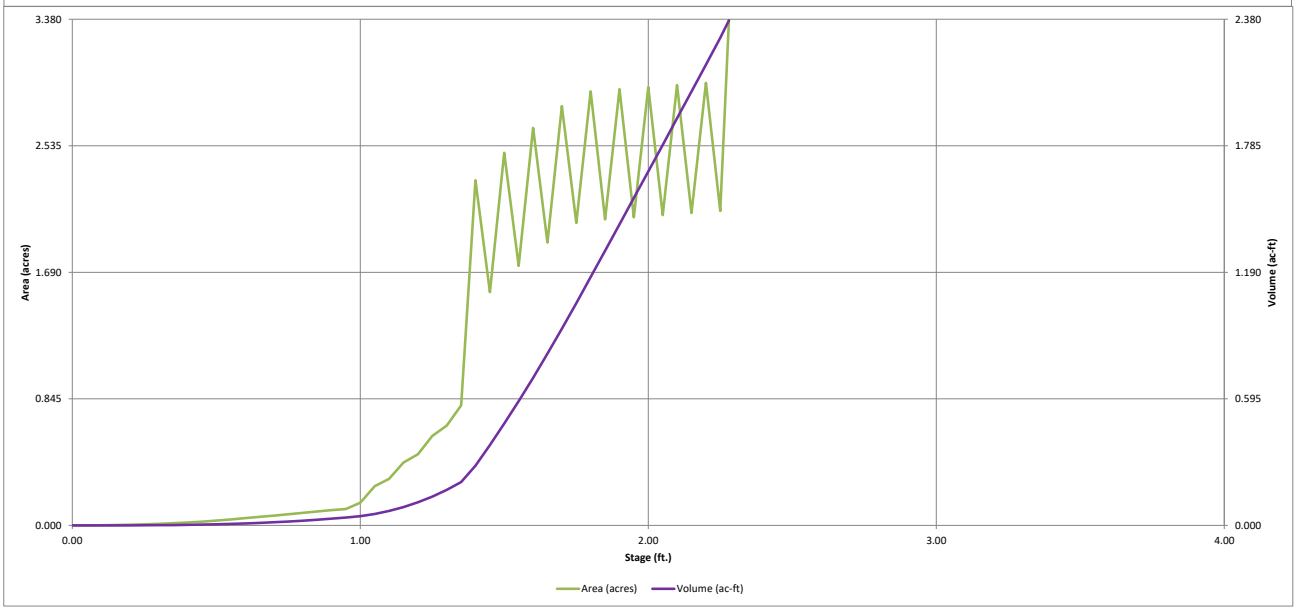
Depth Increment = 0.10 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
	--	0.05	--	--	--	8	0.000	0	0.000
	--	0.10	--	--	--	47	0.001	2	0.000
	--	0.15	--	--	--	103	0.002	5	0.000
	--	0.20	--	--	--	193	0.004	13	0.000
	--	0.25	--	--	--	304	0.007	25	0.001
	--	0.30	--	--	--	453	0.010	44	0.001
	--	0.35	--	--	--	629	0.014	71	0.002
	--	0.40	--	--	--	848	0.019	108	0.002
	--	0.45	--	--	--	1,098	0.025	157	0.004
	--	0.50	--	--	--	1,399	0.032	219	0.005
	--	0.55	--	--	--	1,737	0.040	297	0.007
	--	0.60	--	--	--	2,109	0.048	393	0.009
	--	0.65	--	--	--	2,472	0.057	508	0.012
	--	0.70	--	--	--	2,862	0.066	641	0.015
	--	0.75	--	--	--	3,243	0.074	794	0.018
	--	0.80	--	--	--	3,650	0.084	966	0.022
	--	0.85	--	--	--	4,048	0.093	1,159	0.027
	--	0.90	--	--	--	4,450	0.102	1,371	0.031
	--	0.95	--	--	--	4,759	0.109	1,601	0.037
Edge of Well Pad	--	1.00	--	--	--	6,595	0.151	1,885	0.043
	--	1.05	--	--	--	11,417	0.262	2,335	0.054
	--	1.10	--	--	--	13,511	0.310	2,958	0.068
	--	1.15	--	--	--	18,294	0.420	3,753	0.086
	--	1.20	--	--	--	20,679	0.475	4,728	0.109
	--	1.25	--	--	--	26,035	0.598	5,895	0.135
	--	1.30	--	--	--	29,009	0.666	7,272	0.167
	--	1.35	--	--	--	34,907	0.801	8,869	0.204
	--	1.40	--	--	--	100,371	2.304	12,246	0.281
	--	1.45	--	--	--	67,835	1.557	16,450	0.378
	--	1.50	--	--	--	108,388	2.488	20,854	0.479
	--	1.55	--	--	--	75,470	1.733	25,449	0.584
	--	1.60	--	--	--	115,639	2.655	30,225	0.694
	--	1.65	--	--	--	82,298	1.889	35,173	0.807
	--	1.70	--	--	--	121,966	2.800	40,278	0.925
	--	1.75	--	--	--	87,995	2.020	45,526	1.045
	--	1.80	--	--	--	126,257	2.898	50,881	1.168
	--	1.85	--	--	--	89,026	2.044	56,262	1.292
	--	1.90	--	--	--	126,868	2.912	61,659	1.415
	--	1.95	--	--	--	89,636	2.058	67,070	1.540
	--	2.00	--	--	--	127,478	2.927	72,497	1.664
	--	2.05	--	--	--	90,247	2.072	77,939	1.789
	--	2.10	--	--	--	128,090	2.941	83,396	1.915
	--	2.15	--	--	--	90,859	2.086	88,869	2.040
	--	2.20	--	--	--	128,704	2.955	94,357	2.166
	--	2.25	--	--	--	91,473	2.100	99,860	2.292
	--	2.28	--	--	--	147,010	3.375	103,434	2.375
	--		--	--	--				
	--		--	--	--				
	--		--	--	--			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



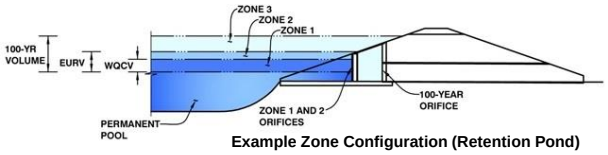


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: McGavin 6-19HZ

Basin ID: Production Phase - Well Pad Storage



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.02	0.045	Orifice Plate
Zone 2 (100-year)	1.39	0.197	Weir (No Pipe)
Zone 3			
Total (all zones)		0.242	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.74						
Orifice Area (sq. inches)	0.249	3.976						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.10		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	N/A		feet
Overflow Weir Bottom Length =	2.00		feet	Overflow Weir Slope Length =	N/A		feet
Overflow Weir Side Slopes =	4.00		H:V	Grate Open Area / 100-yr Orifice Area =	N/A		
Horiz. Length of Weir Sides =	N/A		feet	Overflow Grate Open Area w/o Debris =	N/A		ft^2
Overflow Grate Open Area % =	N/A		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	N/A		ft^2
Debris Clogging % =	N/A		%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	N/A		ft^2
Circular Orifice Diameter =	N/A		inches	Outlet Orifice Centroid =	N/A		feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	1.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.48	feet
Spillway Crest Length =	5.20	feet	Stage at Top of Freeboard =	2.50	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	3.37	acres
Freeboard above Max Water Surface =	0.52	feet	Basin Volume at Top of Freeboard =	2.37	acre-ft
Spillway position relative to Overflow Weir =	Overlapping				

Calculated Parameters for Spillway

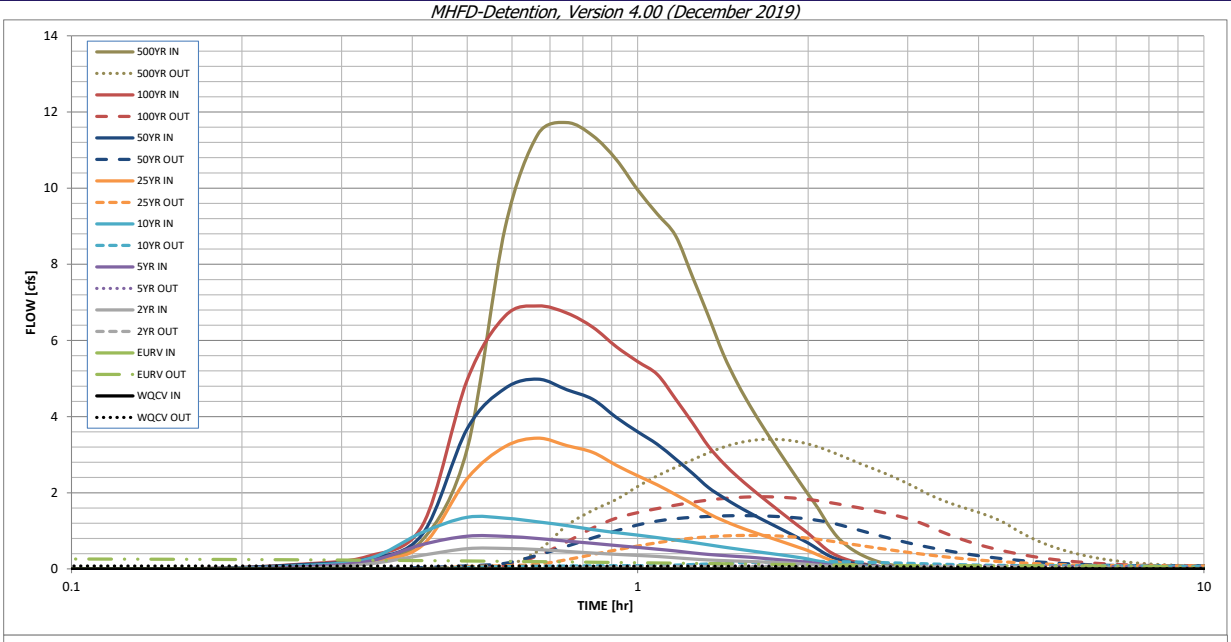
Routed Hydrograph Results

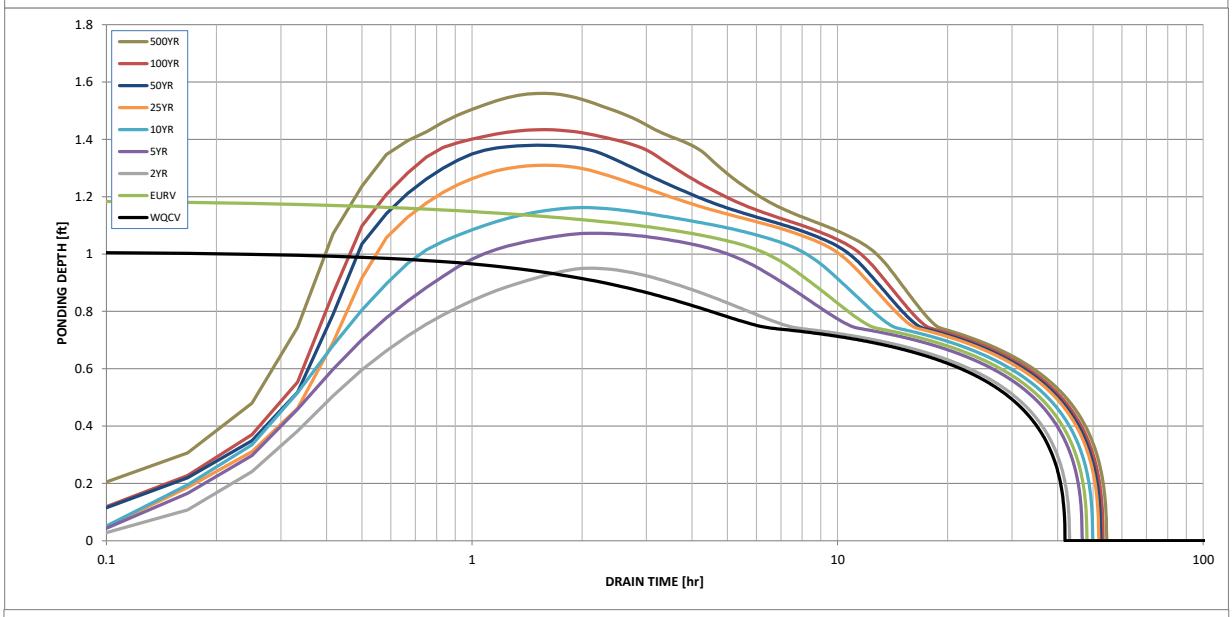
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

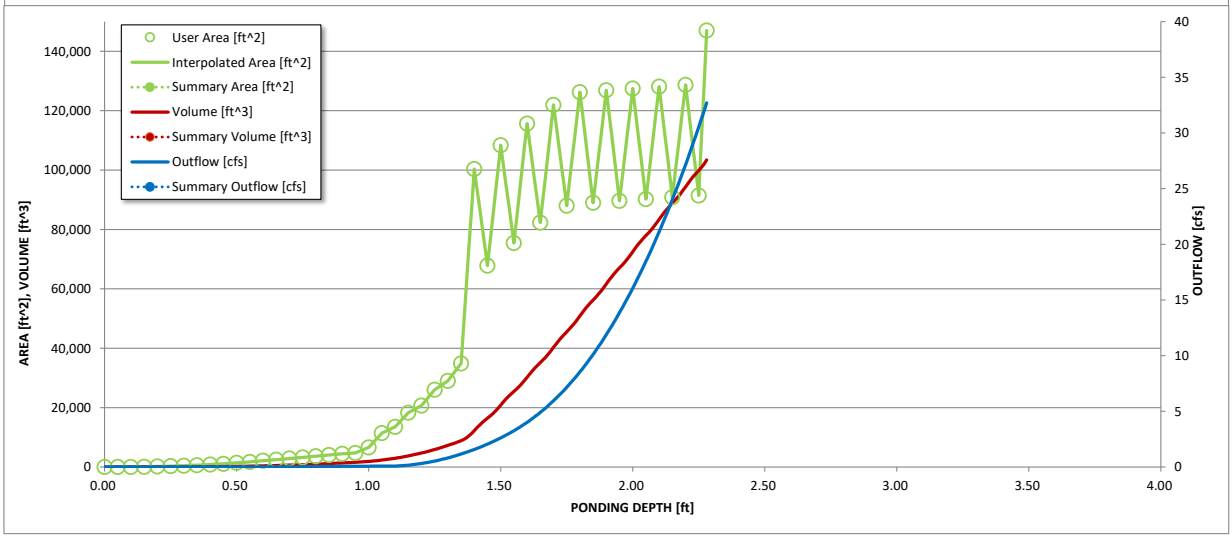
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.82	1.10	1.39	1.84	2.25	2.71	3.97
CUHP Runoff Volume (acre-ft) =	0.045	0.104	0.046	0.073	0.113	0.254	0.372	0.536	0.934
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.046	0.073	0.113	0.254	0.372	0.536	0.934
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.3	2.2	3.6	5.3	9.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.07	0.57	0.93	1.39	2.48
Peak Inflow Q (cfs) =	N/A	N/A	0.5	0.9	1.4	3.4	5.0	6.9	11.7
Peak Outflow Q (cfs) =	0.1	0.3	0.1	0.1	0.2	0.9	1.4	1.9	3.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.7	0.7	0.4	0.4	0.4	0.4
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	40	39	41	41	34	28	21	16
Time to Drain 99% of Inflow Volume (hours) =	**40**	45	42	44	46	45	43	40	34
Maximum Ponding Depth (ft) =	1.02	1.20	0.95	1.07	1.16	1.31	1.38	1.43	1.56
Area at Maximum Ponding Depth (acres) =	0.20	0.47	0.11	0.28	0.43	0.67	1.40	1.86	1.92
Maximum Volume Stored (acre-ft) =	0.047	0.109	0.037	0.059	0.090	0.167	0.226	0.344	0.602

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Appendix G:

Pipe Buoyancy Calculations

Buoyancy Calculations for Outlet Pipes
10" HDPE Pipe

$Ww = (\pi \div 4)*(Bc^2)*\gamma$

0.90 Bc = outside pipe diameter (feet)
62.42 γ = unit weight of fresh water (pounds per cubic foot)

39.71 Ww = weight of displaced water (pounds per linear foot)

$Wt = Ww - Wp$

4.73 Wp = weight of pipe (pounds per linear foot)

34.98 Wt = resultant buoyant force of the submerged pipe (pounds per linear foot)

$Hi = (FS*Wt \div Wi*Bc) - (0.1073*Bc)$

68.0 Wi = average unit weight of inundated backfill (pounds per cubic foot)
1.5 FS = factor of safety

0.76 Hi = minimum depth of inundated backfill required above top of pipe (feet)

INPUT
CALCULATED
** Assumes all backfill is inundated*
** Does not account for added weight from anti-seep collars*

Appendix H:

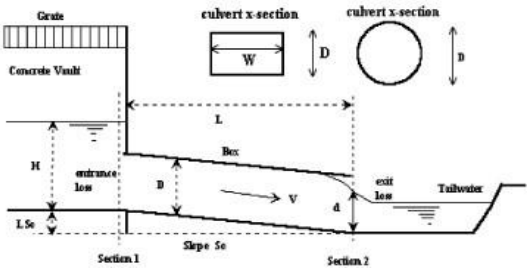
MHFD-Culvert Spreadsheet Calculations for Culvert Design

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #1 (ARC1)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	15	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4923.5	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft
	Culvert Length	L =	45	ft
	Manning's Roughness	n =	0.013	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	1.04
Sum of All Loss Coefficients	K_s =	2.24
Minimum Energy Condition Coefficient	KE_{low} =	0.0400
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

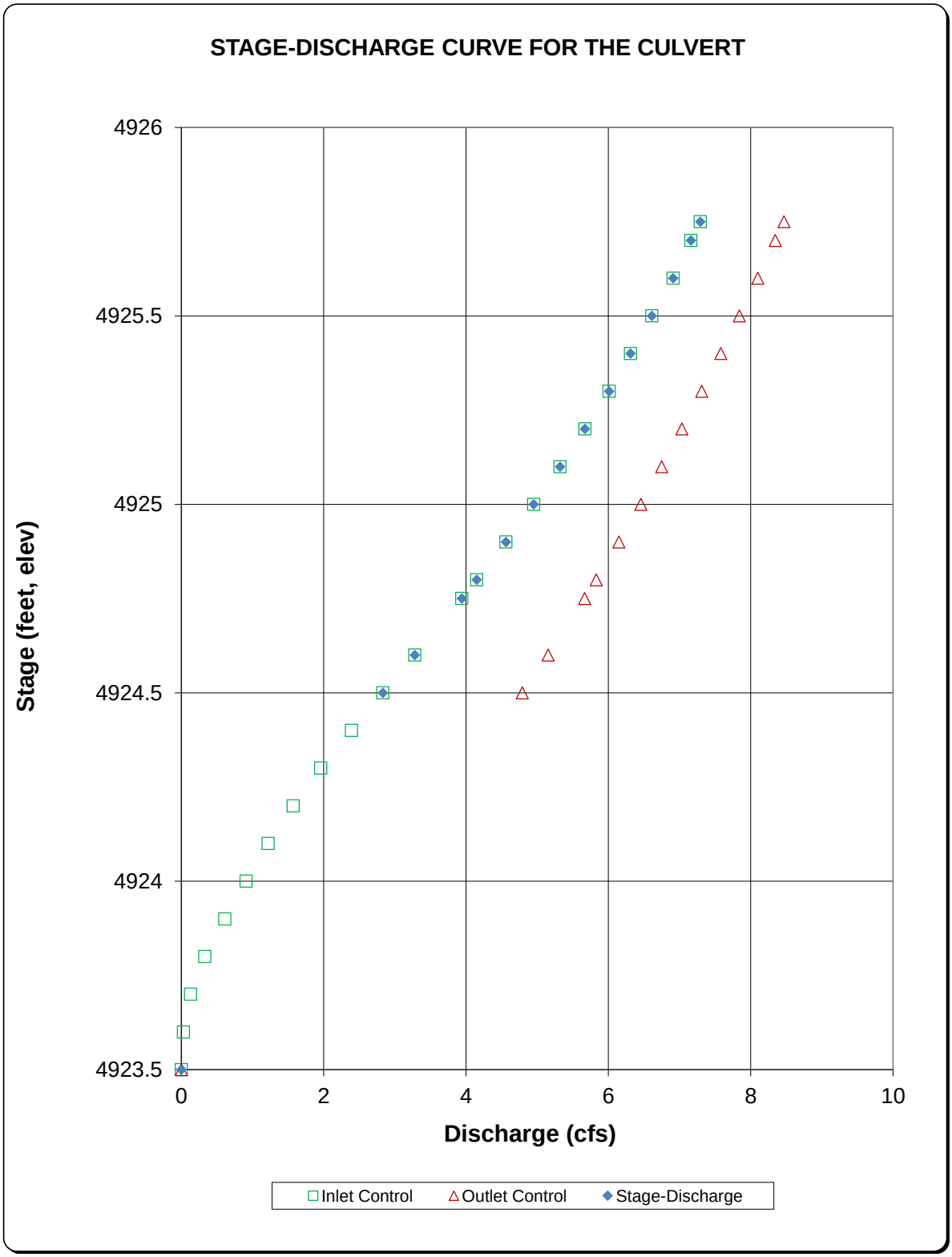
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.50		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.60		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4923.70		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4923.80		Min. Energy. Eqn.	0.33	#N/A	#N/A	#N/A
4923.90		Min. Energy. Eqn.	0.61	#N/A	#N/A	#N/A
4924.00		Min. Energy. Eqn.	0.91	#N/A	#N/A	#N/A
4924.10		Min. Energy. Eqn.	1.22	#N/A	#N/A	#N/A
4924.20		Regression Eqn.	1.57	#N/A	#N/A	#N/A
4924.30		Regression Eqn.	1.96	#N/A	#N/A	#N/A
4924.40		Regression Eqn.	2.39	#N/A	#N/A	#N/A
4924.50		Regression Eqn.	2.83	4.79	**2.83**	INLET
4924.60		Regression Eqn.	3.28	5.15	**3.28**	INLET
4924.75		Regression Eqn.	3.94	5.67	**3.94**	INLET
4924.80		Regression Eqn.	4.15	5.83	**4.15**	INLET
4924.90		Regression Eqn.	4.56	6.15	**4.56**	INLET
4925.00		Regression Eqn.	4.95	6.46	**4.95**	INLET
4925.10		Regression Eqn.	5.32	6.75	**5.32**	INLET
4925.20		Regression Eqn.	5.67	7.03	**5.67**	INLET
4925.30		Regression Eqn.	6.01	7.31	**6.01**	INLET
4925.40		Regression Eqn.	6.31	7.58	**6.31**	INLET
4925.50		Regression Eqn.	6.61	7.84	**6.61**	INLET
4925.60		Regression Eqn.	6.91	8.10	**6.91**	INLET
4925.70		Regression Eqn.	7.16	8.34	**7.16**	INLET
4925.75		Regression Eqn.	7.29	8.47	**7.29**	INLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #1 (ARC1)

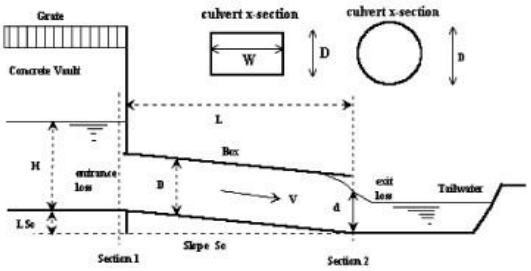


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: **McGavin 6-19HZ**

ID: **Access Road Culvert #2 (ARC2)**



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4927.1	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4927	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

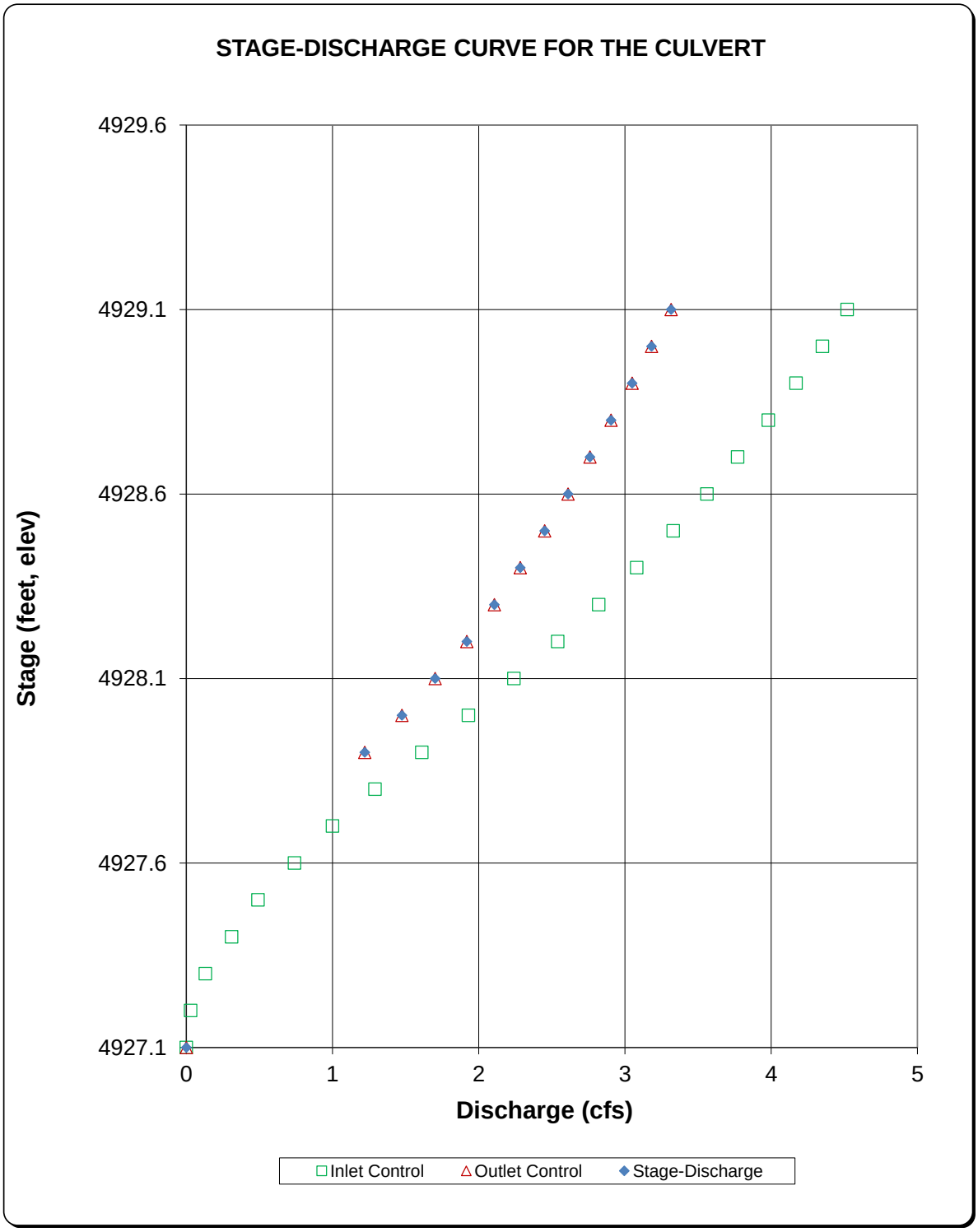
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4927.10		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4927.20		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4927.30		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4927.40		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4927.50		Min. Energy. Eqn.	0.49	#N/A	#N/A	#N/A
4927.60		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4927.70		Regression Eqn.	1.00	#N/A	#N/A	#N/A
4927.80		Regression Eqn.	1.29	#N/A	#N/A	#N/A
4927.90		Regression Eqn.	1.61	1.22	**1.22**	OUTLET
4928.00		Regression Eqn.	1.93	1.47	**1.47**	OUTLET
4928.10		Regression Eqn.	2.24	1.70	**1.70**	OUTLET
4928.20		Regression Eqn.	2.54	1.92	**1.92**	OUTLET
4928.30		Regression Eqn.	2.82	2.11	**2.11**	OUTLET
4928.40		Regression Eqn.	3.08	2.28	**2.28**	OUTLET
4928.50		Regression Eqn.	3.33	2.45	**2.45**	OUTLET
4928.60		Regression Eqn.	3.56	2.61	**2.61**	OUTLET
4928.70		Regression Eqn.	3.77	2.76	**2.76**	OUTLET
4928.80		Regression Eqn.	3.98	2.90	**2.90**	OUTLET
4928.90		Regression Eqn.	4.17	3.05	**3.05**	OUTLET
4929.00		Regression Eqn.	4.35	3.18	**3.18**	OUTLET
4929.10		Regression Eqn.	4.52	3.31	**3.31**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #2 (ARC2)

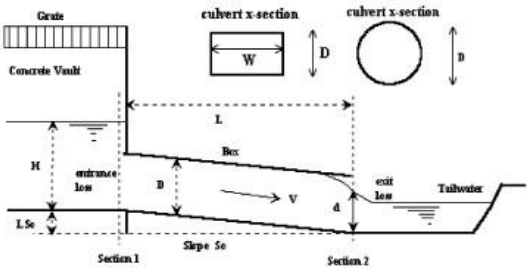


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #3 (ARC3)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4920.4	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4920.2	ft
	Culvert Length	L =	30	ft
	Manning's Roughness	n =	0.024	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Very Small Culvert
D >= 15 inches exp
For concrete, typically <= 0.016

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

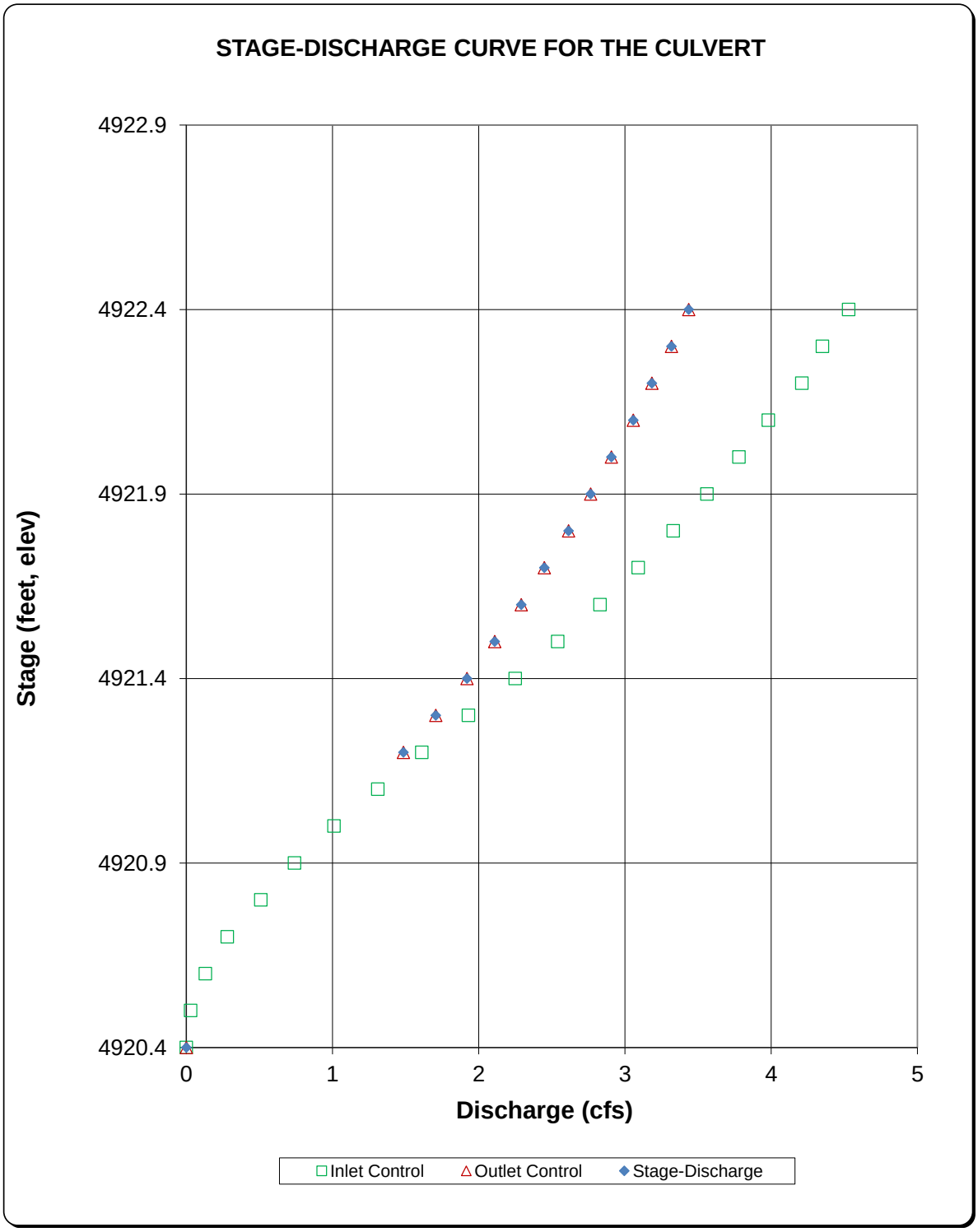
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4920.40		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4920.50		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4920.60		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4920.70		Min. Energy. Eqn.	0.28	#N/A	#N/A	#N/A
4920.80		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4920.90		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4921.00		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4921.10		Regression Eqn.	1.31	#N/A	#N/A	#N/A
4921.20		Regression Eqn.	1.61	1.48	**1.48**	OUTLET
4921.30		Regression Eqn.	1.93	1.71	**1.71**	OUTLET
4921.40		Regression Eqn.	2.25	1.92	**1.92**	OUTLET
4921.50		Regression Eqn.	2.54	2.11	**2.11**	OUTLET
4921.60		Regression Eqn.	2.83	2.29	**2.29**	OUTLET
4921.70		Regression Eqn.	3.09	2.45	**2.45**	OUTLET
4921.80		Regression Eqn.	3.33	2.61	**2.61**	OUTLET
4921.90		Regression Eqn.	3.56	2.76	**2.76**	OUTLET
4922.00		Regression Eqn.	3.78	2.91	**2.91**	OUTLET
4922.10		Regression Eqn.	3.98	3.06	**3.06**	OUTLET
4922.20		Regression Eqn.	4.21	3.18	**3.18**	OUTLET
4922.30		Regression Eqn.	4.35	3.32	**3.32**	OUTLET
4922.40		Regression Eqn.	4.53	3.44	**3.44**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #3 (ARC3)

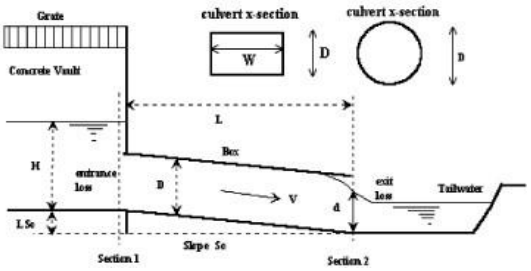


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #4 (ARC4)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting	
OR:				
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation at Culvert Invert	Elev IN =	4917.3	ft
	Outlet Elevation **OR** Slope	Elev OUT =	4916.9	ft
	Culvert Length	L =	30	ft
	Manning's Roughness	n =	0.024	
	Bend Loss Coefficient	K_b =	0	
	Exit Loss Coefficient	K_x =	1	

Very Small Culvert
D >= 15 inches exp
For concrete, typically <= 0.016

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0669
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

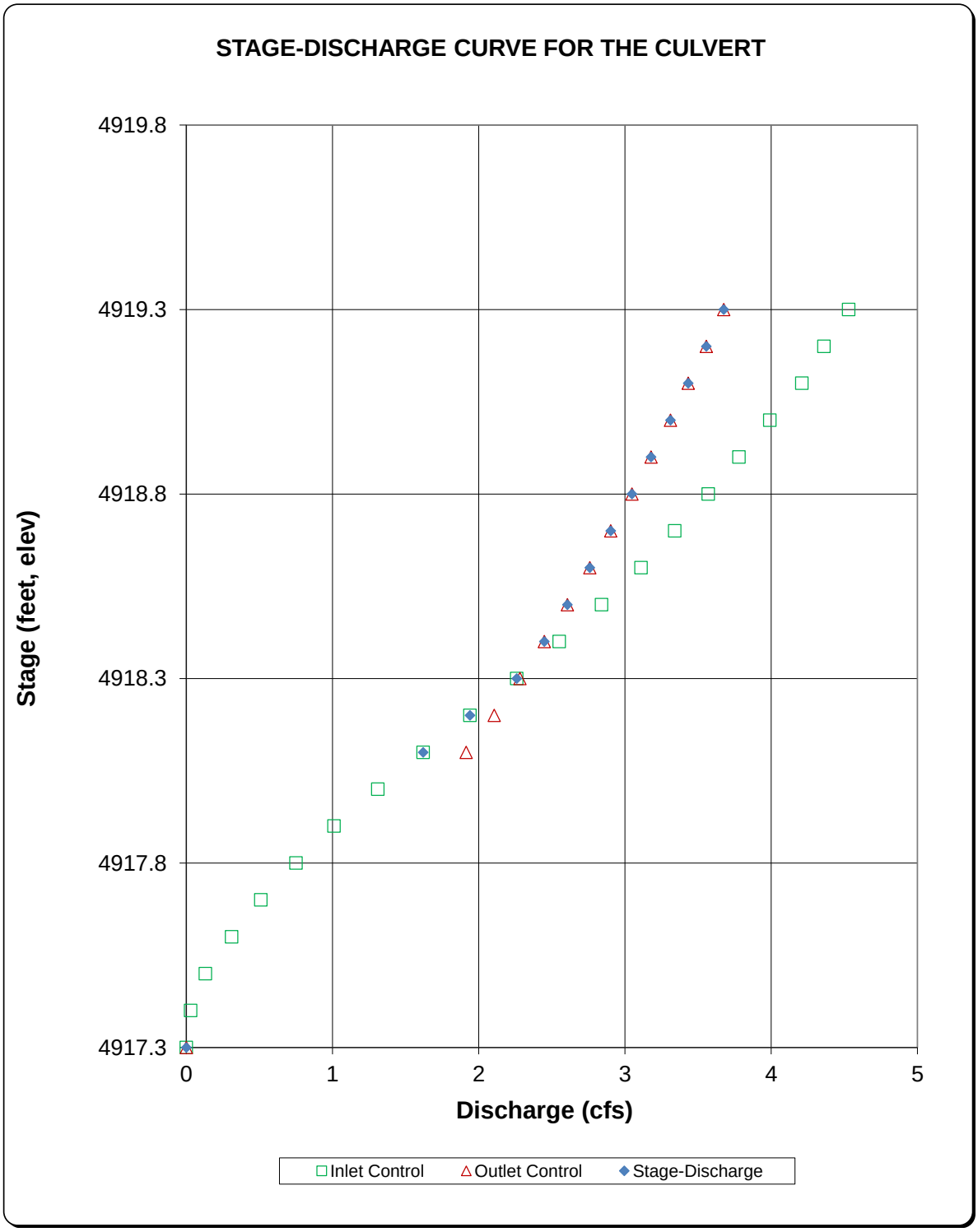
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4917.30		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4917.40		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4917.50		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4917.60		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4917.70		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4917.80		Min. Energy. Eqn.	0.75	#N/A	#N/A	#N/A
4917.90		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4918.00		Regression Eqn.	1.31	#N/A	#N/A	#N/A
4918.10		Regression Eqn.	1.62	1.91	**1.62**	INLET
4918.20		Regression Eqn.	1.94	2.11	**1.94**	INLET
4918.30		Regression Eqn.	2.26	2.28	**2.26**	INLET
4918.40		Regression Eqn.	2.55	2.45	**2.45**	OUTLET
4918.50		Regression Eqn.	2.84	2.61	**2.61**	OUTLET
4918.60		Regression Eqn.	3.11	2.76	**2.76**	OUTLET
4918.70		Regression Eqn.	3.34	2.90	**2.90**	OUTLET
4918.80		Regression Eqn.	3.57	3.05	**3.05**	OUTLET
4918.90		Regression Eqn.	3.78	3.18	**3.18**	OUTLET
4919.00		Regression Eqn.	3.99	3.31	**3.31**	OUTLET
4919.10		Regression Eqn.	4.21	3.43	**3.43**	OUTLET
4919.20		Regression Eqn.	4.36	3.56	**3.56**	OUTLET
4919.30		Regression Eqn.	4.53	3.67	**3.67**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #4 (ARC4)

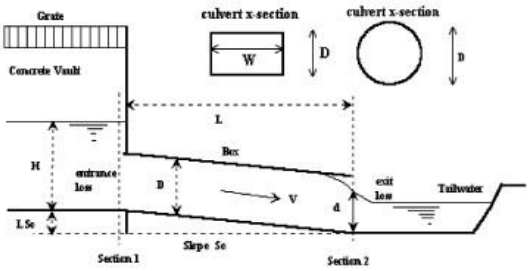


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #5 (ARC5)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4923.2	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0963
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output): **Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris**

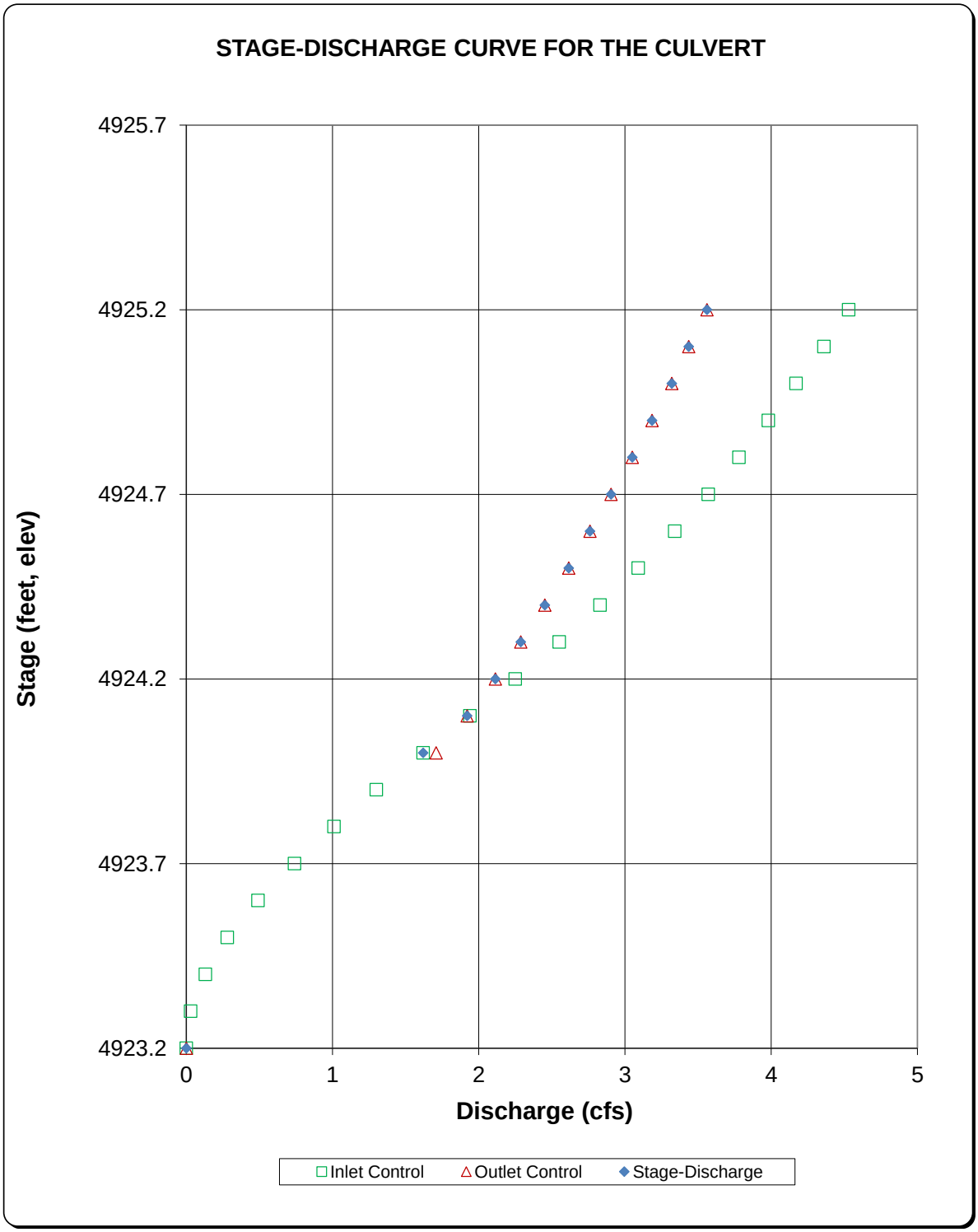
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.20		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.30		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4923.40		Min. Energy. Eqn.	0.13	#N/A	#N/A	#N/A
4923.50		Min. Energy. Eqn.	0.28	#N/A	#N/A	#N/A
4923.60		Min. Energy. Eqn.	0.49	#N/A	#N/A	#N/A
4923.70		Min. Energy. Eqn.	0.74	#N/A	#N/A	#N/A
4923.80		Regression Eqn.	1.01	#N/A	#N/A	#N/A
4923.90		Regression Eqn.	1.30	#N/A	#N/A	#N/A
4924.00		Regression Eqn.	1.62	1.71	**1.62**	INLET
4924.10		Regression Eqn.	1.94	1.92	**1.92**	OUTLET
4924.20		Regression Eqn.	2.25	2.11	**2.11**	OUTLET
4924.30		Regression Eqn.	2.55	2.29	**2.29**	OUTLET
4924.40		Regression Eqn.	2.83	2.45	**2.45**	OUTLET
4924.50		Regression Eqn.	3.09	2.62	**2.62**	OUTLET
4924.60		Regression Eqn.	3.34	2.76	**2.76**	OUTLET
4924.70		Regression Eqn.	3.57	2.90	**2.90**	OUTLET
4924.80		Regression Eqn.	3.78	3.05	**3.05**	OUTLET
4924.90		Regression Eqn.	3.98	3.18	**3.18**	OUTLET
4925.00		Regression Eqn.	4.17	3.32	**3.32**	OUTLET
4925.10		Regression Eqn.	4.36	3.44	**3.44**	OUTLET
4925.20		Regression Eqn.	4.53	3.56	**3.56**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #5 (ARC5)

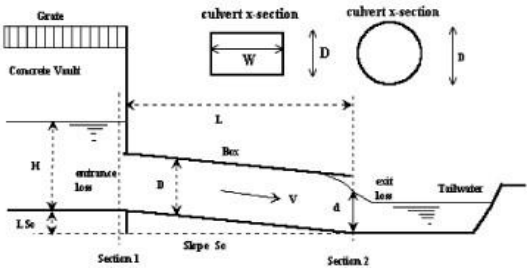


CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

ID: Access Road Culvert #6 (ARC6)



Design Information (Input):

Circular Culvert:	Barrel Diameter in Inches	D =	12	inches	**Very Small Culvert**
	Inlet Edge Type (Choose from pull-down list)		Square Edge Projecting		**D >= 15 inches exp**
OR:					
Box Culvert:	Barrel Height (Rise) in Feet	H (Rise) =		ft	
	Barrel Width (Span) in Feet	W (Span) =		ft	
	Inlet Edge Type (Choose from pull-down list)				
	Number of Barrels	# Barrels =	1		
	Inlet Elevation at Culvert Invert	Elev IN =	4923.8	ft	
	Outlet Elevation **OR** Slope	Elev OUT =	4922.9	ft	
	Culvert Length	L =	30	ft	
	Manning's Roughness	n =	0.024		**For concrete, typically <= 0.016**
	Bend Loss Coefficient	K_b =	0		
	Exit Loss Coefficient	K_x =	1		

Design Information (calculated):

Entrance Loss Coefficient	K_e =	0.20
Friction Loss Coefficient	K_f =	3.18
Sum of All Loss Coefficients	K_s =	4.38
Minimum Energy Condition Coefficient	KE_{low} =	0.0125
Orifice Inlet Condition Coefficient	C_d =	0.60

Calculations of Culvert Capacity (output):

Backwater calculations required to obtain Outlet Control Flowrate when HWo < 0.75 * Culvert Ris

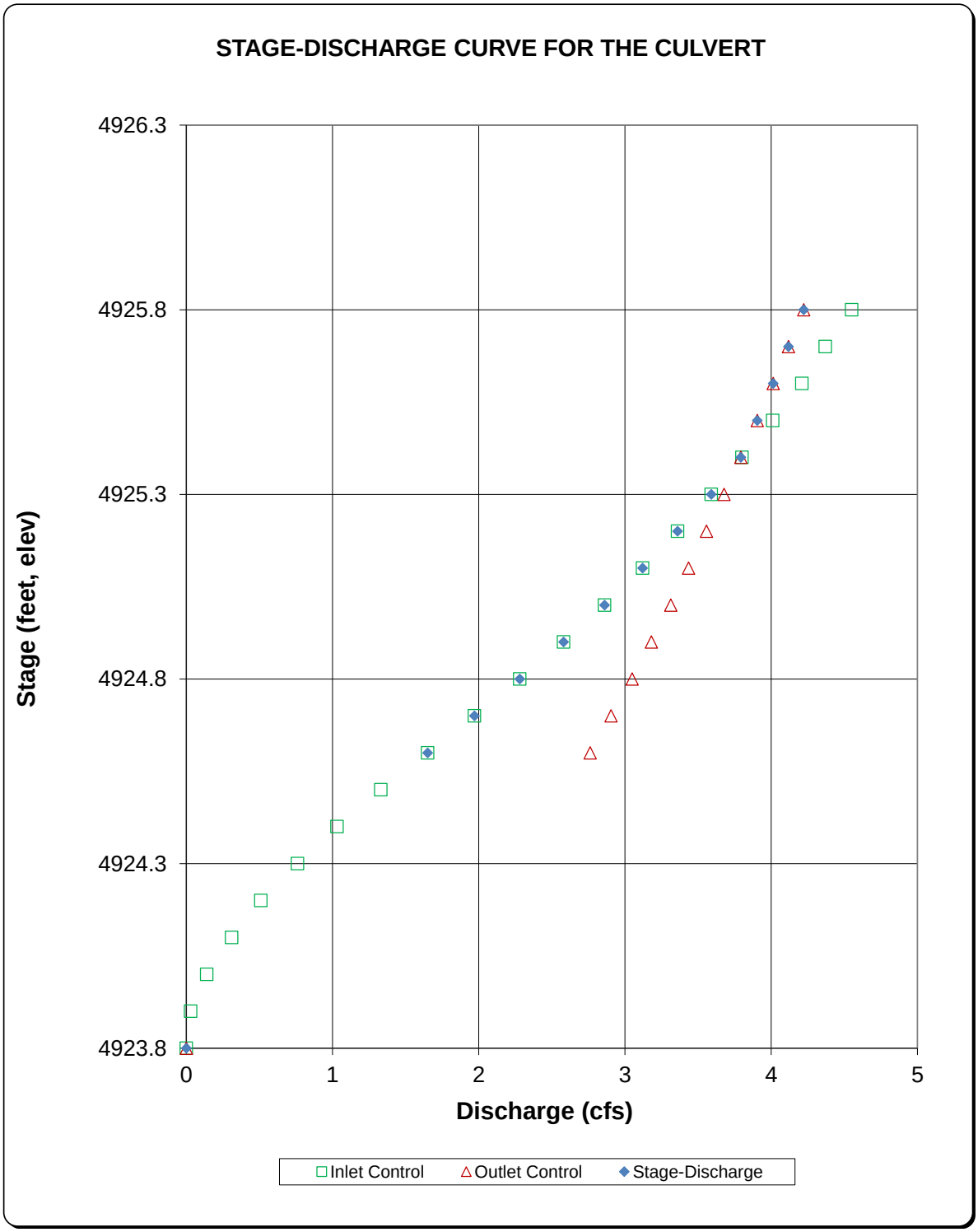
Headwater Surface Elevation (ft)	Tailwater Surface Elevation (ft)	Inlet Control Equation Used	Inlet Control Flowrate (cfs)	Outlet Control Flowrate (cfs)	Controlling Culvert Flowrate (cfs)	Flow Control Used
4923.80		No Flow (WS < inlet)	0.00	0.00	**0.00**	N/A
4923.90		Min. Energy. Eqn.	0.03	#N/A	#N/A	#N/A
4924.00		Min. Energy. Eqn.	0.14	#N/A	#N/A	#N/A
4924.10		Min. Energy. Eqn.	0.31	#N/A	#N/A	#N/A
4924.20		Min. Energy. Eqn.	0.51	#N/A	#N/A	#N/A
4924.30		Min. Energy. Eqn.	0.76	#N/A	#N/A	#N/A
4924.40		Regression Eqn.	1.03	#N/A	#N/A	#N/A
4924.50		Regression Eqn.	1.33	#N/A	#N/A	#N/A
4924.60		Regression Eqn.	1.65	2.76	**1.65**	INLET
4924.70		Regression Eqn.	1.97	2.90	**1.97**	INLET
4924.80		Regression Eqn.	2.28	3.05	**2.28**	INLET
4924.90		Regression Eqn.	2.58	3.18	**2.58**	INLET
4925.00		Regression Eqn.	2.86	3.31	**2.86**	INLET
4925.10		Regression Eqn.	3.12	3.43	**3.12**	INLET
4925.20		Regression Eqn.	3.36	3.56	**3.36**	INLET
4925.30		Regression Eqn.	3.59	3.68	**3.59**	INLET
4925.40		Regression Eqn.	3.80	3.79	**3.79**	OUTLET
4925.50		Regression Eqn.	4.01	3.90	**3.90**	OUTLET
4925.60		Regression Eqn.	4.21	4.01	**4.01**	OUTLET
4925.70		Regression Eqn.	4.37	4.12	**4.12**	OUTLET
4925.80		Regression Eqn.	4.55	4.22	**4.22**	OUTLET

CULVERT SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

MHFD-Culvert, Version 4.00 (May 2020)

Project: McGavin 6-19HZ

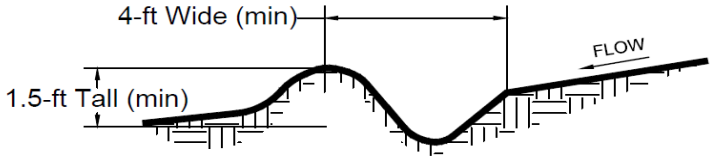
ID: Access Road Culvert #6 (ARC6)



Appendix I:

Conveyance Calculations for Diversion Ditch Design

Temporary Diversion Ditch Design (Typical)



INSTALLATION NOTES:

1. DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.
2. ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.
3. BERM HEIGHT SHALL BE A MINIMUM OF 18"
4. TEMPORARY DIVERSION SWALE SIDE SLOPES SHALL BE ~2:1 OR FLATTER

Estimated Capacity of Temporary Diversion Ditch Design (Typical)

Depth of 1ft*

n=	0.022	
A=	2	ft^2
P=	4.5	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 5.6 cfs
Calculated V= 2.79 fps

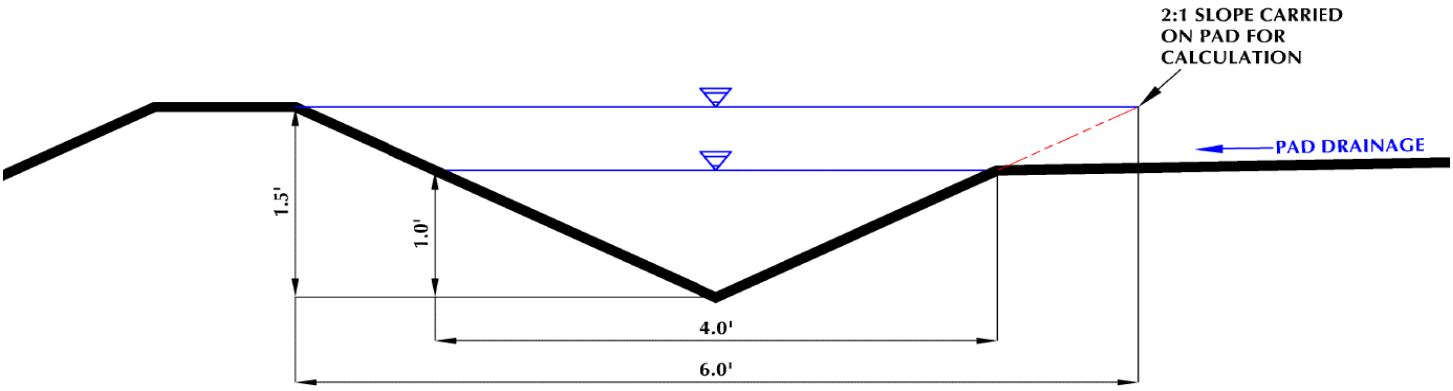
Depth of 1.5ft*

n=	0.022	
A=	4.5	ft^2
P=	6.7	ft
Minimum S=	0.005	ft/ft

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Calculated Q= 16.5 cfs
Calculated V= 3.67 fps

* channel shape simplified to triangular geometry for conservative calculations



Appendix J:

Sediment Trap Sizing Calculations

Sediment Trap Sizing Calculations

Outlet	Ditch Length			Approximate Pad Fill Height				Minimum Design Area, ft^2	Recommended Design Size
	Total, ft	Along Fill and Soil Piles, ft	Used for Sizing, ft	Top of Pad Fill, ft NAVD 88	Sediment Trap Invert, ft NAVD 88	Calculated Pad Fill Height, ft	Used for Sizing, ft		
ST1	1550	780	**800**	4928.6	4921.3	7.3	**8**	400	20'x20' (400 ft^2)
ST2	420	250	**300**	4919.3	4917.2	2.1	**4**	100	15'x15' (225 ft^2)
ST3	1670	990	**1000**	4929.0	4923.5	5.5	**6**	380	20'x20' (400 ft^2)

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Section 6

Stormwater Management Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP

Stormwater Management Plan

McGavin 6-19HZ Well Pad and Facility
NW/4 Sec 19, T2N, R67W

Firestone, Colorado

Revised October 2021

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APPENDICES

APPENDIX A CDPS STORMWATER GENERAL PERMIT CERTIFICATION
APPENDIX B GRADING PLAN(S) AND DRAINAGE REPORT
APPENDIX C CONTROL MEASURE / BMP SPECIFICATIONS

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has prepared this site-specific Stormwater Management Plan (SWMP) for construction activities in Weld County, Colorado. The SWMP is intended to ensure construction activities adhere to good engineering, hydrologic, and pollution control practices, and to ensure erosion, sediment and stormwater control measures are selected, installed, implemented, and maintained to protect state waters, and minimize site erosion or degradation. This facility is a part of Kerr-McGee's Area 2 operations and is covered under CDPS Permit COR402541.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	McGavin 6-19HZ Well Pad and Facility
Location:	Sec 19, T2N, R67W / Firestone, Colorado
Total Area of Project:	25.63 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is seasonal winter wheat; primary land use is agriculture.
Percentage of Existing Vegetation Cover:	Vegetative cover on the subject location is 100%, with exception to seasonal planting/harvest and crop rotation. Method for determination: National Resource Conversation Service (NRCS) soil survey data, and on-site assessment at the time of pit excavation for planning and permitting purposes.
Soil Type(s):	47 - Olney fine sandy loam, 1-3% slopes, HSB B 72 - Vona loamy sand, 0-3% slopes, HSG A 4 - Aquolls and Aquepts, flooded, HSG D
Primary Receiving Water:	Delineated wetland approximately 200' northwest of proposed location.
Operator ID:	47120
CDPS Permit:	COR402541
Stormwater Manager:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation Office: (720) 929-6317
SWMP Administrator & Inspector:	Austin Lee, HSE Advisor Occidental Petroleum Corporation Office: (605) 920-0675
Emergency Contact:	Name: Integrated Operation Center (IOC) Office: (970) 506-5980

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

☒ Delineation of Disturbance Limits	☒ Access Road Construction	☒ Perimeter /Control Measures Installation	☒ Grading, stripping, excavation, earthwork	☒ Well drilling & Completions
☒ Facility Construction	☒ Pipeline & Flowline Installation	☒ Disturbance Reduction	☒ Interim & Final Reclamation	☒ Return to Agriculture

All construction and development shall be in accordance with the Colorado Department of Public Health and Environment's CDPS General Permit for Stormwater Discharges Associated with Construction Activity, and the Colorado Oil and Gas Conservation Commission (COGCC) 304.c.15 and 1002.f rules and requirements.

4.0 POTENTIAL POLLUTANT SOURCES

Potential pollution sources shall be placed within the project construction boundary, designated staging area(s), working surface, contained by general or sized secondary containment, and stormwater perimeter controls. Anticipated pollution sources which will be managed by appropriate BMP fact sheets or operational best management standard operating procedures include, but are not limited to:

☒ Disturbed and stored soils	☒ Vehicle/equipment maintenance and fueling	☐ Non-industrial waste
☒ Vehicle tracking of sediments	☒ Dust generating processes	☒ Potential Spills
☐ Management of contaminated soils	☒ Routine maintenance activities	☐ Spill prevention and response
☒ Loading/unloading ops	☒ On-site waste management	
☒ Outdoor storage activities	☐ Concrete truck washing	

No dedicated concrete or asphalt batch plants will be at the project location. Safety Data Sheets (SDS) for materials to be used are maintained by Kerr-McGee. Pollutants shall be managed in accordance with waste regulations administered by COGCC 900 series rules.

5.0 STORMWATER, EROSION & SEDIMENT CONTROL MEASURES / BMPS

Measures for stormwater, erosion and sediment control will be accomplished through a combination of construction techniques, structural and non-structural controls, vegetation and re-vegetation, administrative controls and good housekeeping practices. Control measures will be implemented and adjusted with changing site conditions, as well as phases of construction. All control measures deployed throughout construction, shall be identified on site specific stormwater management plan as-built maps.

The following list of control measures will be implemented during all phases of construction on the Project. Installation and detail specifications can be found in Appendix C:

BMP / Control Measure	Intended Use/Purpose	Installation Timing	Removal Timing
Limits of Construction (LOC)	*To establish a perimeter for which construction activities are managed within.*	Prior to construction	Interim / Final Reclamation
Vehicle Tracking Controls (VOC)	*Provide a stabilized construction site access to reduce off-site tracking.*	Prior to construction	Interim Reclamation
Diversion Ditch (DD)	*To divert and effectively manage run-on/run-off from the project.*	Prior to Construction	Interim Reclamation
Sediment Control Log (SCL)	*Provide a sediment barrier to intercept sheet flow run-off from disturbed areas, or as a perimeter control.*	During Construction	Interim Reclamation
Check Dams (CD)	*Slow the velocity of concentrated flow, thus reducing erosion.*	During Construction	Interim Reclamation
Sediment Basin (SB)	*Collect stormwater and provide detention and settling time of stormwater run-off.*	During Construction	Interim Reclamation or As Permitted
Culverts (C)	*Divert water under a crossing, or to direct flow to a designated point.*	During Construction	Interim Reclamation
Inlet Protection (IP)	*Reduce erosion and sediment loading into a designated culvert or inlet.*	During Construction	Interim Reclamation
Outlet Protection (OP)	*Reduce velocity and erosion from a designated culvert or outlet.*	During Construction	Interim Reclamation
Seed & Mulch (SM)	*Stabilize disturbed areas no longer in use or intended for construction and development (including stockpiles)*	Construction and Interim Reclamation	N/A

6.0 MATERIALS HANDLING AND SPILL PREVENTION

Discharges of hazardous substances or oil resulting from spills or construction operations are not authorized under the Construction General Permit or this plan. Spills or leaks will be managed by Kerr-McGee personnel or their designee, and according to the Kerr-McGee *Wattenberg Field, Colorado Spill Prevention, Control and Countermeasure (SPCC)* Plan. Kerr-McGee personnel and designees are trained to prevent, mitigate, evaluate, and respond to spills and releases. In the event of a spill, notify the Stormwater Manager, after taking emergency and internal procedures for notification. Depending on the nature of the spill and material involved, the Colorado Department of Public Health and Environment 24-hour spill reporting line (877-518-5608) will be contacted and/or downstream water users notified, as necessary.

7.0 NON-STORMWATER DISCHARGES

Sources of non-stormwater discharges include emergency fire-fighting activities or a fire hydrant, uncontaminated springs which do not originate from an area of land disturbance, and construction dewatering. In the event of construction dewatering, control measures shall be implemented and Low Risk Discharge Guidance for Uncontaminated Groundwater to Land (WQP27) shall be followed.

8.0 FINAL STABILIZATION

All soil horizons segregated for the purpose of construction shall be replaced to their original relative positions and contour for reclamation and final stabilization. Following topsoil re-distribution, the reclamation area shall be cross ripped to alleviate compaction. Soil amendments will be determined and applied as necessary, and incorporated by disking, harrowing or cultiplacking during seedbed preparation.

Seed used for reclamation will be determined based on Surface Owner consultation, and consider soil type, land use, and adjacent reference area(s) vegetation. The approved seed mix, in combination with certified weed-free mulch, shall be installed when seasonal or weather conditions are most favorable to take advantage of moisture, such as early spring or late fall, and never during windy or frozen conditions.

The Colorado Department of Health and Environment (CDPHE) defines final stabilization as, “finally stabilized means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, and the vegetation cover is capable of providing erosion control equivalent to pre-existing conditions, or equivalent permanent, physical erosion reduction methods have been employed.” Stabilized unpaved surfaces, such as gravel access roads or working surfaces, necessary for the operation of the facility or nearby facilities, also qualifies as “final stabilized”.

9.0 POST-CONSTRUCTION STORMWATER

Following final stabilization, and pursuant of COGCC rule 1002.f and rule 1004, BMPs shall be maintained under Kerr-McGee’s Post-Construction Stormwater Program, and evaluated for Tier 1 / Non-Tier 1 status as applicable and per COGCC 100 series definitions, until the facility is abandoned, and final reclamation is achieved.

10.0 INSPECTION AND MAINTENANCE PROCEDURES

10.1 Inspections

Inspections will be conducted to document the status of construction activities, stormwater control measure placement, maintenance needs, and effectiveness, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Stormwater Manager and SWMP Administrator and conducted by their designated representative(s). Inspection forms will document non-compliance conditions, including any release of sediment or other contaminants, additional control measures that are needed, or repair and maintenance work orders.

During construction, inspections shall be conducted every 14 days, and after a major precipitation or melt event, which has the potential to cause surface runoff.

For sites earthwork and construction is completed, but final stabilization is not achieved due to vegetative cover, inspections shall be conducted every 30 days and exclude precipitation or melt event response. Inspections will continue until all reclaimed areas have achieved a cover of 70% the pre-construction reference vegetation (i.e. final stabilization).

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection. All inspection records are stored for a minimum of three years after the location has achieved final stabilization.

10.2 Maintenance

For maintenance items discovered at active construction locations, action and documentation towards completing repairs identified at the time of inspection, shall be made within 24 hours of discovery.

Maintenance items discovered post-construction will be documented and coordinate with production personnel.

Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for actions requiring ground disturbance / earthwork.

APPENDIX A

CDPS STORMWATER GENERAL PERMIT CERTIFICATION

COLORADO
Department of Public Health & Environment

CERTIFICATION TO DISCHARGE
UNDER
CDPS GENERAL PERMIT COR400000
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

Certification Number: **COR402541**

This Certification to Discharge specifically authorizes:

Owner Kerr McGee Oil and Gas Onshore LP
Operator Kerr McGee Oil and Gas Onshore LP

to discharge stormwater from the facility identified as

Kerr Area 2

To the waters of the State of Colorado, including, but not limited to:

to Boulder Creek to South Platte River

Facility Activity :	Oil & Gas Field Development
Disturbed Acres:	>5 acres
Facility Located at:	See Map in File Denver & Boulder & Broomfield CO 80229 Adams County Latitude 40.081 Longitude -104.717000
Specific Information (if applicable):	

Certification is issued 4/1/2019

Certification is effective 4/1/2019

Expiration date of general permit : 3/31/2024

This certification under the permit requires that specific actions be performed at designated times. The certification holder is legally obligated to comply with all terms and conditions of the permit.

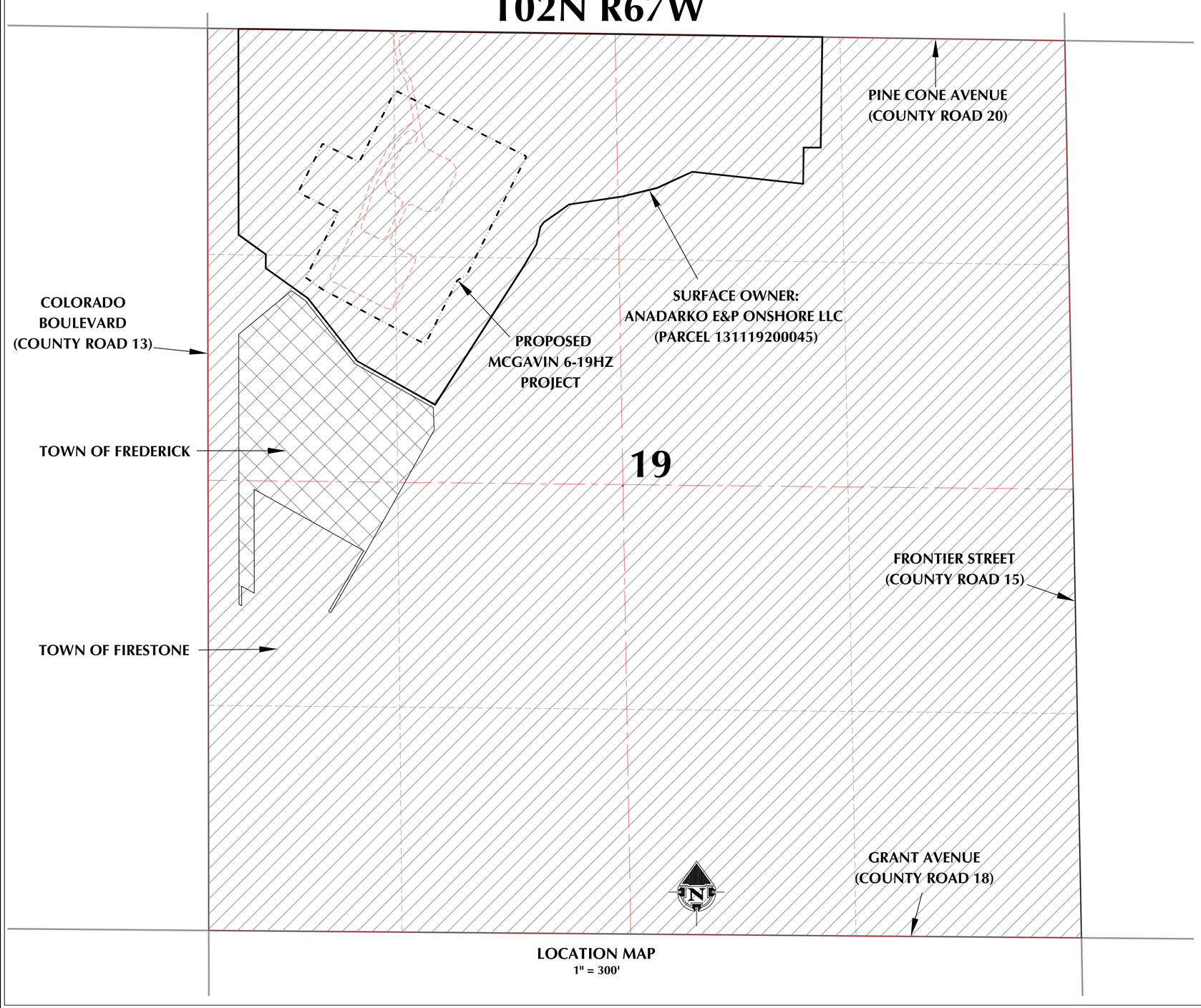
This certification was approved by:
Meg Parish, Unit Manager
Permits Section
Water Quality Control Division

APPENDIX B

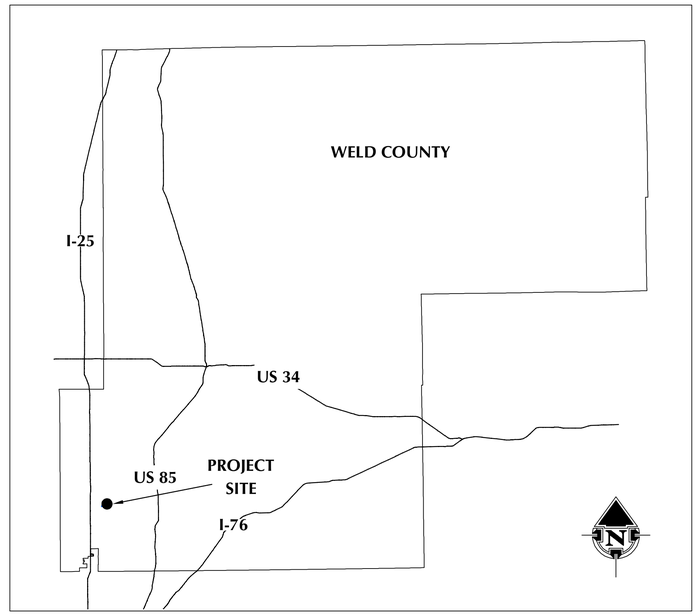
GRADING PLANS AND DRAINAGE REPORT

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN

LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
FIRESTONE, COLORADO



LOCATION MAP
1" = 300'



VICINITY MAP

PAGE INDEX

1 - COVER SHEET
2 - SITE OVERVIEW
3 - CONSTRUCTION PHASE DRAINAGE PLAN
4 - PRODUCTION PHASE DRAINAGE PLAN
5 - FACILITY STORMWATER STORAGE
6 - WELL PAD STORMWATER STORAGE
7 - BMP TYPICALS (A)
8 - BMP TYPICALS (B)

GENERAL NOTES:

1. THIS DRAINAGE AND EROSION CONTROL PLAN WAS PREPARED FOLLOWING TOWN OF FIRESTONE MUNICIPAL CODE AND DESIGN GUIDANCE PROVIDED BY MILE HIGH FLOOD DISTRICT.
2. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
3. ORIGINAL DOCUMENT SIZE: 24" X 36"

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
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Phone 970-776-4331

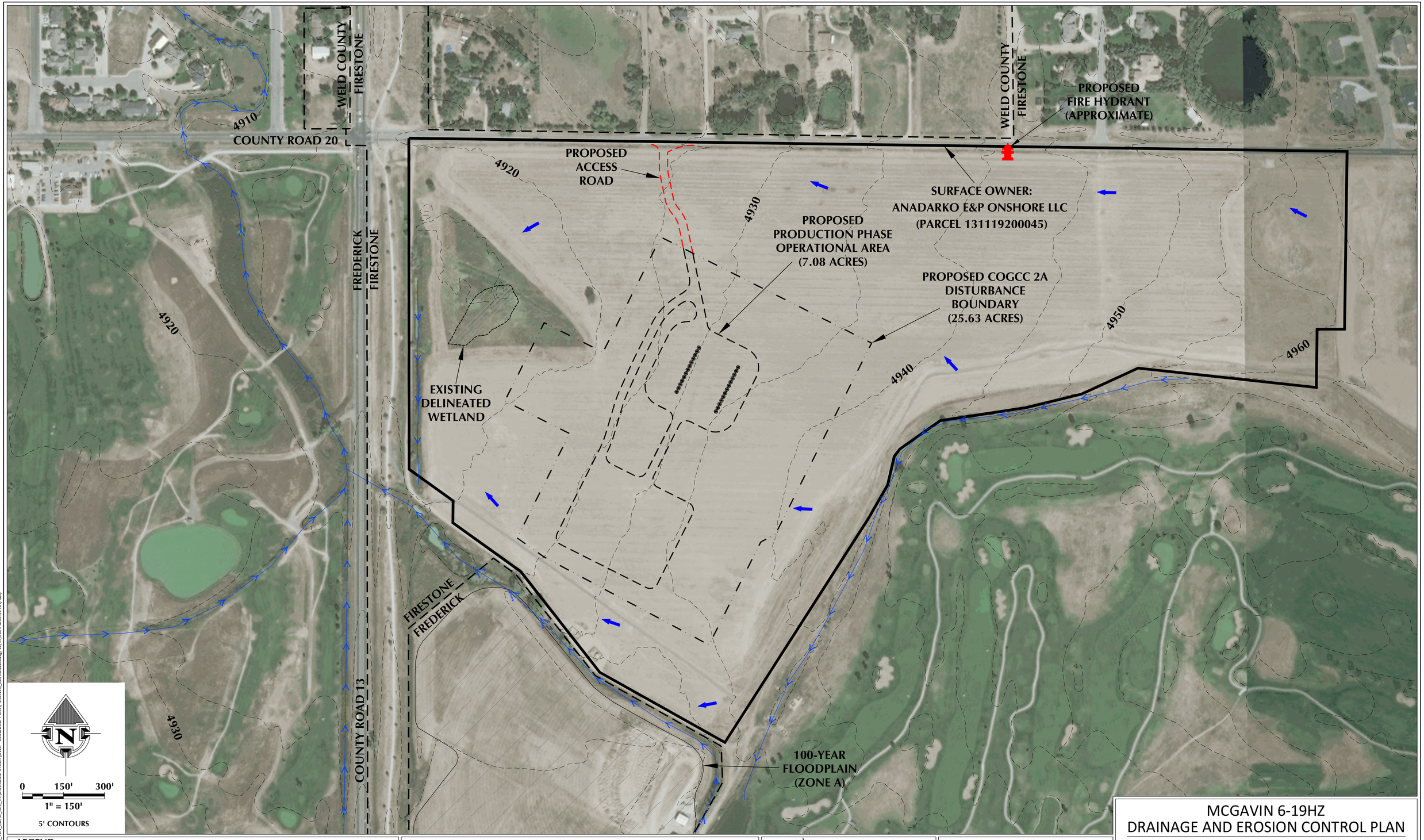
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Denver, Colorado 80202

MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
COVER SHEET

SCALE:	VARIES	PAGE:	1 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DRAINAGE STUDY\DWG - DRAINAGE PLAN\MCGAVIN_COMBINED.dwg, 12/13/2021 8:48:15 AM, katy



LEGEND

- EXISTING CONTOUR
- EXISTING TRIBUTARY / DRAINAGE
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED PRODUCTION PHASE OPERATIONAL AREA
- PROPOSED ACCESS ROAD
- PROPOSED WELL
- STORMWATER DRAINAGE

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
SITE OVERVIEW

SCALE:	1" = 150'	PAGE:	2 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DRAINAGE STUDY\DWG - DRAINAGE PLAN\MCGAVIN_COMBINED.dwg, 12/13/2021 8:53:32 AM, katy

CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC2	12" CMP	30	4927.1	4927.0	0.3%
ARC3	12" CMP	30	4920.4	4920.2	0.7%
ARC4	12" CMP	30	4917.3	4916.9	1.3%
ARC5	12" CMP	30	4923.2	4922.9	1.0%

COUNTY ROAD 13
BIKE PATH
100-YEAR FLOODPLAIN (ZONE A)
EXISTING PRIVATE ROAD
DELINEATED WETLAND
15' X 15' X 3' SEDIMENT TRAP (ST2)
ACCESS ROAD CULVERT #4 (ARC4)
ACCESS ROAD CULVERT #3 (ARC3)
20' X 20' X 3' SEDIMENT TRAP (ST1)
ACCESS ROAD CULVERT #5 (ARC5)
20' X 20' X 3' SEDIMENT TRAP (ST3)
ACCESS ROAD CULVERT #1 (ARC1)
ACCESS ROAD CULVERT #2 (ARC2)
COUNTY ROAD 20
POWER POLE (TYP.)
OVERHEAD POWER LINE
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
MCGAVIN 6-19HZ MLVT
FLAT GRADED ELEVATION = 4919.3'
MCGAVIN 6-19HZ FACILITY
FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'
MCGAVIN 6-19HZ WELL PAD
FLAT GRADED ELEVATION = 4929.9'
TEMPORARY EQUIPMENT AREA
TOPSOIL STOCKPILE
4915
4920
4925
4930
4935
4940
1.1% DITCH SLOPE
1.8% DITCH SLOPE
2.0% DITCH SLOPE
1.2% DITCH SLOPE
1.3% DITCH SLOPE
1.4% DITCH SLOPE
0.5% DITCH SLOPE
0.5% SLOPE
1.0% SLOPE
0.8% SLOPE
0.6% SLOPE
CUT
FILL
SP

0 75' 150'
1" = 75'
1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED SEDIMENT TRAP WITH PROTECTED OUTLET
- PROPOSED SLOPE PROTECTION

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. SLOPE PROTECTION USED FOR TEMPORARY EROSION CONTROL ON CUT/FILL SLOPES AND SOIL STOCKPILES.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
CONSTRUCTION PHASE DRAINAGE PLAN

SCALE:	1" = 75'	PAGE:	3 OF 8
JOB NUMBER:	16-105	DATE:	10/18/21
DRAFTED BY:	HJL	REVISED:	12/10/21

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CULVERT ID	SIZE	LENGTH (FT)	ELEVATION (FT)		GRADE
			INLET INVERT	OUTLET INVERT	
ARC1	15" RCP	45	4923.5	4922.9	1.3%
ARC6	12" CMP	30	4923.8	4922.9	3.0%

COUNTY ROAD 13

BIKE PATH

4915

DELINEATED WETLAND

4920

4920

EXISTING PRIVATE ROAD

100-YEAR FLOODPLAIN (ZONE A)

FACILITY WEIR & SPILLWAY

FACILITY OUTLET PIPE 4925

FACILITY STORAGE BERM

2-YEAR STORMWATER STORAGE FOOTPRINT

ACCESS ROAD CULVERT #6 (ARC6)

WELL PAD OUTLET PIPE

WELL PAD WEIR & SPILLWAY

WELL PAD STORAGE BERM

PROPOSED 6' MASONRY WALL

FILL

CUT

0.5% SLOPE

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ FACILITY

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.5'

0.8% SLOPE

0.5% SLOPE

FLAT GRADED SEPARATOR AREA ELEVATION = 4928.9'

0.6% SLOPE

FILL

CUT

0.5% SLOPE

0.5% SLOPE

MCGAVIN 6-19HZ WELL PAD

WELL ELEVATION = 4929.9'

0.5% SLOPE

0.5% SLOPE

4930

4930

4930

4925

ACCESS ROAD CULVERT #1 (ARC1)

COUNTY ROAD 20

POWER POLE (TYP.)

OVERHEAD POWER LINE

4935

4935

4940

4940

PRODUCTION PHASE OPERATIONAL AREA (7.08 ACRES)

OFF-SITE FLOW DEFLECTION

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

N

0 75' 150'

1" = 75'

1' CONTOURS

LEGEND

- EXISTING FENCE
- EXISTING ROAD
- EXISTING PIPELINE
- EXISTING CONTOUR
- EXISTING WATER LINE
- STORMWATER DRAINAGE
- PROPOSED CONTOUR
- PROPOSED WELL
- PROPOSED COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED ACCESS ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED BERM / OFF-SITE FLOW DEFLECTION
- PROPOSED CULVERT PROTECTION / RIPRAP
- PROPOSED PERMANENT SEEDING
- 2-YEAR STORMWATER STORAGE FOOTPRINT
- 100-YEAR STORMWATER STORAGE FOOTPRINT

GENERAL NOTES:

1. DISCLAIMER: THIS PLAN REPRESENTS AN APPROXIMATE LOCATION OF DRAINAGE AND EROSION CONTROL FEATURES; EXACT LOCATION MAY VARY DEPENDING UPON EXISTING EASEMENTS, PIPELINES, FLOWLINES, AND SETBACK REQUIREMENTS.
2. ELEVATIONS ARE BASED ON NAVD88 (GEOID12B).
3. RECLAIMED AREA WILL BE RE-SEEDED AND RE-VEGETATED.

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PRODUCTION PHASE DRAINAGE PLAN

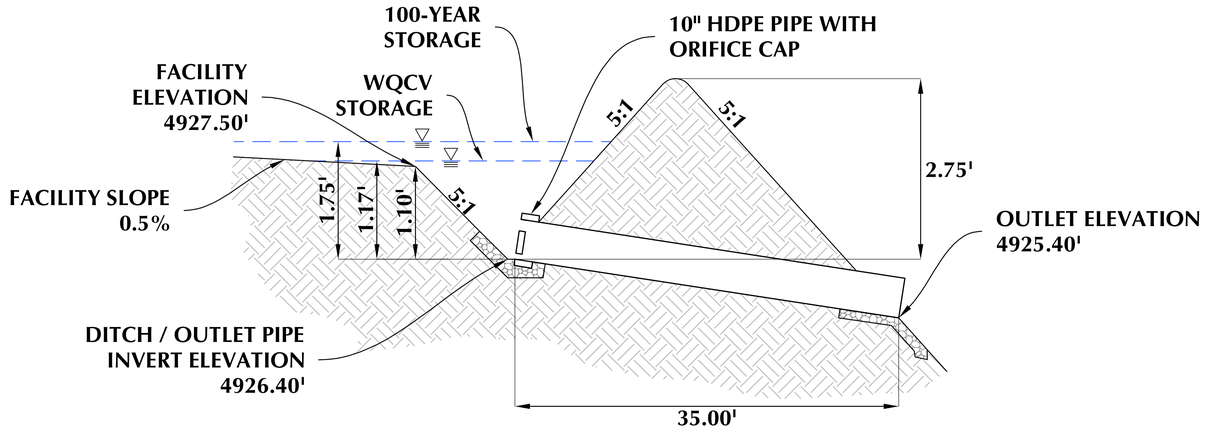
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FACILITY STORMWATER STORAGE

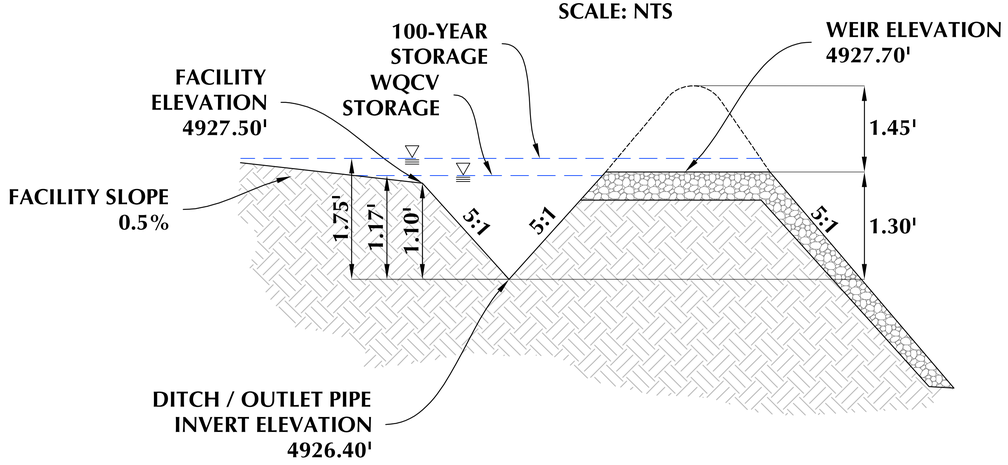
OUTLET PROFILE

SCALE: NTS



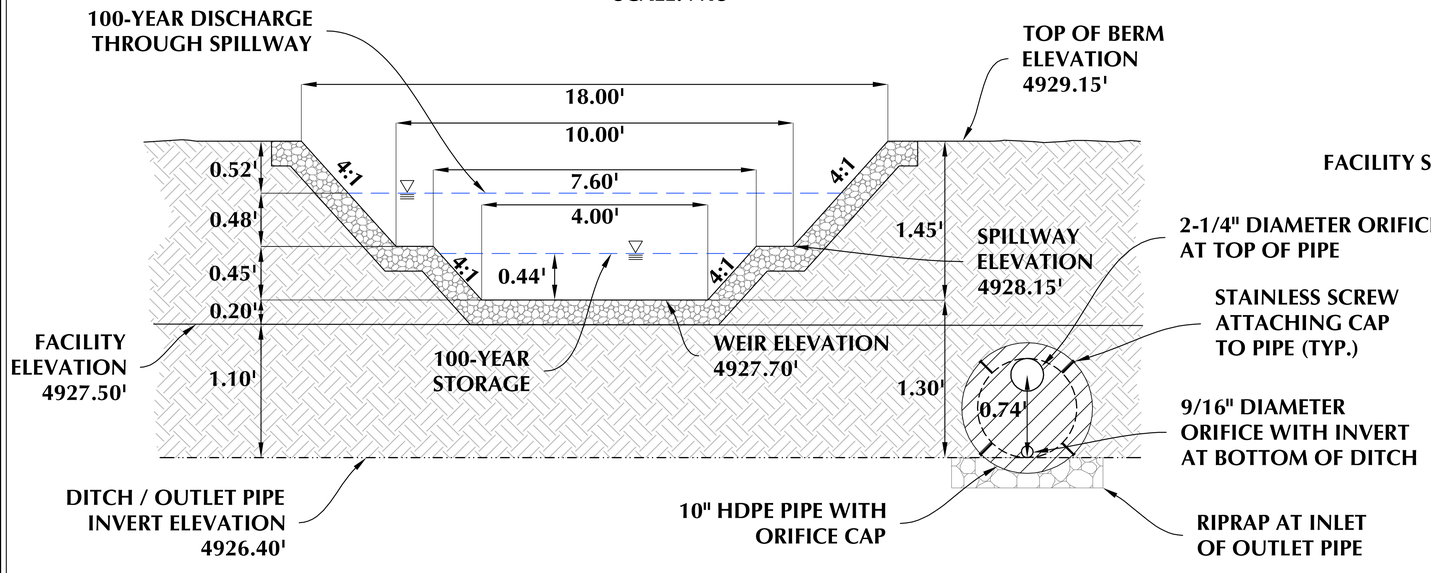
WEIR PROFILE

SCALE: NTS



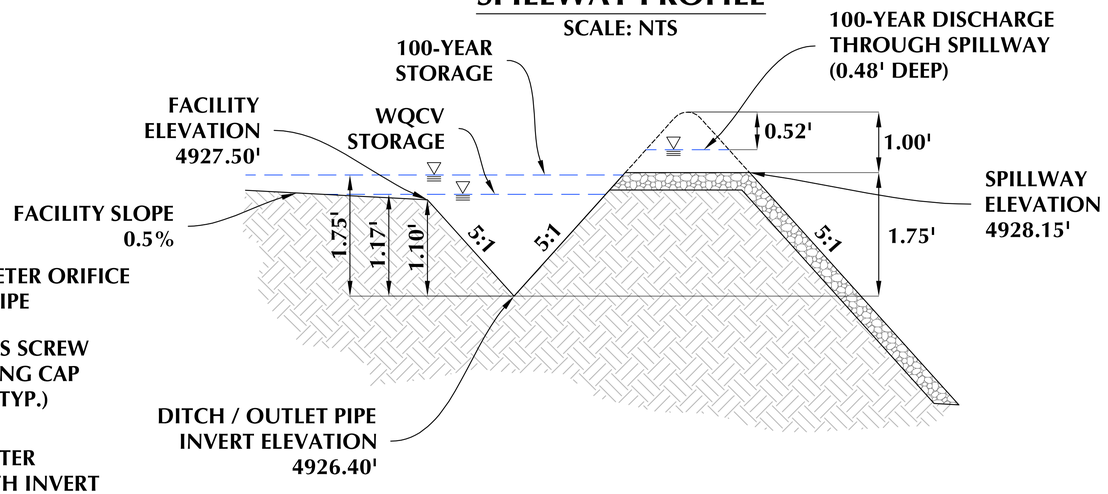
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
FACILITY STORMWATER STORAGE

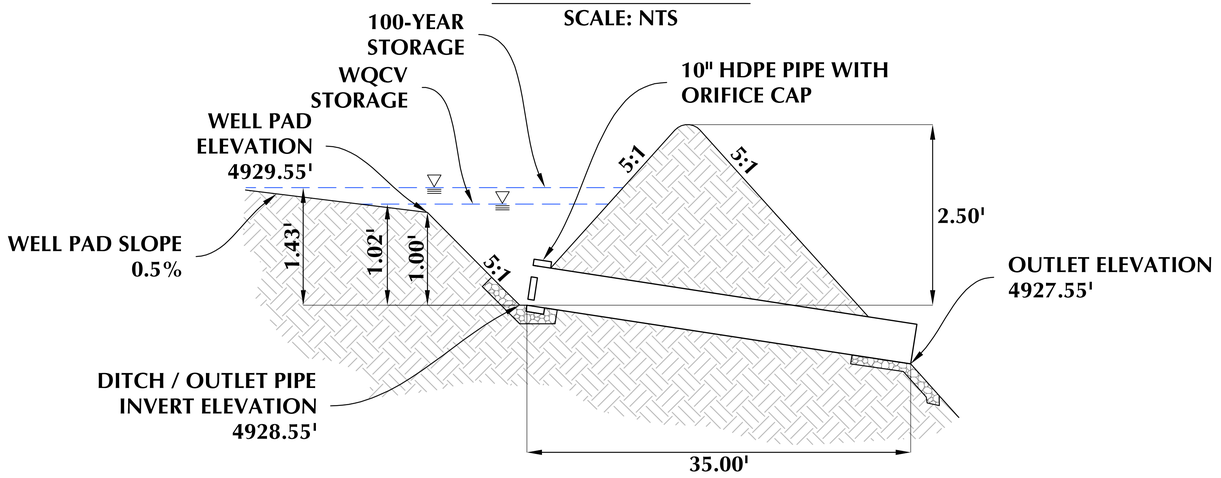
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WELL PAD STORMWATER STORAGE

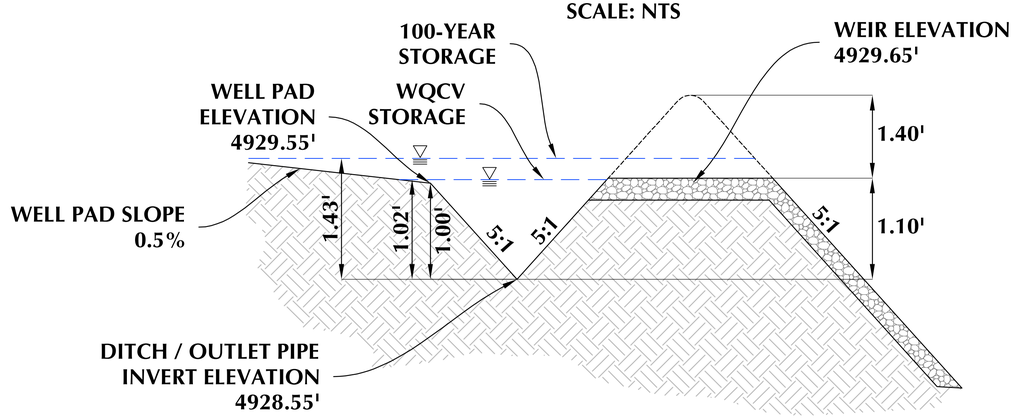
OUTLET PROFILE

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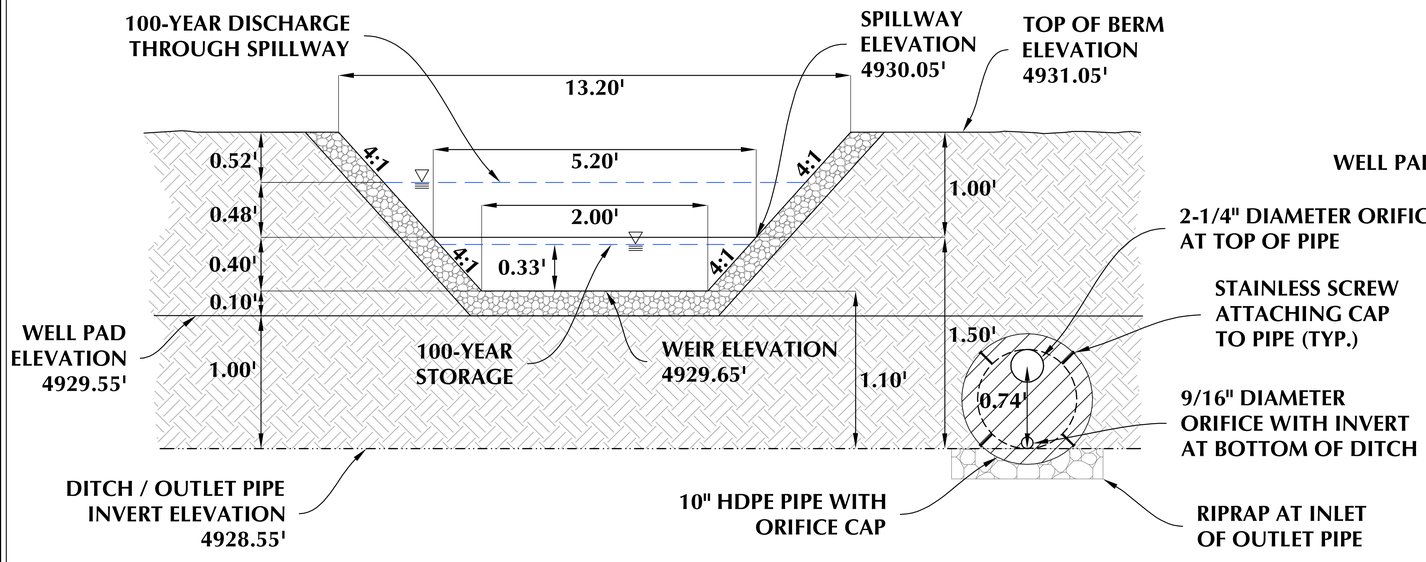
WEIR PROFILE

SCALE: NTS



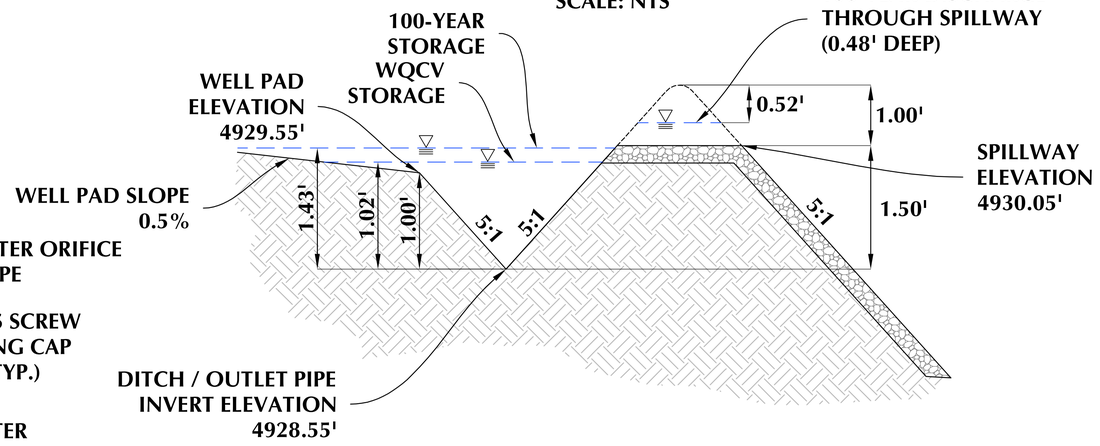
WEIR & SPILLWAY SECTION

SCALE: NTS



SPILLWAY PROFILE

SCALE: NTS



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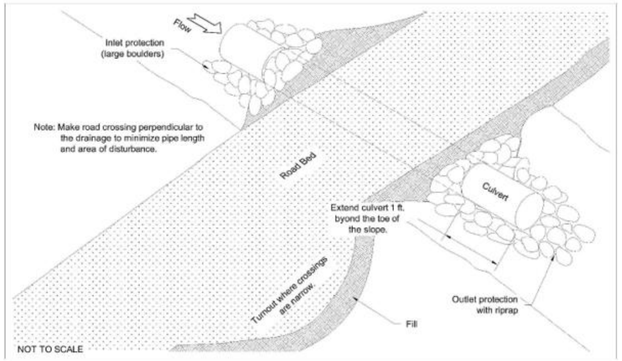
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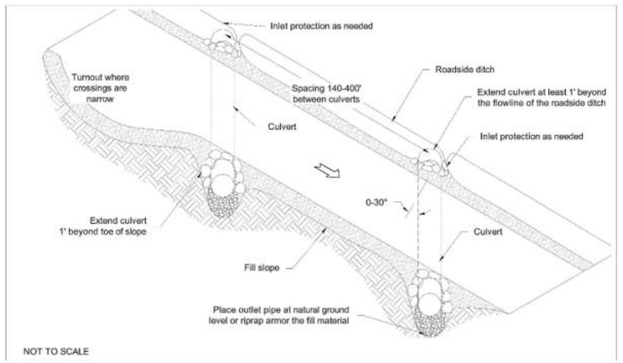
MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
WELL PAD STORMWATER STORAGE

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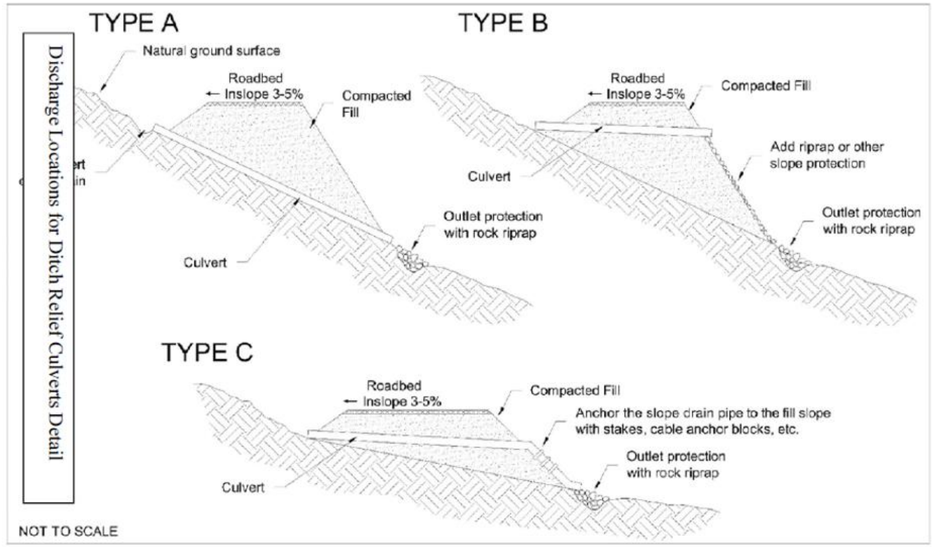
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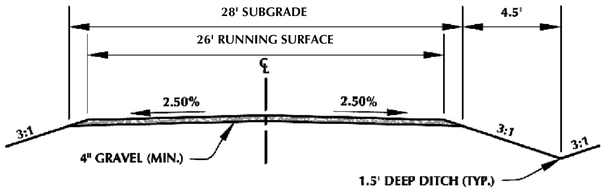
Culvert





Culvert

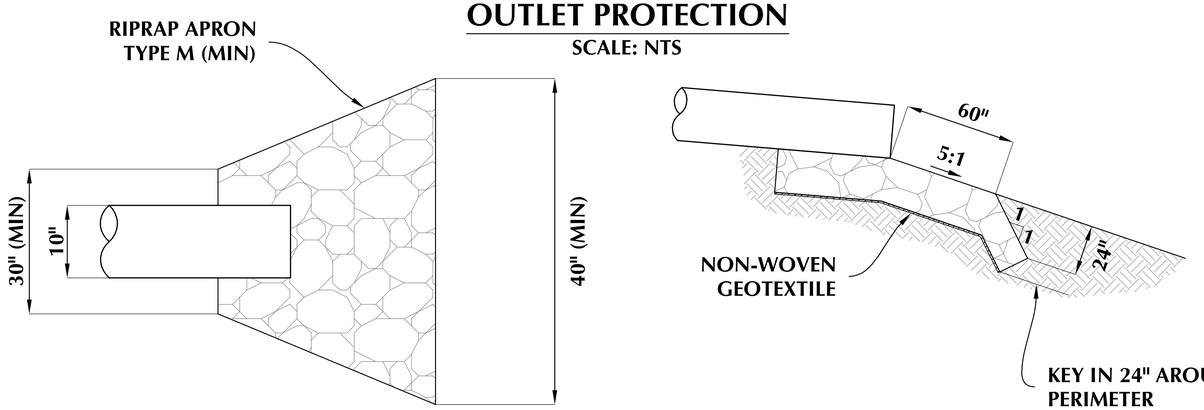




ACCESS DRIVE - TYPICAL CROSS SECTION

OUTLET PROTECTION

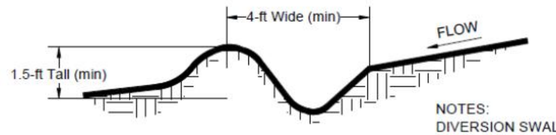
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Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

Temporary and Permanent Seeding (TS/PS)

TS/PS

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

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MCGAVIN 6-19HZ
DRAINAGE AND EROSION CONTROL PLAN
BMP TYPICALS (A)

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Sediment Trap

ST

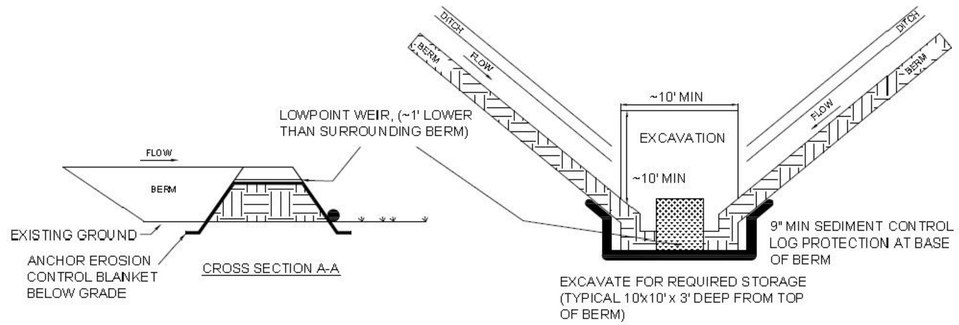
Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	4	6	8	10	12
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	Area of 3.0' Deep Sediment Trap (ft^2)					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

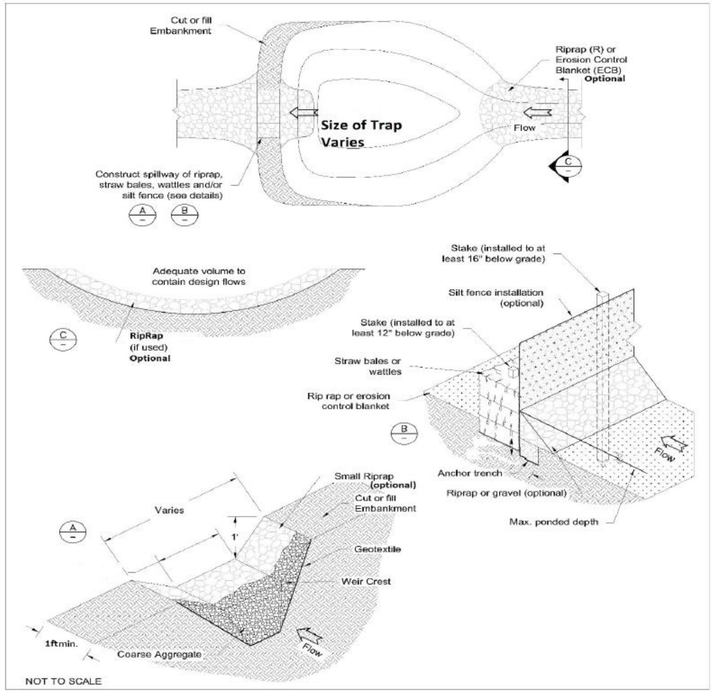
Sediment Trap

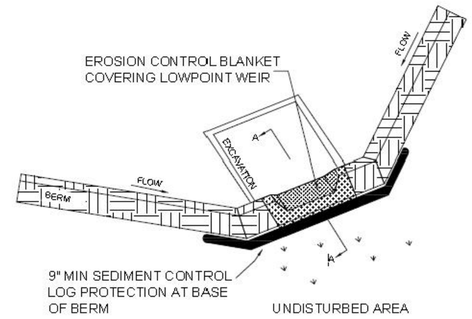
ST



Sediment Trap

ST





GENERAL NOTES:

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BMP TYPICALS (B)

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APPENDIX C

CONTROL MEASURE / BMP SPECIFICATIONS

Construction Phasing/Sequencing (CP)

CP

Description



Source: UDFCD BMP Fact Sheet

Effective construction site management to minimize erosion and sediment transport includes attention to construction phasing, scheduling, and sequencing of land disturbing activities. On most construction projects, erosion and sediment controls will need to be adjusted as the project progresses and should be documented in the SWMP. Construction phasing refers to disturbing only part of a site at a time to limit the potential for erosion from dormant parts of a site. Grading activities and construction are completed and soils are effectively stabilized on one part of a site before grading and construction begins on another portion of the site. Construction sequencing or scheduling refers to a specified work schedule that coordinates the timing of land disturbing activities and the installation of erosion and sediment control practices.

Appropriate Uses

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance. Larger projects and linear construction projects may benefit most from construction sequencing or phasing, but even small projects can benefit from construction sequencing that minimizes the duration of disturbance. Typically, erosion and sediment controls needed at a site will change as a site progresses through the major phases of construction. Erosion and sediment control practices corresponding to each phase of construction must be documented in the SWMP.

Design and Installation

BMPs appropriate to the major phases of development should be identified on construction drawings. In some cases, it will be necessary to provide several drawings showing construction-phase BMPs placed according to stages of development (e.g., clearing and grading, utility installation, active construction, final stabilization). Some municipalities in the Denver area set maximum sizes for disturbed area associated with phases of a construction project. Additionally, requirements for phased construction drawings vary among local governments within the UDFCD boundary. Some local governments require separate erosion and sediment control drawings for initial BMPs, interim conditions (in active construction), and final stabilization.

Construction Phasing/Sequencing (CP)

CP

Construction Scheduling	
Functions	
Erosion Control	Moderate
Sediment Control	Moderate
Site/Material Management	Yes

Typical construction phasing BMPs include:

- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.

- If there is carryover of stockpiled material from one phase to the next, position carryover material in a location easily accessible for the pending phase that will not require disturbance of stabilized areas to access the stockpile. Particularly with regard to efforts to balance cut and fill at a site, careful planning for location of stockpiles is important.

Typical construction sequencing BMPs include:

- Sequence construction activities to minimize duration of soil disturbance and exposure. For example, when multiple utilities will occupy the same trench, schedule installation so that the trench does not have to be closed and opened multiple times.

- Schedule site stabilization activities (e.g., landscaping, seeding and mulching, installation of erosion control blankets) as soon as feasible following grading.

- Install initial erosion and sediment control practices before construction begins. Promptly install additional BMPs for inlet protection, stabilization, etc., as construction activities are completed. Table CP-1 provides typical sequencing of construction activities and associated BMPs.

Maintenance and Removal

When the construction schedule is altered, erosion and sediment control measures in the SWMP and construction drawings should be appropriately adjusted to reflect actual "on the ground" conditions at the construction site. Be aware that changes in construction schedules can have significant implications for site stabilization, particularly with regard to establishment of vegetative cover.

Construction Phasing/Sequencing (CP)

CP

Table CP-1. Typical Phased BMP Installation for Construction Projects

Project Phase	BMPs
Pre-disturbance, Site Access	▪ Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection). ▪ Establish vehicle tracking control at entrances to paved streets. Fence as needed. ▪ Use construction fencing to define the boundaries of the project and limit access to areas of the site that are not to be disturbed. **Note: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.**
Site Clearing and Grubbing	▪ Install perimeter controls as needed on downgradient perimeter of site (silt fence, wattles, etc). ▪ Limit disturbance to those areas planned for disturbance and protect undisturbed areas within the site (construction fence, flagging, etc). ▪ Preserve vegetative buffer at site perimeter. ▪ Create stabilized staging area. ▪ Locate portable toilets on flat surfaces away from drainage paths. Stake in areas susceptible to high winds. ▪ Construct concrete washout area and provide signage. ▪ Establish waste disposal areas. ▪ Install sediment basins. ▪ Create dirt perimeter berms and/or brush barriers during grubbing and clearing. ▪ Separate and stockpile topsoil, leave roughened and/or cover. ▪ Protect stockpiles with perimeter control BMPs. Stockpiles should be located away from drainage paths and should be accessed from the upgradient side so that perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period. ▪ Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but that will be inactive for an extended period. ▪ Water to minimize dust but not to the point that watering creates runoff.

Construction Phasing/Sequencing (CP)

CP

Project Phase	BMPs
Utility And Infrastructure Installation	**In Addition to the Above BMPs:** ▪ Close trench as soon as possible (generally at the end of the day). ▪ Use rough-cut street control or apply road base for streets that will not be promptly paved. ▪ Provide inlet protection as streets are paved and inlets are constructed. ▪ Protect and repair BMPs, as necessary. ▪ Perform street sweeping as needed.
Building Construction	**In Addition to the Above BMPs:** ▪ Implement materials management and good housekeeping practices for home building activities. ▪ Use perimeter controls for temporary stockpiles from foundation excavations. ▪ For lots adjacent to streets, lot-line perimeter controls may be necessary at the back of curb.
Final Grading	**In Addition to the Above BMPs:** ▪ Remove excess or waste materials. ▪ Remove stored materials.
Final Stabilization	**In Addition to the Above BMPs:** ▪ Seed and mulch/tackify. ▪ Seed and install blankets on steep slopes. ▪ Remove all temporary BMPs when site has reached final stabilization.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Description

Vehicle tracking controls provide a stabilized construction site access where vehicles merge onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface. There are a number of different types of vehicle tracking controls. Rock pads are the most common and effective, but other forms include cattle guards and mud mats.



Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking. Source: UDFCD BMP Fact Sheet

Applicability

Typically, vehicle tracking controls are installed at locations where construction traffic leaves or enters an existing paved road.

Limitations

- Although installing vehicle tracking control is a good way to help reduce the amount of sediment leaving a site, some soil may still be deposited from vehicle tires onto paved surfaces. To further reduce the chance of these sediments polluting stormwater runoff, sweeping of the paved area adjacent to the access is recommended.
- Heavy traffic and wet conditions will result in more frequent maintenance.
- May not be needed when access points are off unpaved roads.

Construction Specifications

Aggregate Vehicle Tracking Control (VTC)

This is a coarse-aggregate surfaced pad. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires. Typically, a geotextile should be placed between the rock and the soil surface. If the aggregate surfaced pad is not anticipated to be in use for a long duration and/or if it has limited traffic, the geotextile may be omitted.

Cattle Guard (CG)

A prefabricated rack, such as a cattle guard, may be used to reduce the amount of sediment that leaves the site on vehicle tires.

Mud Mat or TRM (MM)

This type of control may be appropriate for access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove significant sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

Maintenance and Removal

Inspect the area for degradation and replace the aggregate or material used for a stabilized entrance/exit as needed. If the area becomes clogged and ponds water, remove and dispose of excess sediment or replace material with a fresh layer of aggregate as necessary.

With aggregate vehicle tracking controls, ensure rock and debris from this area do not enter the public right-of-way.

Remove sediment that is tracked onto the public right of way daily or more frequently as needed. Excess sediment in the roadway indicates that the stabilized construction entrance requires maintenance.

Ensure that drainage ditches at the entrance/exit area remain clear.

A stabilized entrance should be removed only when the potential for off-site vehicle tracking no longer exists. This is typically after the site has been stabilized.

When wheel wash equipment is used, be sure that the wash water is discharged to a sediment trap prior to discharge. Also inspect channels conveying the water from the wash area to the sediment trap, and stabilize areas that may be eroding or have the potential to erode.

When a construction entrance/exit is removed, excess sediment from the aggregate should be removed and disposed of appropriately. The entrance should be promptly stabilized with a permanent surface following removal, typically by paving.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

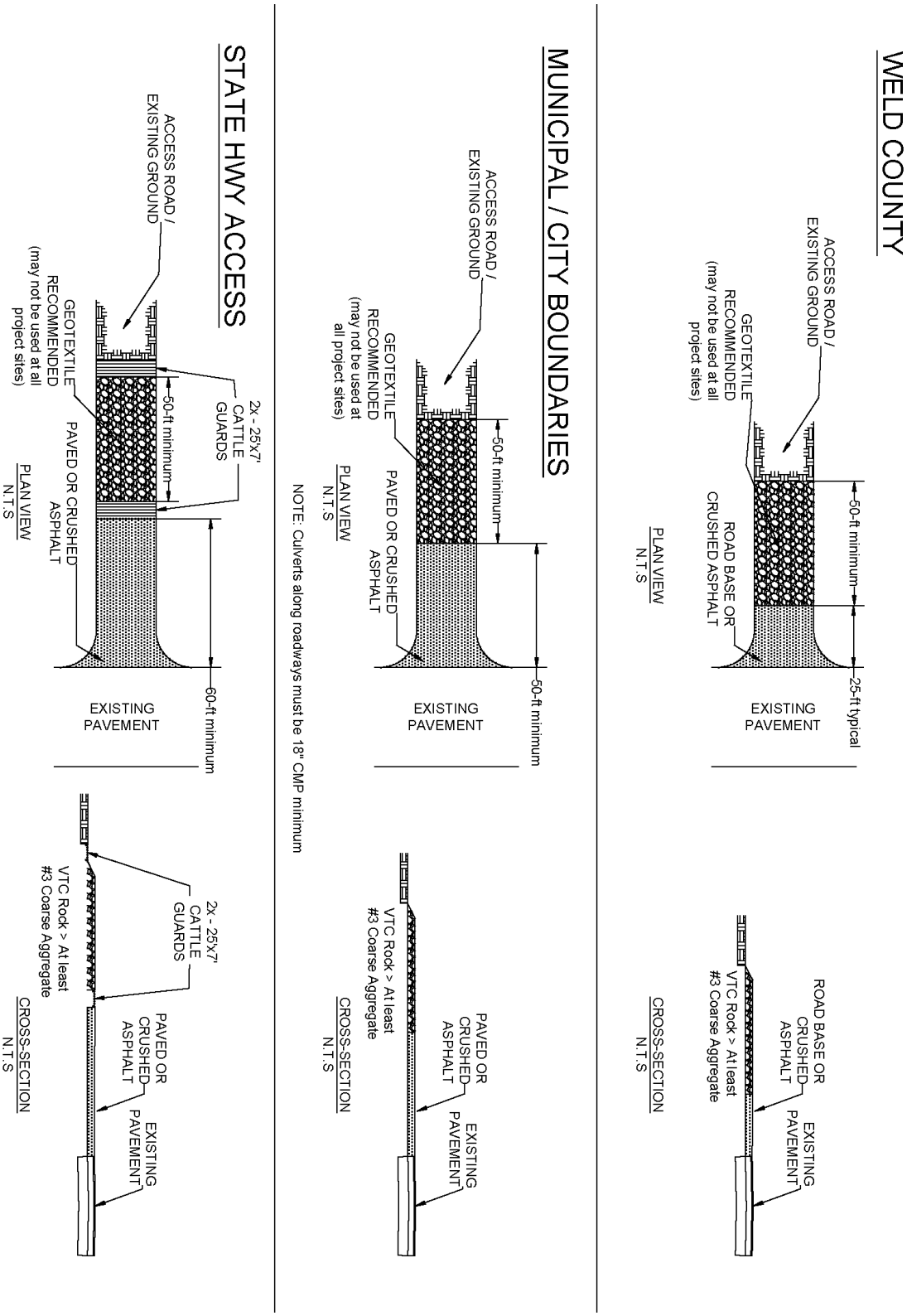
Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

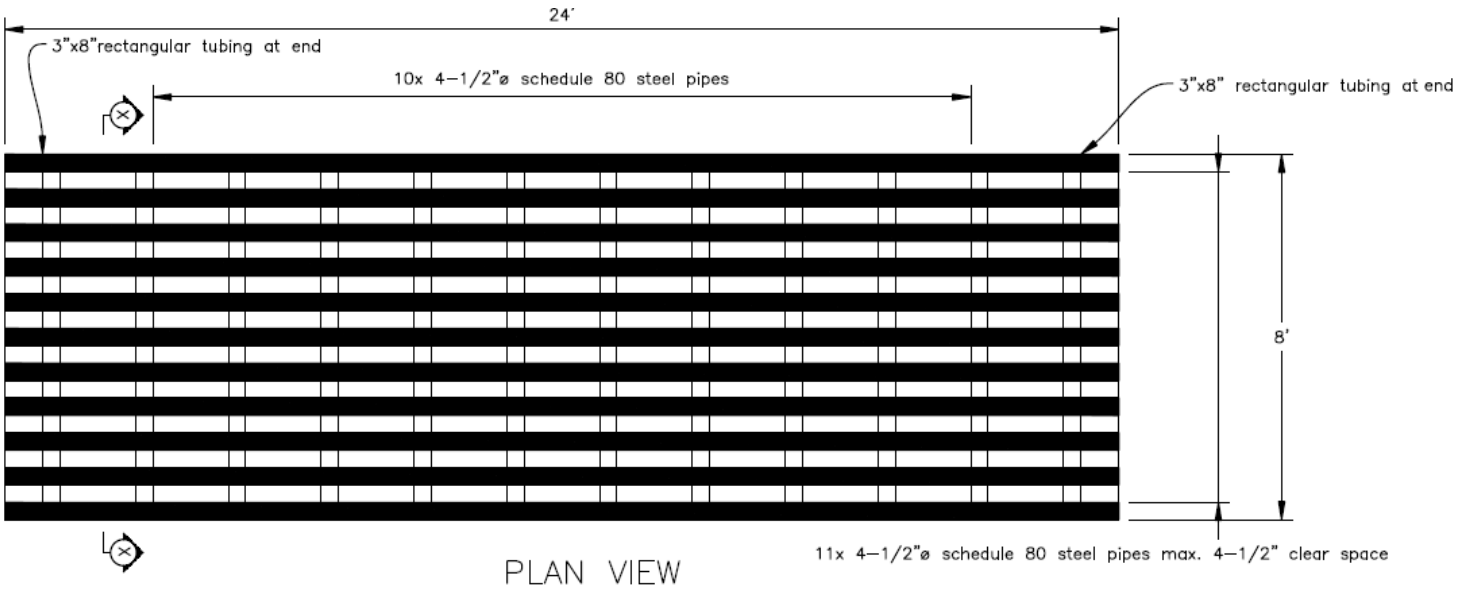
VTC/CG/MM

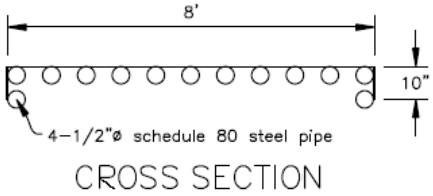


AGGREGATE VEHICLE TRACKING CONTROL DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM





These are typical dimensions for cattle guards; however, variations can be made per landowner agreements.

Typically 4- or 4½-inch pipe is used on the top but can be less if requested by landowner.

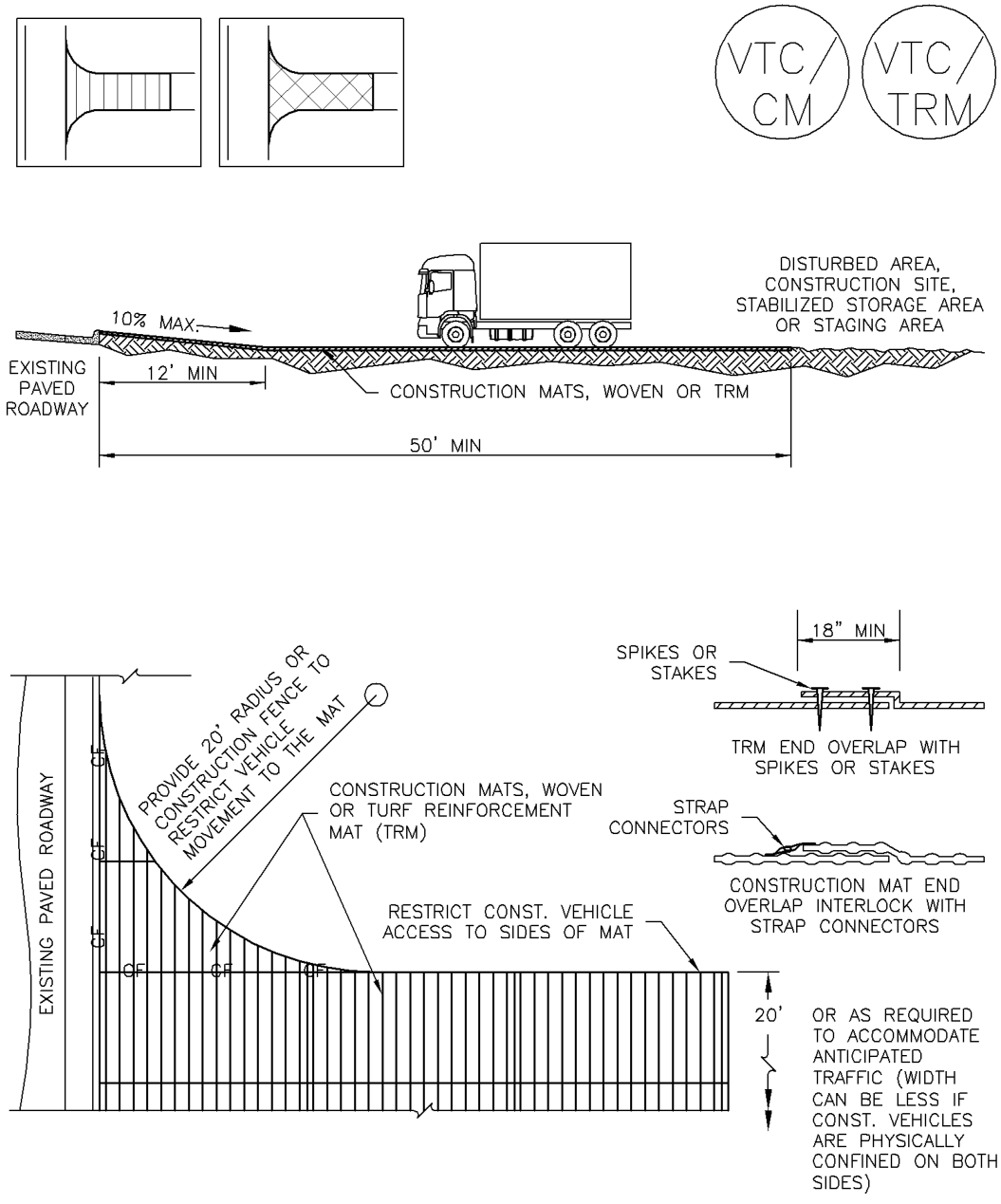




CATTLE GUARD DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM



VTC–3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM)

MUD MAT OR TRM DETAIL

Vehicle Tracking Control Pad, Cattle Guard, and Mud Mats (VTC/CG/MM)

VTC/CG/MM

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S).
   –TYPE OF CONSTRUCTION ENTRANCE(S)/EXITS(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).

2. CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.

3. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT–OF–WAYS.

4. STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

5. A NON–WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.

6. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.

5. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

Diversion Ditch and Berm

DD

Definition



A ditch and berm is a drainage swale with a parabolic or trapezoidal cross-section and a supporting ridge on the lower side that is constructed across the slope. The purpose of a ditch and berm diversion is to prevent off-site stormwater runoff from entering a disturbed area, to prevent sediment laden storm runoff from leaving the construction site or disturbed area, and to direct sediment laden runoff to a sediment control feature.

Applicability

Ditch and berms may be designed for temporary or permanent use. The maximum drainage area for a temporary ditch and berm is ten acres. For undisturbed drainage areas larger than ten acres, a permanent earthen dike / berm may be designed or used for larger flows. Ditch and berms may be used for:

- The upslope of cut or fill slopes to convey or divert flows away from disturbed areas;
- The downslope of cut or fill slopes to divert on-site runoff to a stabilized outlet or sediment control feature;
- The outer edge of a well pad to ensure that runoff remains on the pad and is diverted to a sediment pond or trap, if available;
- Where runoff from higher areas has the potential for causing erosion, or for interfering with and/or preventing the establishment of vegetation on lower areas;
- Where the length of slopes need to be reduced so soil loss will be kept to a minimum; and
- The perimeter of a site or disturbed area.

Limitations

- The area around the ditch and berm that is disturbed during its construction shall be stabilized (typically by maintaining existing vegetation).
- To effectively manage erosion, ditch and berms must be directed into a stabilized outlet, well-vegetated area, or to alternative sediment control measures.
- Temporary ditch and berms should be designed to avoid crossing vehicle pathways.
- Ditch and berms should be used with caution on soils subject to slippage.

Design Criteria

For a temporary ditch and berm (drainage less than 10 acres), no formal design is necessary.

Location

Ditch and berms are usually located above or below cut or fill slopes. Exact ditch and berm location(s) shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, and the development layout. Whenever possible, preserve existing vegetation between the edge of the cut or fill slope and the ditch and berm.

Diversion Ditch and Berm

DD

Capacity

For a permanent design, constructed ditch and berm features shall have the capacity to carry, at a minimum, the peak discharge from a 10-year frequency rainfall event with freeboard of no less than 0.3 feet.

Cross section See Figure DD-1 for details.

The ditch and berm shall be parabolic or trapezoidal in shape, if possible. The ditch and berm shall have compacted, stable, side slopes. The side slopes shall be flat enough to ensure ease of maintenance of the ditch and berm.

Velocity and grade

The permissible velocity for the specific soil type will determine the maximum grade. The maximum permissible velocity for sand and silt channels is 3 feet per second, and 5 feet per second for clay vegetated channels. Ditch and berms are usually not applicable below high sediment producing areas unless structural measures, designed to prevent accumulations of sediment within the channel, are installed within the ditch and berm.

Construction Specifications

General

- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the ditch and berm.
- All ditch and berms shall have uninterrupted positive grade to an outlet.
- Diverted runoff from a disturbed area shall be conveyed to a sediment control measure.
- Diverted runoff from an undisturbed area shall outlet to a sediment control measure or into an undisturbed stabilized area at non-erosive velocities.

Temporary diversion ditch and berm (typically at edge of disturbance) See figure DD-1

- The ditch and berm shall be excavated or shaped to line, grade, and cross section as required to meet the site-specific criteria. **The ditch and berm must be compacted.**
- This is accomplished by excavation of a U-shaped or trapezoidal trench or ditch, and compaction of the fill on the downslope side of the cut.
- Stabilization with vegetation is not required, so long as adequate sediment traps or other sediment control devices are provided at outlets.
- Inspect the ditch for adequate capacity, erosion, or damage. If there is reoccurring erosion, consider installing check dams or lining the channel.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Channels should be cleared of sediment and repairs made when necessary. Maintain ditch and berm capacity, ridge height, especially if high-sediment yielding areas are in the

drainage area above the ditch and berm. Redistribute the sediment as necessary to maintain the capacity of the ditch and berm.

Removal

Temporary ditch and berms shall remain in place only until the disturbed areas are re-graded and prepared for permanent stabilization. Permanent ditch and berms shall remain in place.

References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February, 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

United States Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), *Field Office Technical Guide.* 2002. http://www.nrcs.usda.gov/technical/efotg/

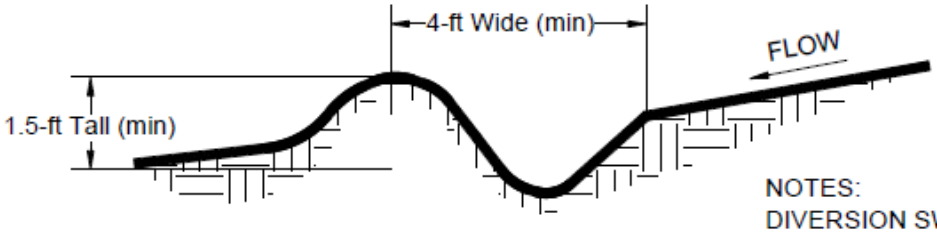
Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011. http://www.mde.state.md.us/PROGRAMS/WATER/STORMWATERMANAGEMENTPROGRAM/SOILEROSIONANDSEDIMENTCONTROL

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control.* 2012. https://www.codot.gov/business/designsupport/standard-plans/2012-m-standards-plans/2012-m-standards-pdfs/10-temproary-erosion-control/m-208-1-temp-erosion-control

Diversion Ditch and Berm

DD

DD-1 Temporary Diversion Ditch and Berm



NOTES:
DIVERSION SWALE SHALL SLOPE BETWEEN 0.50% AND 8% TO A STABILIZED OUTLET SUCH AS A SEDIMENT TRAP.

ALL BERMS MUST BE FULLY COMPACTED SO THAT THERE IS NO LOOSE SOIL.

References: Maryland Department of Environment, *Maryland Standards and Specifications for Soil Erosion and Sediment Control.* 2011.

Colorado Department of Transportation, *M-208-1 Temporary Erosion Control*. 2012.

Sediment Control Log (SCL)

SCL

Description

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.





Photographs SCL-1 and SCL-2. Sediment control logs used as 1) a perimeter control around a soil stockpile; and, 2) as a "J-hook" perimeter control at the corner of a construction site.
Source: UDFCD BMP Fact Sheet

Appropriate Uses

Sediment control logs can be used in the following applications to trap sediment:

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

Design and Installation

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

Sediment Control Log	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	No

Sediment Control Log (SCL)

SCL

Although sediment control logs initially allow runoff to flow through the BMP, they can quickly become a barrier and should be installed is if they are impermeable.

Design details and notes for sediment control logs are provided in Detail SCL-1. Sediment logs must be properly trenched and staked into the ground to prevent undercutting, bypassing and displacement. When installed on slopes, sediment control logs should be installed along the contours (i.e., perpendicular to flow).

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

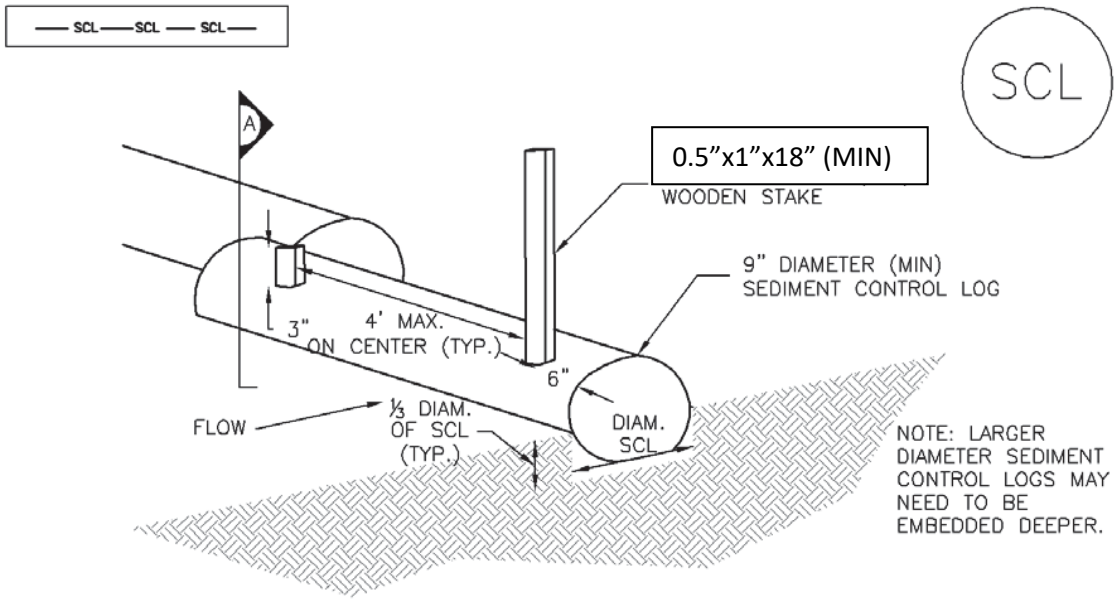
Maintenance and Removal

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

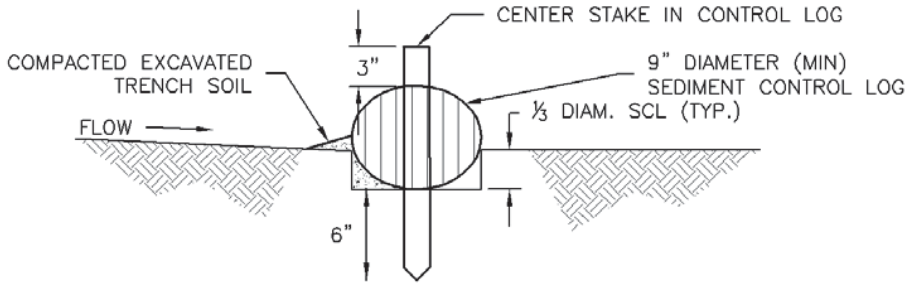
Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

Sediment Control Log (SCL)

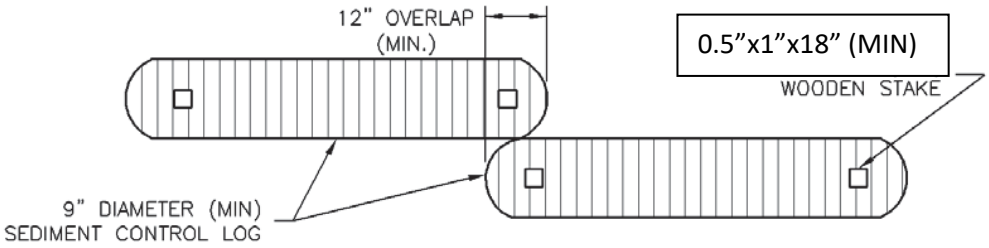
SCL



SEDIMENT CONTROL LOG



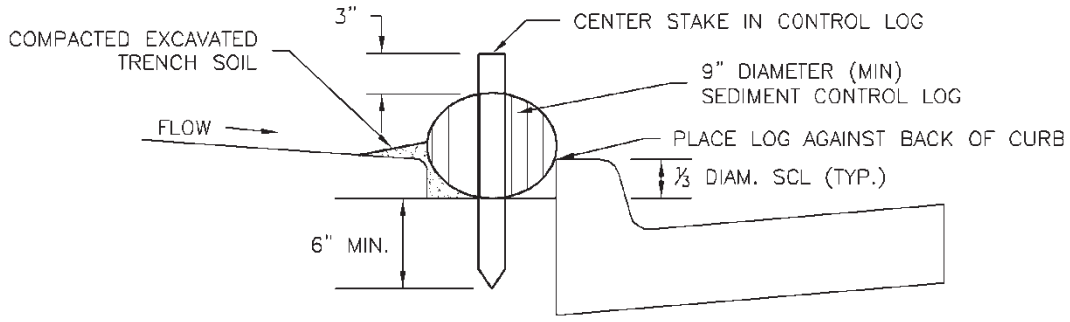
SECTION A



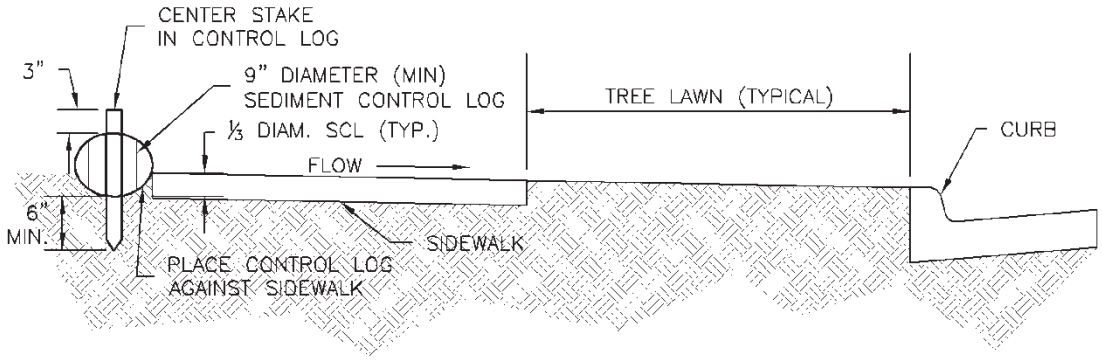
SEDIMENT CONTROL LOG JOINTS

SCL–1. SEDIMENT CONTROL LOG

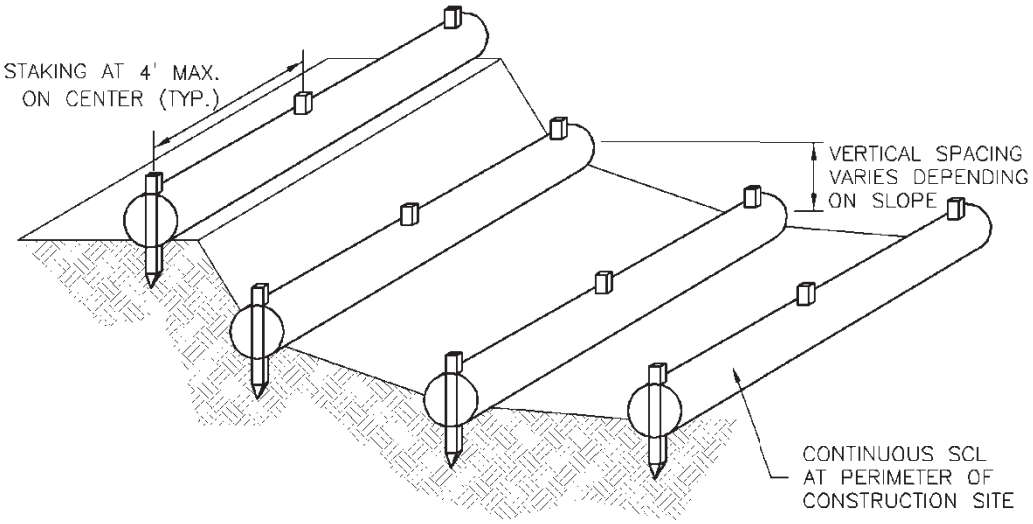
Sediment Control Log (SCL)



SCL–2. SEDIMENT CONTROL LOG AT BACK OF CURB



SCL–3. SEDIMENT CONTROL LOG AT SIDEWALK WITH TREE LAWN



SCL–4. SEDIMENT CONTROL LOGS TO CONTROL SLOPE LENGTH

Sediment Control Log (SCL)

SCL

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.

2. SEDIMENT CONTROL LOGS *THAT ACT* AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR *TO* ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.

3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.

4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES. HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE WAYS.

5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND *TO* A DEPTH OF APPROXIMATELY .l3 OF THE DIAMETER OF THE LOG. IF TRENCHING *TO* THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT *TO* DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST STAKING

6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.

7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4' CENTERS AND EMBEDDED A MINIMUM OF 6" INTO THE GROUND. 3" OF THE STAKE SHALL PROTRUDE FROM THE TOP OF THE LOG. STAKES THAT ARE BROKEN PRIOR *TO* INSTALLATION SHALL BE REPLACED.

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY *TO* MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED *TO* MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY)2 OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.

5. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO. JEFFERSON COUNTY, COLORADO, DOUGLAS COUNTY, COLORADO, AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Check Dam (CD)

CD

Description



Check dams are small, temporary dams constructed across a swale or roadside ditch. Check dams can be constructed using rock, sandbags, gravel bags, earth with erosion control blanketing, sediment control logs, or synthetic materials to slow the velocity of concentrated flow in a channel and thus reduce erosion. As a secondary function, check dams can also be used to catch sediment from the channel itself or from the contributing drainage area as stormwater runoff flows through or over the structure.

Applicability

Check dams are most often used in small, open channels with contributing drainage area of less than 10 acres and side slopes of 2:1 or less. Check dams may be used in the following applications.

- In swales or roadside ditches where it is not practical to line the channel or implement other flow control and sediment control practices;
- In swales or roadside ditches where temporary seeding has been recently implemented but has not had time to take root and fully develop;
- As a series of check dams, spaced at appropriate intervals, used in one of the above two applications.

Rock ditch checks should be **perpendicular** to the flowline of the ditch and must be designed so that water can flow over them, not around them. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the low point on the crest of the check. Where multiple check dams are used, the top of the lower dam should be at the same elevation as the toe of the upper dam.

The following table provides check spacing for a given ditch grade:

Ditch Grade (Percent)	Check Spacing (feet)	Check Spacing (meters)
5	59	18
6	49	15
7	43	13
8	36	11
9	33	10
10	30	9

Limitations

- Check dams should not be used in live, continuously flowing streams unless approved by an appropriate regulatory agency.
- Check dams may require frequent removal of accumulated sediments. Dams should therefore be located in areas accessible to maintenance vehicles.
- Leaves have been shown to be a significant problem by clogging check dams in the fall. Therefore, increased inspection and maintenance may be required in the fall.
- Sediment control log check dams decompose over time, and may be consumed by livestock.

Construction Specifications

- Install straw bale check dams, rock check dams, and other check dams according to design criteria outline at the end of the BMP Fact Sheet.
- Check dams should be located in areas accessible to maintenance vehicles for the periodic removal of accumulated sediments.
- Check dams should be installed with careful placement of the construction material. Do not dump rocks into the drainage channel carefully place material to construct the check dams.
- Check dams can be constructed from a number of different materials. Most commonly, they are made of sediment control log or rock. When using rock, the material diameter should be four to eight inches depending on the expected velocity and quantity of runoff within the channel. Sand/gravel bags may also be used. Silt fence is not an appropriate material for check dams.
- When reinforced check dams are used, install erosion control fabric around the dam to prevent erosion on the upstream and downstream sides. Each section of the check dam should be keyed in with good contact with the ground surface and extend to the top of the swale/ditch.
- When installing more than one check dam in a channel, outlet erosion stabilization measures should be installed below the final dam in the series because this area is likely to be vulnerable to further erosion. Riprap, erosion control blanket lining, or some other stabilization measure can be used for this outlet/energy dissipation.

Maintenance and Removal

Replace missing rocks causing voids in the check dam. If gravel bags or sandbags are used, replace or repair torn or displaced bags.

Remove accumulated sediment, as needed to maintain BMP effectiveness, typically before the sediment depth upstream of the check dam is within ½ of the crest height. Remove accumulated sediment prior to mulching, seeding, or chemical soil stabilization. Removed sediment can be incorporated into the earthwork with approval from the Project Manager, or disposed of at an alternate location in accordance with the standard specifications.

Check dams constructed in permanent swales should be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment should be removed, and the area seeded and mulched, or otherwise stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide*. 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm
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Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004.

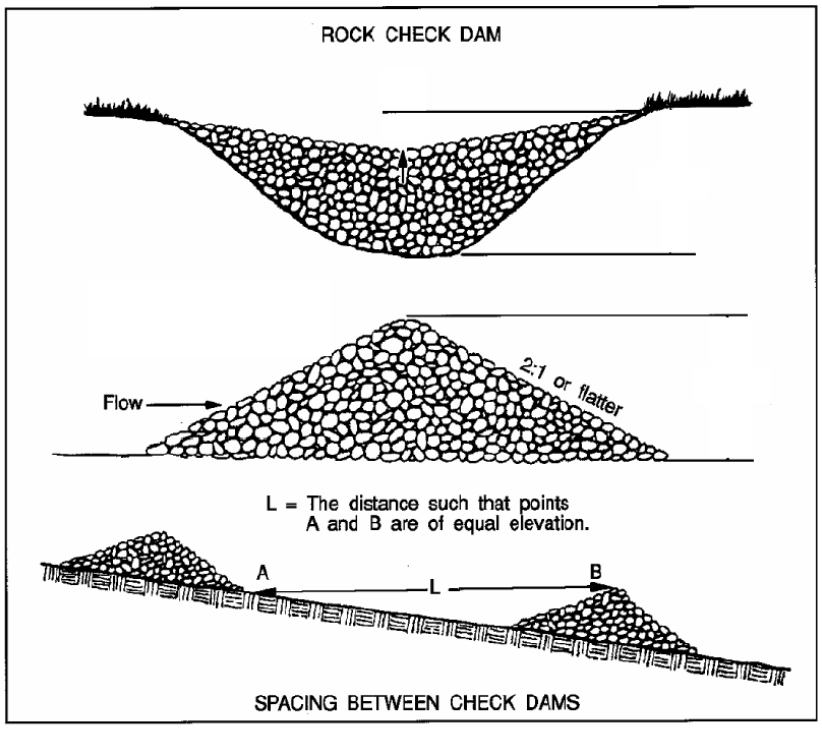
North Dakota Department of Health Division of Water Quality, *A Guide to Temporary Erosion-Control Measures for Contractors, Designers and Inspectors, June 2001.*

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

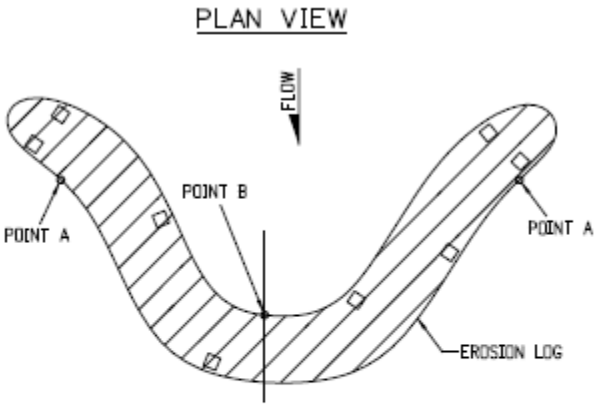
Check Dam (CD)

CD

Design Criteria

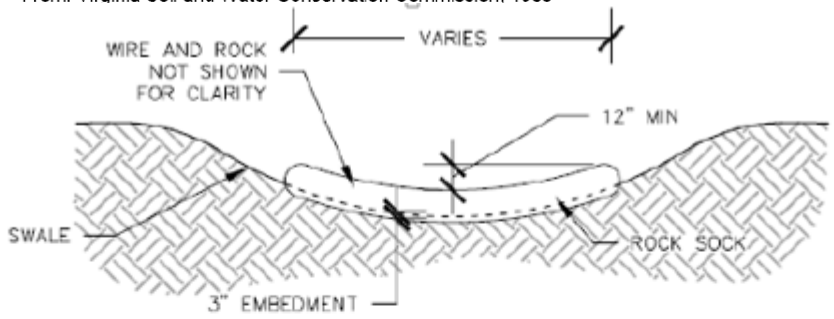


From: Virginia Soil and Water Conservation Commission, 1985

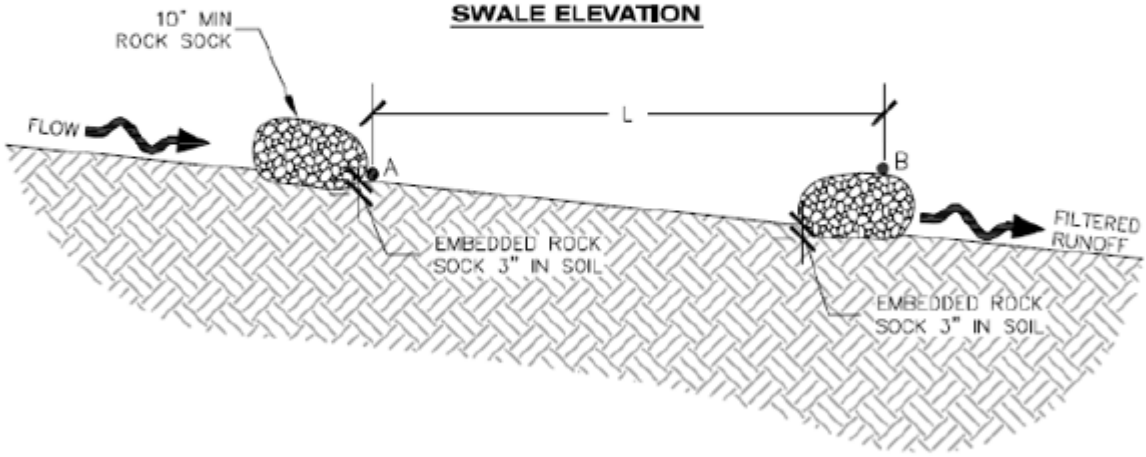


NOTES

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. STAKES SHALL BE EMBEDDED TO A MINIMUM DEPTH OF 12 INCHES.
3. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.



SWALE ELEVATION



L = THE DISTANCE SUCH THAT POINT A AND B ARE OF EQUAL ELEVATION.

SWALE SPACING

ROCK SOCK IN SWALE

CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF CHECK DAMS.
   - –CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - –LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).

2. CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.

3. RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").

4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.

5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.

5. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

6. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Basin (SB)

SB

Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.



Photograph SB-1. Sediment basin at the toe of a slope. Photo courtesy of WWE. Source: UDFCD BMP Fact Sheet

Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume**: Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent "clean" runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft^3/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft^3/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.

- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.

- **Dam Embankment**: It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- **Inflow Structure**: For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins

Imperviousness (%)	Additional Storage Volume (ft^3) Per Acre of Tributary Area
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works**: The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:

  - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.

  - **Orifice Plate or Riser Pipe**: Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.

  - **Floating Skimmer**: If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.

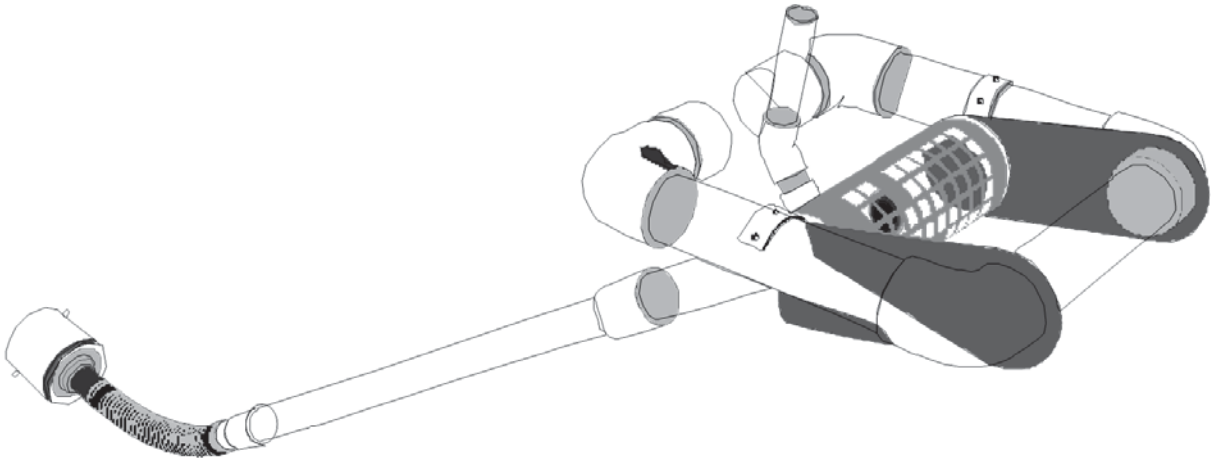


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

Maintenance and Removal

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

Sediment Basin (SB)

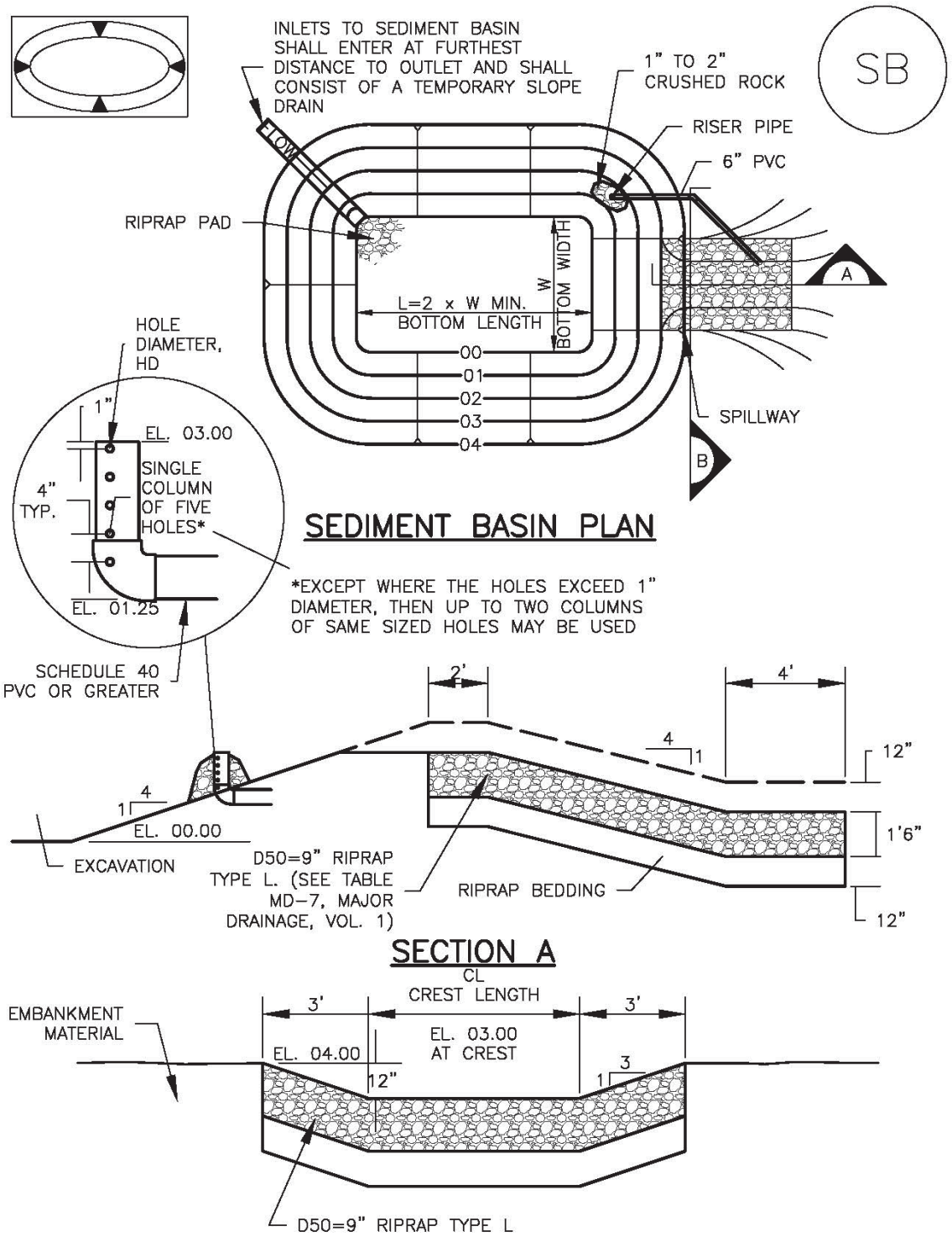


TABLE SB–1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 ½	2	9/32
2	21	3	13/16
3	28	5	½
4	33 ½	6	9/16
5	38 ½	8	21/32
6	43	9	21/32
7	47 ¼	11	25/32
8	51	12	27/32
9	55	13	⅞
10	58 ¼	15	15/16
11	61	16	31/32
12	64	18	1
13	67 ½	19	1 1/16
14	70 ½	21	1 ⅛
15	73 ¼	22	1 3/16

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF SEDIMENT BASIN.
   - –TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
   - –FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
   - –FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.

2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.

3. SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.

4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.

5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.

6. PIPE SCH 40 OR GREATER SHALL BE USED.

7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).

5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.

6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Sediment Trap

ST



Description

Sediment traps are small collection areas that allow sediment to settle out of stormwater runoff. They are usually installed in a drainage way or other point of discharge from a disturbed area. Sediment traps are formed by excavating below grade and/or by constructing an earthen embankment.

Applicability

Sediment traps are generally temporary control measures used at the outlets of stormwater diversion structures, channels, slope drains, construction site entrance wash racks, or any other runoff conveyance that discharges waters containing erosion sediment and debris. Sediment traps should be used for drainage areas less than five acres. The effective life span of these temporary structures is usually limited to 24 months. Traps may be located in a series to allow for backup control in case one trap fails.

Limitations

- Regular maintenance is needed to remove sediment. Traps should be located near roads or where accessible to remove sediment.
- Although sediment traps allow eroded soils to settle, due to the short detention periods for stormwater, traps typically do not remove fine particles such as silts and clays.
- Water may remain in sediment traps for extended periods causing mosquitoes and other insects to gather. Locate the trap in a sunny spot if possible.
- Never construct a sediment trap on a live flow stream or in wetlands.

Design Criteria

Location

Traps should be located at points of discharge from disturbed areas. The location will be determined by the natural terrain, drainage pattern of the runoff, and the accessibility for maintenance. Sediment traps should not be located in areas where their failure due to stormwater runoff excess can lead to further erosive damage of the landscape. Alternative diversion pathways should be designed to accommodate these potential overflows. Sediment trap locations should also allow for easy maintenance access for the periodic removal of accumulated sediment.

Storage capacity

A sediment trap should be designed to maximize surface area for infiltration and sediment settling. This will increase the effectiveness of the trap and decrease the likelihood of backup during and after periods of high runoff intensity. The designed capacity of the sediment trap shall be determined based on site-specific conditions. The orientation of the sediment trap will be limited by the amount of space on a site especially at boundaries.

Construction Specifications

See Figure ST-1 for installation details.

- If possible, sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.
- Traps should be located above the floodplain, where possible. If there are space constraints, several small sediment traps may be constructed in series.
- Area under embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared.
- The fill material for the embankment shall be free of roots and other woody vegetation as well as over-sized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Seeding of the embankment should be performed as soon as possible after construction of the sediment trap. Erosion control blanketing may also be used to cover the embankment in combination with seeding or during time periods when seeding is ineffective.
- The spillway may consist of a stone section in the embankment formed by a combination coarse aggregate/riprap to provide for filtering/detention capability. Riprap shall be 4-inch to 8-inch rock, while the coarse aggregate shall be ½ to ¾ inches. A Geotextile may be placed at the stone-soil interface to act as a separator.
- Another option for the spillway is to use straw bales or wattles at the overflow point in the trap and line the rest of the spillway with an erosion control blanket (see EROSION CONTROL BLANKET [ECB]).

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). The primary maintenance consideration for temporary sediment traps is the removal of accumulated sediment from the basin to ensure the continued effectiveness of the sediment trap. Sediments should be removed when the basin reaches approximately 50% sediment capacity. Inspectors should also ensure that the trap is draining properly and check the structure for damage from erosion. The depth of the spillway should be checked and maintained at a minimum of 1.5 feet below the low point of the trap embankment.

Sediment Trap

ST

Removal

The structure shall be removed and the area stabilized when the drainage area has been properly stabilized.

References

Colorado Department of Transportation (CDOT), *Erosion Control and Stormwater Quality Guide.* 2002. http://www.coloradodot.info/programs/environmental/water-quality/documents/erosion-storm-quality

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, *Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites.* April 2004

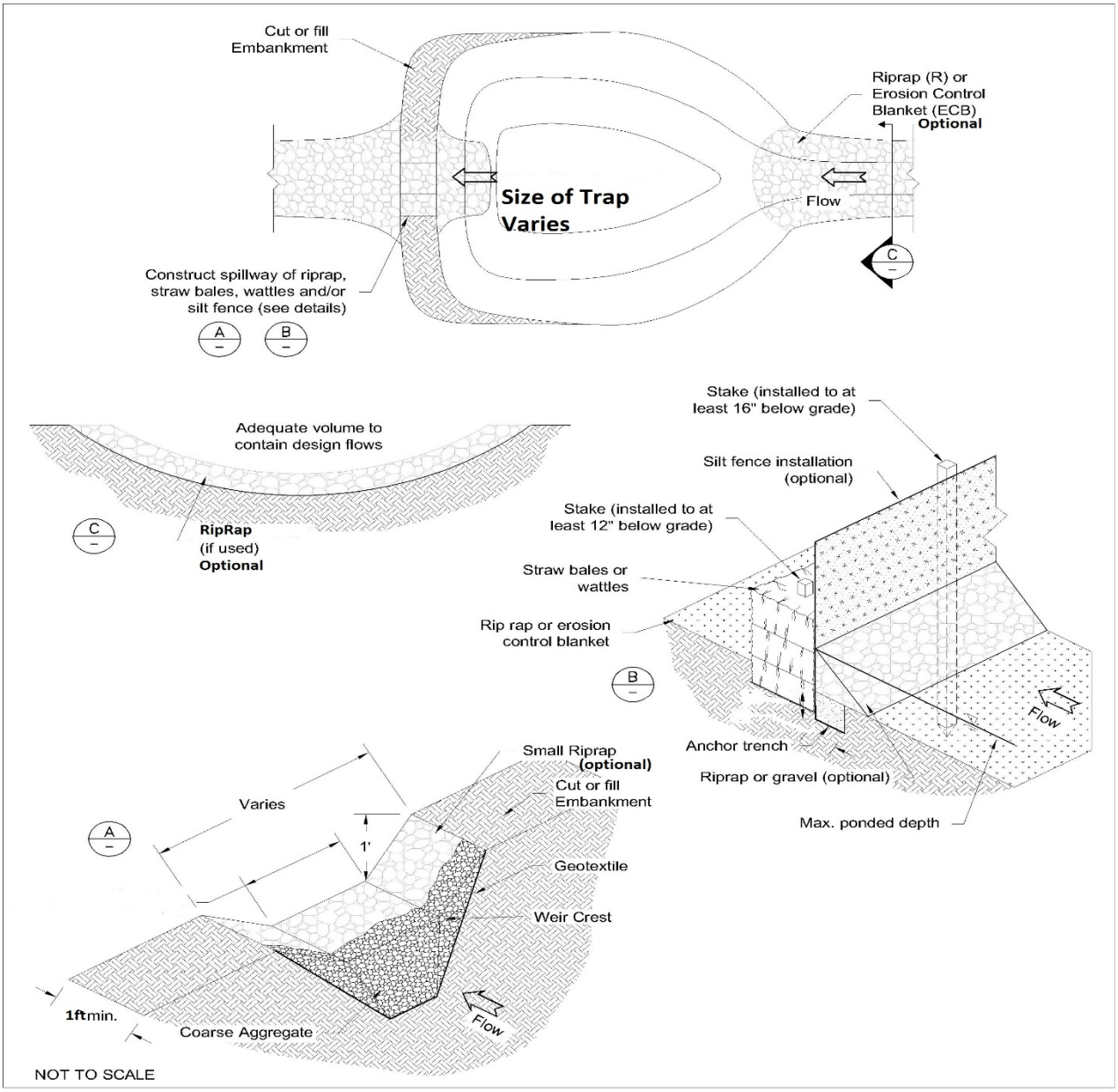

Cut or fill
Embankment
Riprap (R) or
Erosion Control
Blanket (ECB)
Optional
Size of Trap
Varies
Flow
C
Construct spillway of riprap,
straw bales, wattles and/or
silt fence (see details)
A
B
Adequate volume to
contain design flows
C
RipRap
(if used)
Optional
Stake (installed to at
least 16" below grade)
Silt fence installation
(optional)
Stake (installed to at
least 12" below grade)
Straw bales or
wattles
Rip rap or erosion
control blanket
B
Flow
Anchor trench
Riprap or gravel (optional)
Max. ponded depth
Small Riprap
(optional)
Cut or fill
Embankment
Varies
A
1'
Geotextile
Weir Crest
1ftmin.
Coarse Aggregate
Flow
NOT TO SCALE

Figure ST-1.

Sediment Trap

ST

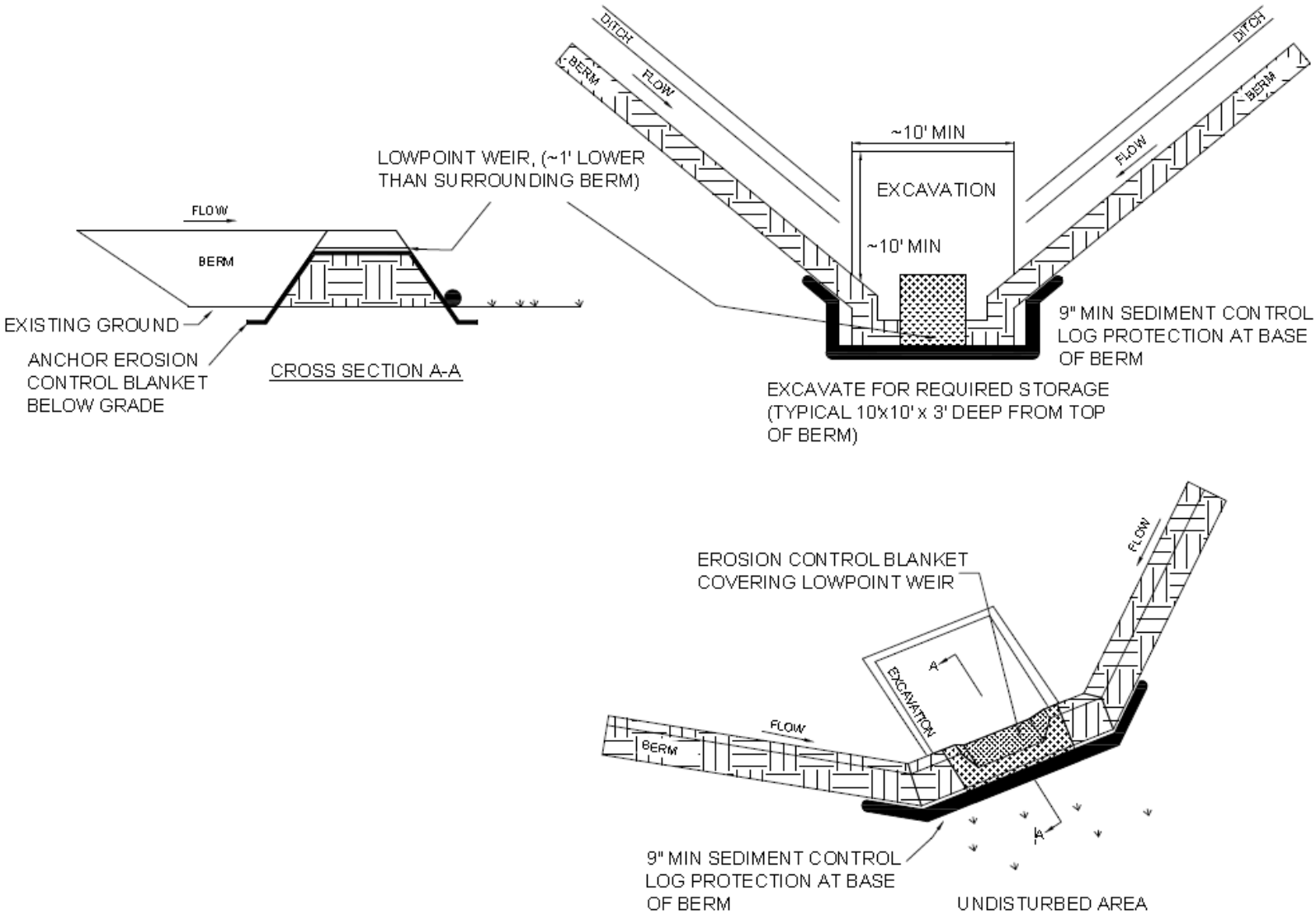


Figure ST-2.

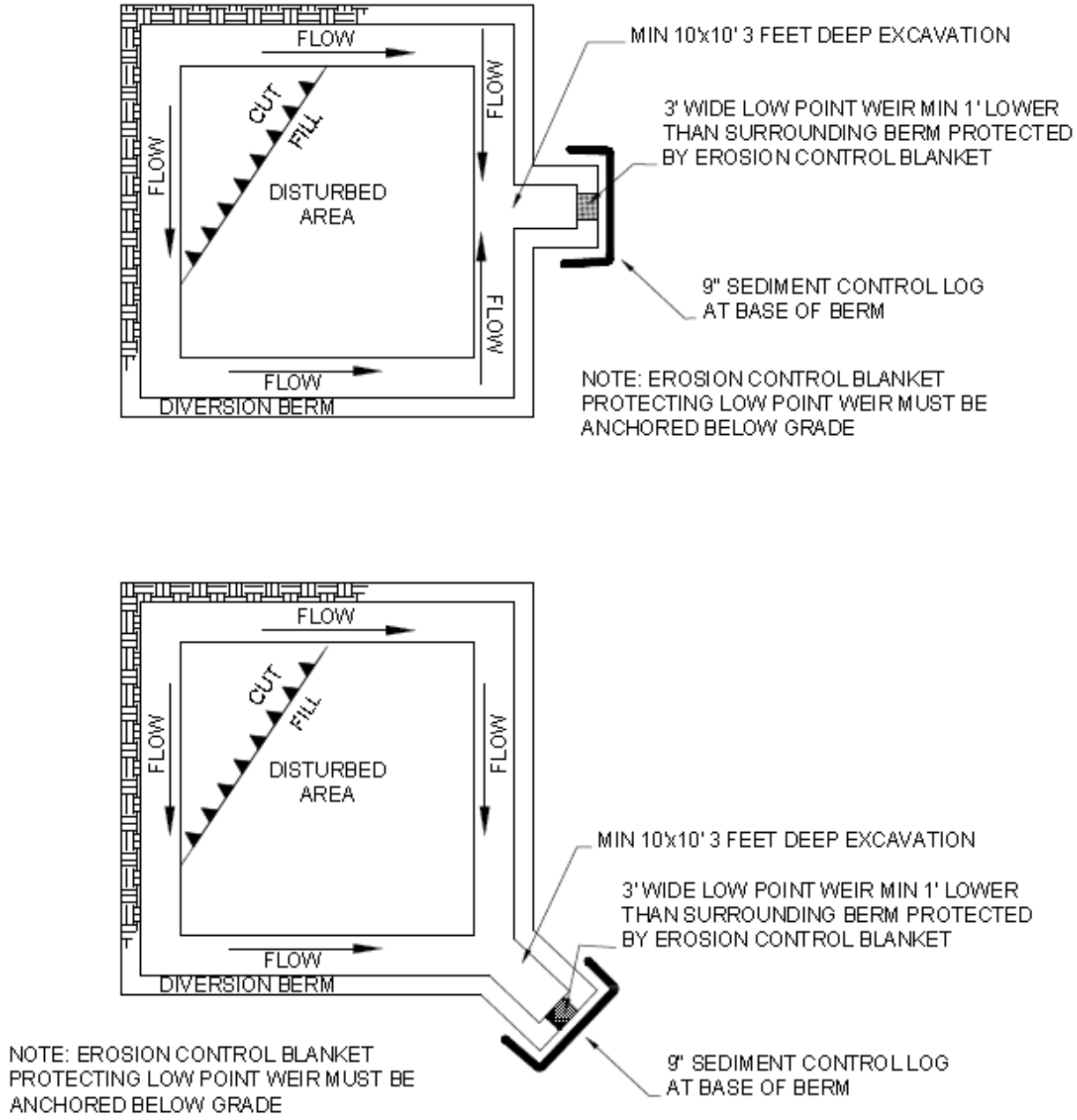


Figure ST-3.

minor revisions to
detail 02/21/2017

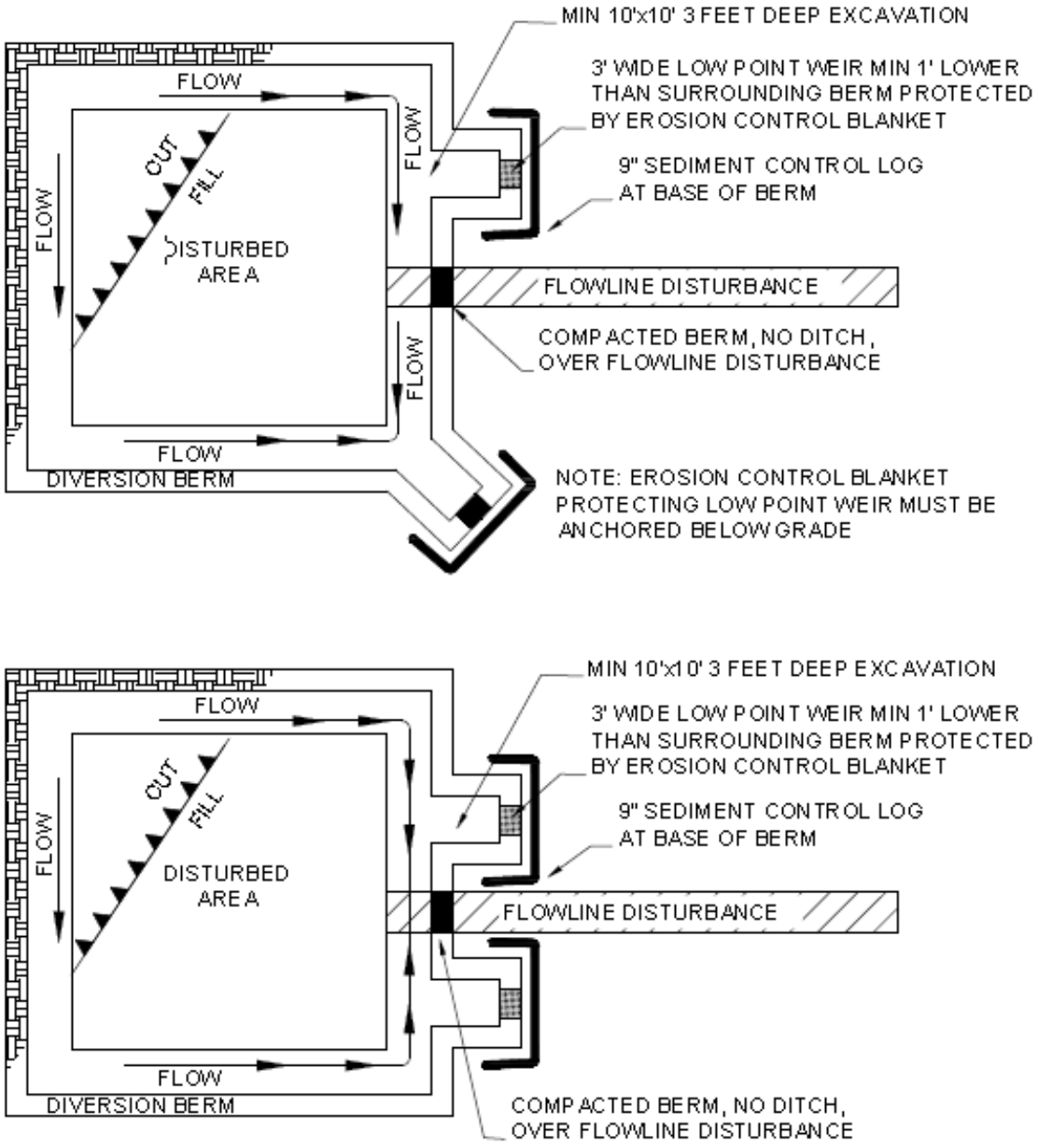


Figure ST-4.

minor revisions to detail 02/21/2017

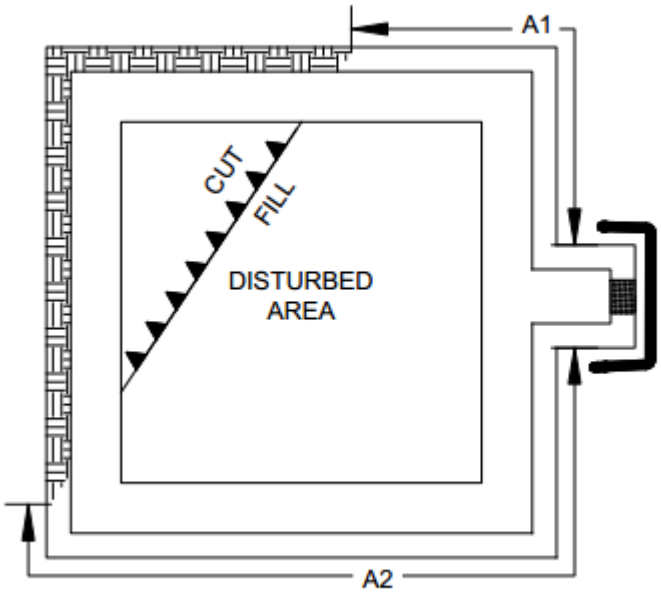


Figure ST-5. A1 + A2 = Total ditch and berm diversion length used to size sediment trap (ft).

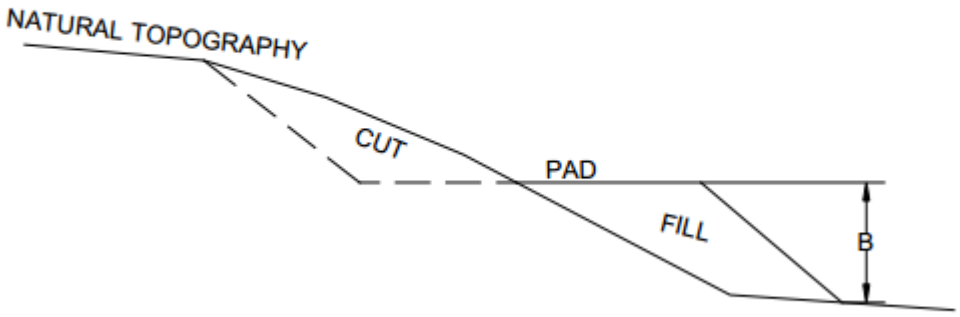


Figure ST-6. B = Pad fill height (ft), at pad low point.

Sediment Trap

ST

Table 1. Sediment Trap Sizing Chart for 4:1 Fill Slopes, 3' Deep, (ft^2)

	Approximate Pad Fill Height, B (ft)					
	2	**4**	**6**	**8**	**10**	**12**
Total Ditch and Berm Diversion Length (A1+A2), In Pad Fill Portion, Diverting to Low Point Sediment Trap(ft)	**Area of 3.0' Deep Sediment Trap (ft^2)**					
200	100.00	100.00	100.00	100.00	130.00	150.00
300	100.00	100.00	120.00	150.00	190.00	230.00
400	100.00	100.00	150.00	200.00	250.00	300.00
500	100.00	130.00	190.00	250.00	320.00	380.00
600	100.00	150.00	230.00	300.00	380.00	450.00
700	100.00	180.00	270.00	350.00	440.00	530.00
800	100.00	200.00	300.00	400.00	500.00	600.00
900	120.00	230.00	340.00	450.00	570.00	680.00
1000	130.00	250.00	380.00	500.00	630.00	750.00
1100	140.00	280.00	420.00	550.00	690.00	830.00
1200	150.00	300.00	450.00	600.00	750.00	900.00
1300	170.00	330.00	490.00	650.00	820.00	980.00
1400	180.00	350.00	530.00	700.00	880.00	1050.00
1500	190.00	380.00	570.00	750.00	940.00	1130.00
1600	200.00	400.00	600.00	800.00	1000.00	1200.00
1700	220.00	430.00	640.00	850.00	1070.00	1280.00
1800	230.00	450.00	680.00	900.00	1130.00	1350.00
1900	240.00	480.00	720.00	950.00	1190.00	1430.00
2000	250.00	500.00	750.00	1000.00	1250.00	1500.00

- Ditch and berm diversion length used to size sediment trap is measured only along the fill portion of the pad.
- Measure along the outer edge of the diversion berm.
- If multiple low point sediment traps are used because of site conditions, only include the diversion length draining to the sediment trap being constructed when sizing.
- Approximate Pad fill height (B) shall be measured at the low point, or where the sediment trap is being constructed, and rounded up to the nearest interval in Table 1.

Culvert

C

Description



Culverts are typically concrete, steel, aluminum, or plastic pipe used to move water under a road or to direct flow under the road or construction area.

Applicability

Culverts are ideal on roads with grades of less than 15%. For grades over 15%, it is best to use frequently spaced relief culverts and drainage crossing culverts, with armored ditches. Culverts may be used in the following applications:

- As drainage crossing culverts in streams and gullies to allow normal drainage to flow under the traveled way;
- As ditch relief culverts to periodically relieve the inside ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway.

Limitations

- Undersized culverts are susceptible to plugging and will require cleaning.
- Culverts will not filter sediment.
- Culverts are easily crushed if not properly designed.

Design Criteria and Construction Specifications

Pipe size can be determined for culverts in Weld County by using their criteria. According to the Weld County Drainage Criteria, a minimum culvert capacity is the capacity required to convey the 10-yr storm. However, the minimum culvert diameter allowed in public right-of-way is 15-inches. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties. Culvert sizing needs to account for the Weld County requirement that a road cannot be overtopped by more than 6-inches of water during the 10-yr event. In jurisdictions other than Weld County, use the jurisdiction's applicable culvert sizing criteria. Table C-1 may be used as a general design guide, but size is ideally based upon site-specific hydrologic analysis.

Culvert

C

Table C-1

Drainage Area (acres)	Size of Drainage Structure (diameter and area)			
	Steep Slopes (Light Vegetation) C=0.7		Gentle Slopes (Heavy Vegetation) C=0.2	
	Round Pipe (In)	Area (sq.ft)	Round Pipe (In)	Area (sq.ft)
0-10	30"	4.9	18"	1.8
10-20	42"	9.6	24"	3.1
20-35	48"	12.6	30"	4.9
35-75	72"	28.3	42"	9.6
75-125	84"	38.5	48"	12.6
125-200	96"	50.3	60"	19.6

* Due to site specific conditions this table may not be used.

Depth

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost to road use and erosion. Weld County requires a minimum of 1–foot of cover. If 1-foot of cover is not possible, the culvert material must be rated for a minimum of HS-20 loading or the largest expected loads crossing it (oil rigs, semis, etc.)

Firmly compact well-graded fill material (soil or road base) around culverts, particularly around the bottom half, using placement in layers to achieve a uniform density. Use slightly plastic sandy gravel with fines. Avoid the use of fine sand and silt rich soils for bedding material because of their susceptibility to piping. Pay particular attention to culvert bedding and compaction around the haunches of the pipe. Do not allow the compaction to move or raise the pipe. In large fills, allow for settlement.

End Sections

Culverts installed in Weld County public right-of-ways must be equipped with a flared end section on the entrance and outlet. Erosion protection such as riprap may be required. See Culvert Protection BMP Fact Sheet for details on riprap installation.

Drainage crossing culverts

Make road crossings of natural drainages perpendicular to the drainage to minimize pipe length and area of disturbance (See Drainage Crossing Culvert Detail).

Use single large pipes versus multiple smaller diameter pipes to minimize plugging potential in most channels (unless roadway elevation is critical). In very broad channels, multiple pipes are desirable to maintain the natural flow spread across the channel. All culverts should be concrete corrugated metal pipe made of steel or aluminum, or properly bedded and backfilled corrugated plastic pipe.

Culvert

C

Align culverts in the bottom and middle of the natural channel flowline so that installation causes no change in the stream alignment or stream bottom elevation. Culverts should not cause damming or pooling or increase stream velocities significantly.

Extend the outlet of the culvert at least one foot beyond the toe of the slope to prevent erosion of the fill material. Alternatively, use retaining walls (headwalls) to hold back the fill slope.
It may be necessary to install rip rap, erosion control blanketing, or a combination of both or other energy-dissipater device at the outlet end of the culvert to reduce soil erosion or to trap sediment (See Culvert Protection BMP Fact Sheet).

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Ditch Relief Culverts See Ditch Relief Culvert Detail and the Discharge Locations for Ditch Relief Culverts Detail for installation details.

Ditch relief culverts can provide better flow when skewed 0 to 30 degrees perpendicular to the road.

The culvert gradient should be at least 2% greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris from plugging the culvert inlet. Discharge the culvert at natural ground level where possible (see Discharge Locations For Ditch Relief Culverts Detail, Type A), on firm, non-erosive soil or in rocky or bushy areas. If discharging on fill slopes, armor outlets with riprap or logging slash (see Discharge Locations For Ditch Relief Culverts Detail, Type B.)

Extend the inlet of the culvert at least one foot beyond the flowline of the roadside ditch. Extend the outlet of the culvert at least one foot beyond the toe slopes to prevent erosion of the fill material.

It may be necessary to install riprap or other energy-dissipater devices at the outlet end of the culvert to prevent soil erosion or to trap sediment (see Culvert Protection BMP Fact Sheet). Spacing of culverts is dependent on the road gradient, soil types, and runoff characteristics according to the table below.

Soil Type	Road Grade		
	3-4%	5-8%	9-12%
Highly Corrosive Granitic or Sandy	240'	180'	140'
Intermediate Erosive Clay or Load	310'	260'	200'
Low Erosive Shale or Gravel	400'	325'	250'

It may be desirable to construct pull offs/turnouts for vehicles on one or both sides of narrow culvert crossings. This will help avoid culvert crushing as well as disturbance to roadside ditches and berms.

Maintenance and Removal Considerations

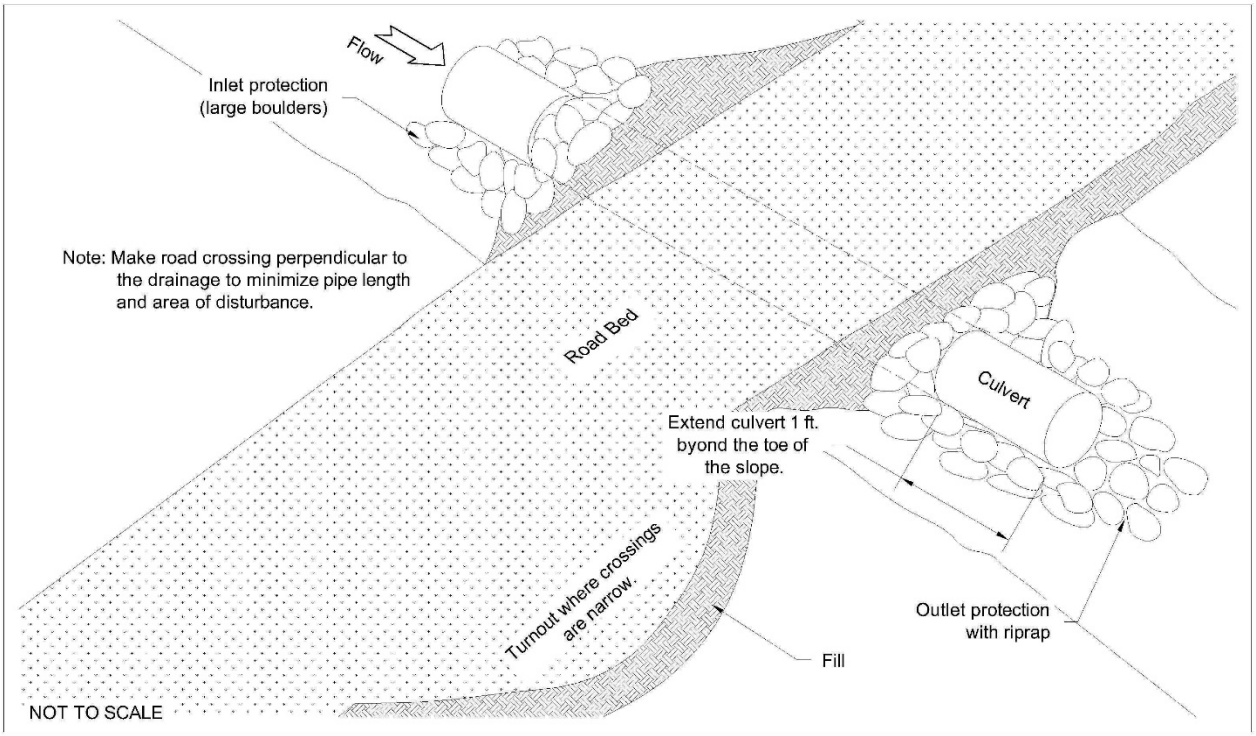
The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). If any damage to culvert or inlet/outlet protection is noted or if there is any evidence of scour, repairs should be made immediately. Any debris that may be blocking the culvert inlet or outlet should be removed. Culverts are typically left in place for permanent drainage for the site.

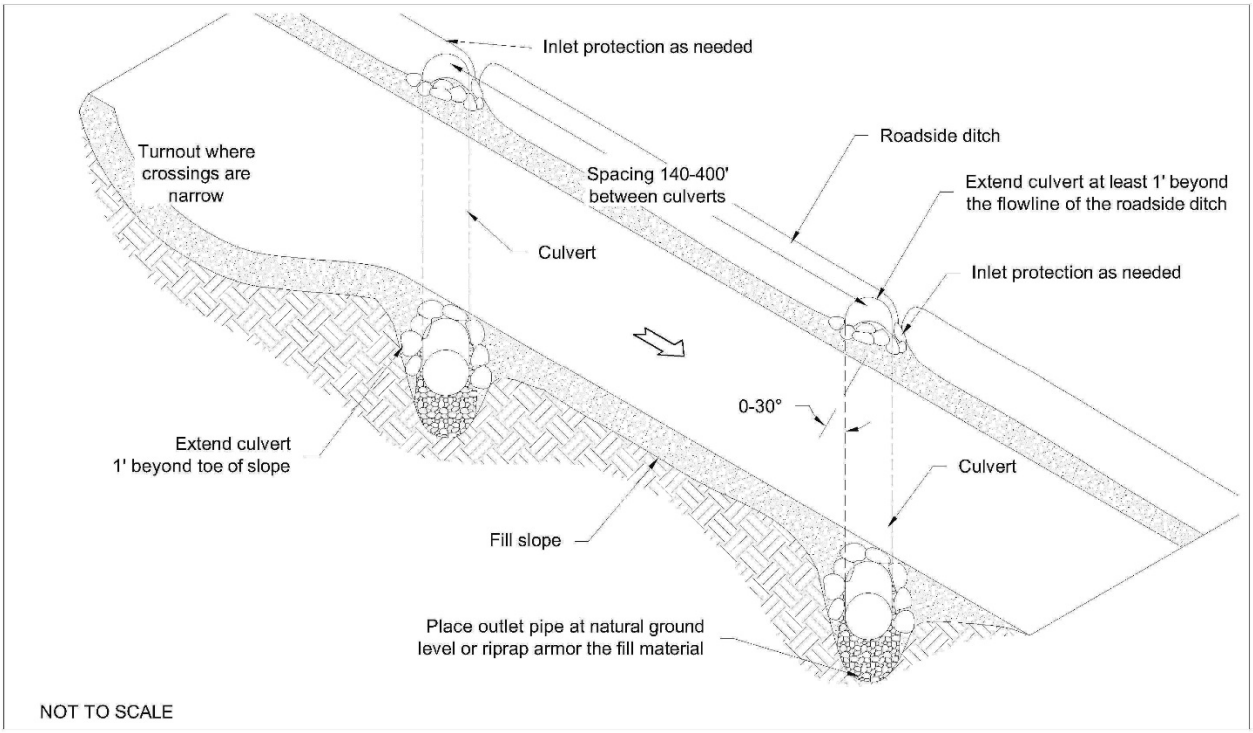
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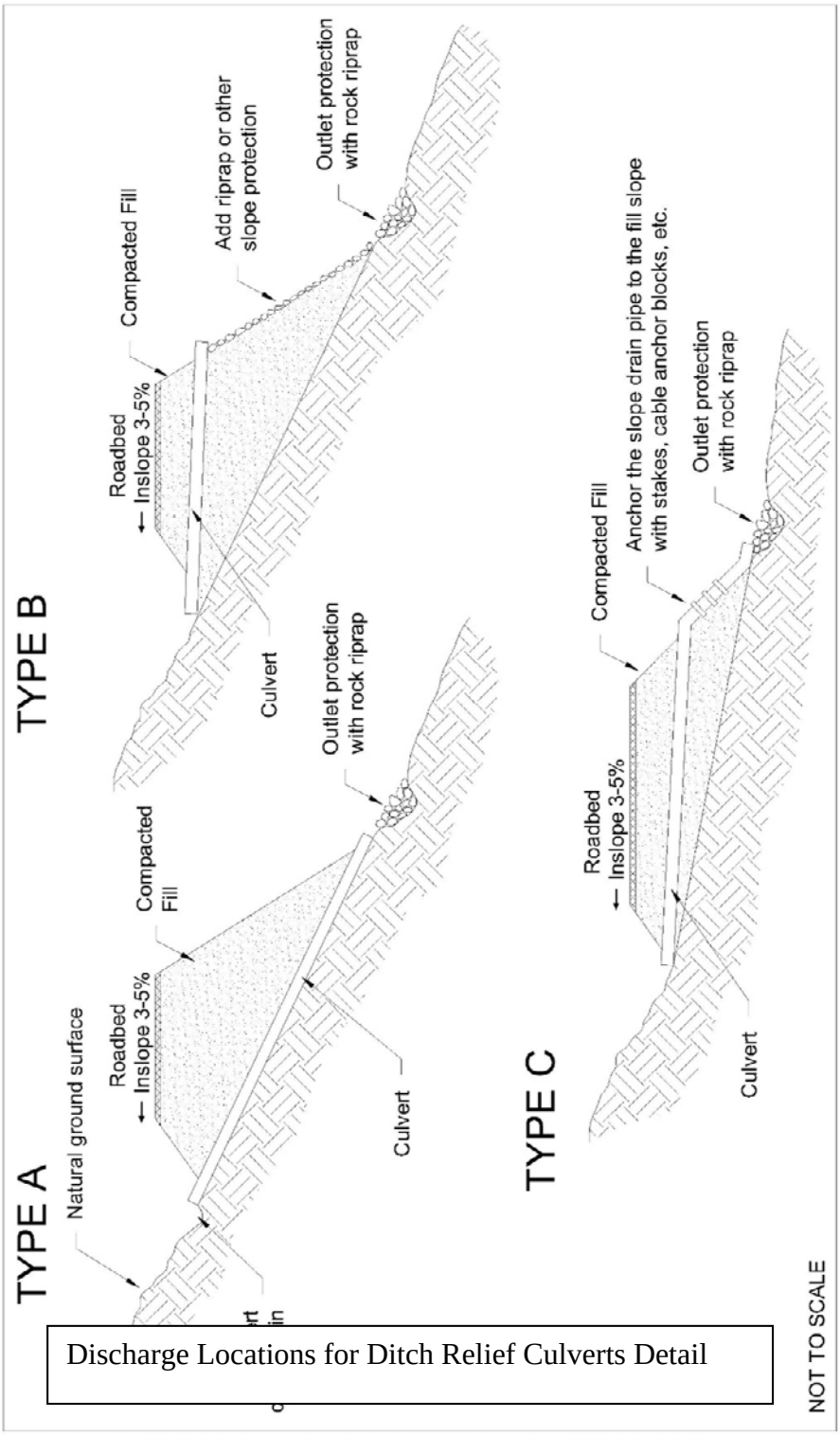




Ditch Relief Culverts Detail

Culvert

C



Discharge Locations for Ditch Relief Culverts Detail

Culvert Protection

IPC/OPC

Description

Culvert protection may be required at the inlet (upstream side) of the culvert and/or the outlet side of the culvert (downstream side).



Photograph. Riprap outlet protection with flared end

Culvert inlet protection may involve placing riprap, gabions, sediment control logs, rock socks, erosion control blankets/turf reinforced mats, and/or any other protection at the inlet pipes. Riprap, or other energy-dissipating devices, will reduce the velocity of stormwater flows and armor the banks, thereby preventing erosion and helping to protect the inlet structure. Sediment control logs minimize the potential for sediment from upgradient construction activities to enter the culvert.

Culvert outlet protection typically involves placing riprap or other appropriate energy-dissipating devices at the outlets of the pipes to reduce the velocity of stormwater flows, reducing the scour potential at stormwater outlets, protecting the outlet structure, and minimizing the potential for erosion downstream. Sediment control logs are also frequently used on the outlet to minimize erosion; however, they do not provide the energy dissipation that rock does.

Applicability

To prevent erosion from occurring at the culvert inlet and outlet, and to reduce the potential for sediment to enter into the culvert, culvert protection may be necessary. Riprap should be used where velocities and energies at the inlets and outlets of culverts are sufficient to erode the structure or the next downstream reach.

Limitations

Inlet protection should not block flow into the culvert. Rock aprons at the culvert outlets should not be placed on slopes steeper than 10 percent. Runoff from pipe outlets at the top of cut/fills or on slopes steeper than 10 percent should be routed via slope drains or riprap chutes to a rock apron at the toe of the slope. Otherwise, the flow will re-concentrate and gain velocity as the flow leaves the apron.

Design Criteria and Construction Specifications

Culvert Inlet protection

Erosion control blanket, riprap, gabions, rock socks or sediment control logs at culvert inlets shall be designed according to the appropriate BMP Fact Sheet for that material.

Culvert Inlet Protection Detail shows typical culvert inlet protection. However, site specifics shall dictate actual design. Modification which differ from the detail sheet must be based on good engineering and hydrologic design and documented in the SWMP.

Culvert Protection

IPC/OPC

Culvert Outlet Protection

Sediment control logs may also be used for temporary outlet protection during construction (see Sediment Control Log Culvert Outlet Protection Detail). If additional erosion protection and energy dissipation are required, riprap may be needed. If riprap is required and the riprap will be in place less than two years, the Temporary Outlet Protection Riprap Detail may be used. If the riprap will be permanently installed, the design methodologies outlined in the Hydraulic Structures chapter of the UDFCD Manual (Volume 2) must be followed.

Maintenance and Removal Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Inspect for debris at the entrance to culverts and within culverts. Inspect culvert protection for damage and erosion. The maintenance needs are usually very low for properly installed riprap aprons at culvert outlets; however, inspect for evidence of scour beneath the riprap at outlet aprons or dislodged stones which have moved beyond the outlet structure. Corrective action items found to reduce the effectiveness of the culvert or culvert outlet protection should be repaired immediately. See additional notes at the end of the details for maintenance.

References

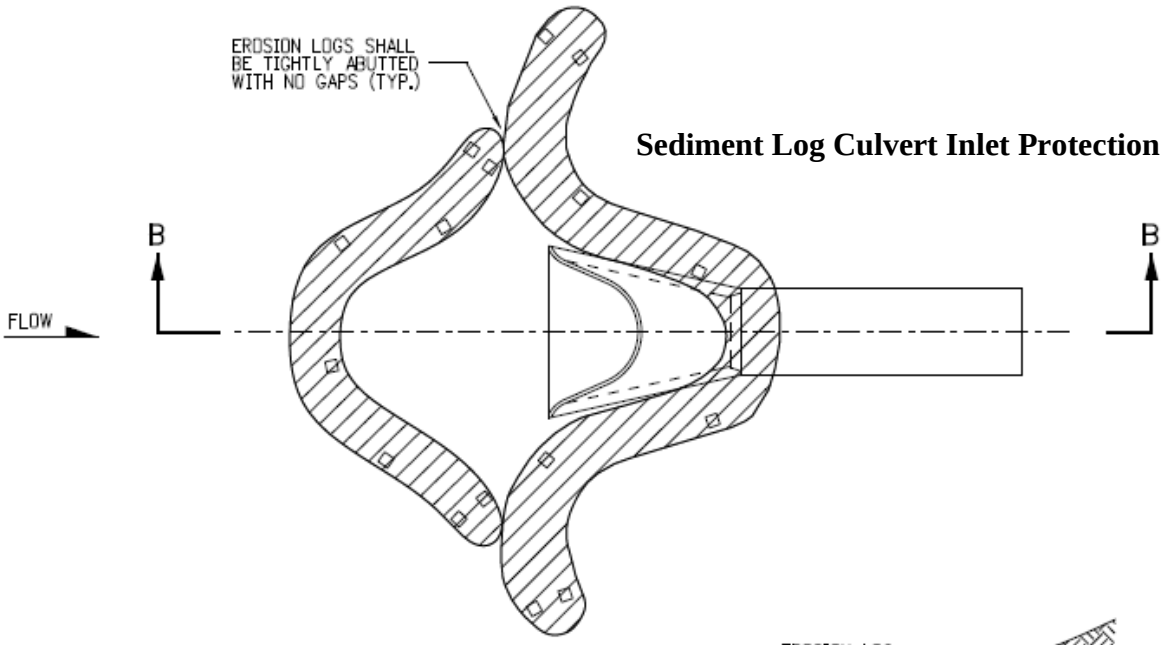
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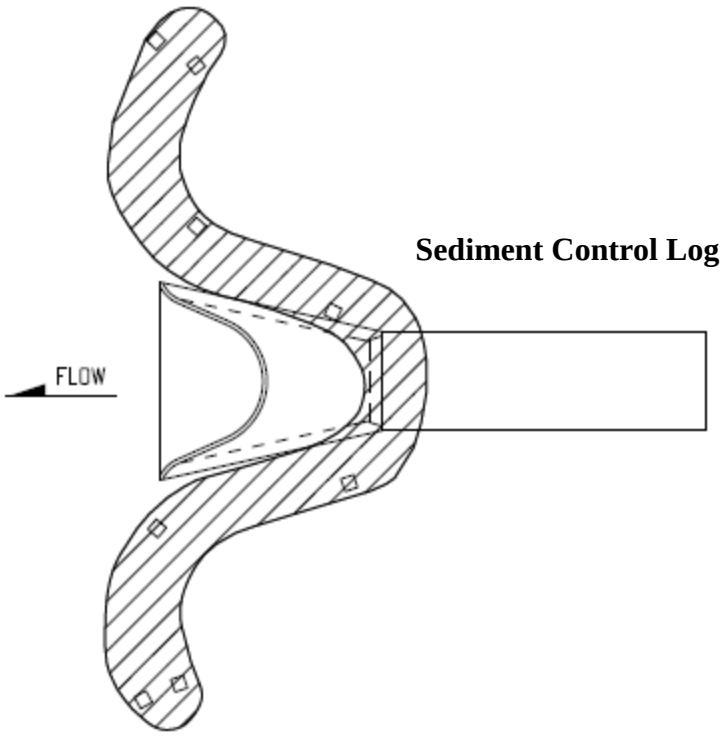
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Culvert Protection

IPC/OPC



Sediment Log Culvert Inlet Protection

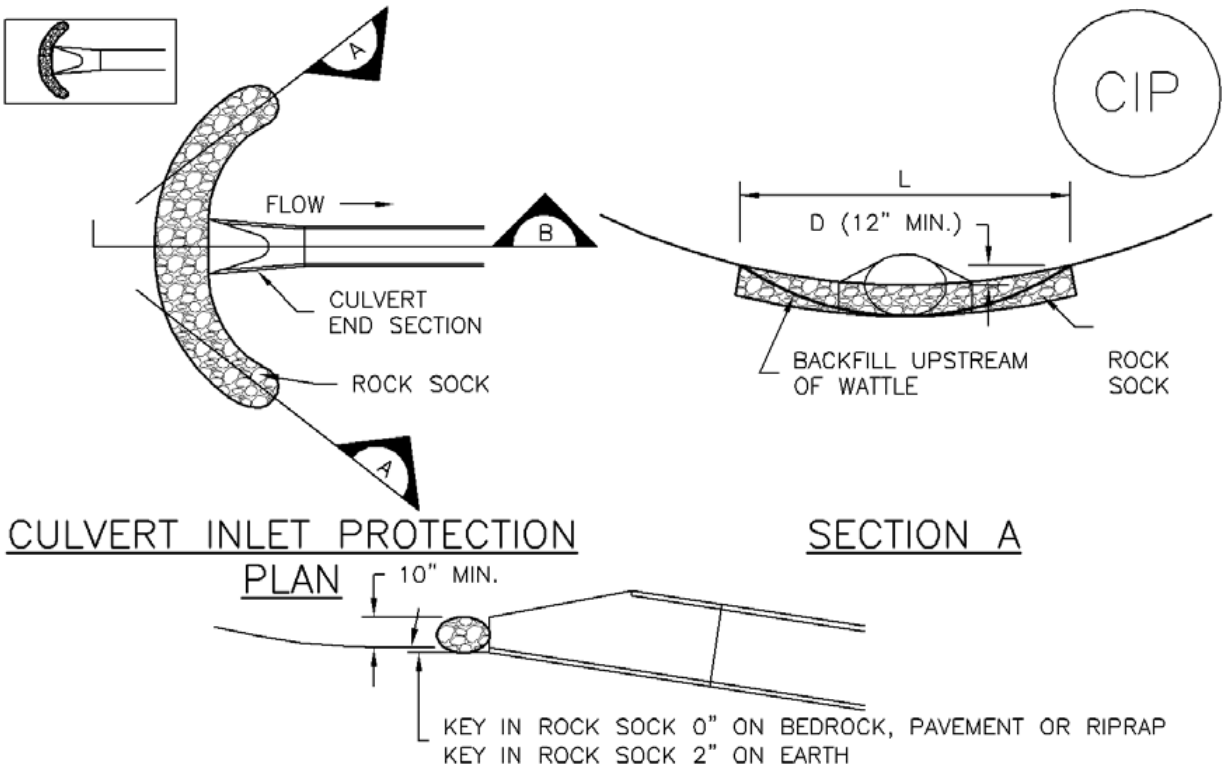


Sediment Control Log Culvert Outlet Protection

Culvert Protection

IPC/OPC

CULVERT PROTECTION DETAIL



CIP-1. CULVERT INLET PROTECTION – ROCK SOCK DETAIL

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CULVERT INLET PROTECTION.

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL OR SEDIMENT CONTROL LOG.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

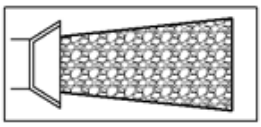
(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

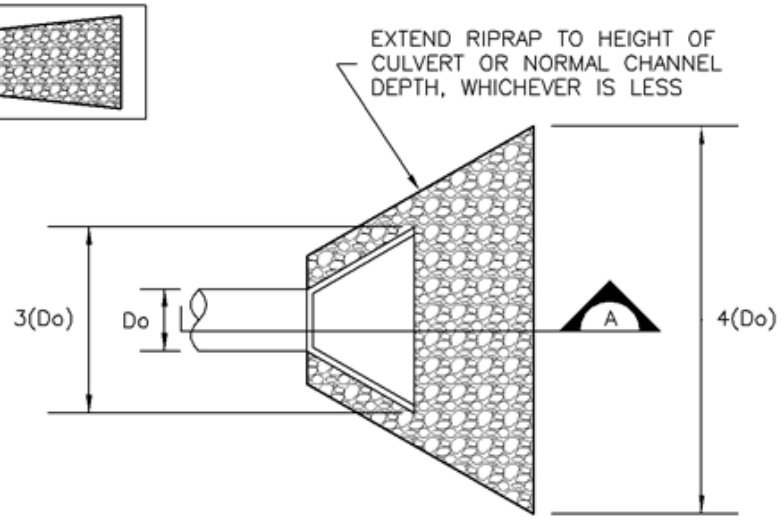
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Culvert Protection

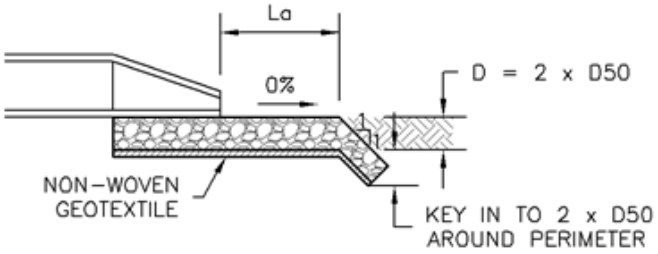
IPC/OPC

OP





TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

TEMPORARY OUTLET PROTECTION RIPRAP DETAIL

Culvert Protection

IPC/OPC

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   - –LOCATION OF OUTLET PROTECTION.
   - –DIMENSIONS OF OUTLET PROTECTION.

2. DETAIL IS INTENDED FOR PIPES WITH SLOPE $\leq$ 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Temporary and Permanent Seeding (TS/PS)

TS/PS

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.



Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period, proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms,

rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period, plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. See applicable seed mixes and/or landowner agreements for revegetation requirements. Other seed mixes may be used if the site conditions warrant a different seed mix.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Various Known Seeding Mixes for Kerr-McGee

Anadarko Dryland Pasture Mix (Lot 20071)

Kind and Variety	Pure%	Germ%	Origin
Tetraploid Perennial Ryegrass	19.68	91	OR
Smooth Brome, Lincoln	18.66	96	KS
Intermediate Wheatgrass, Oahe	14.76	91	SD
Dahurain Wildrye	14.44	93	WA
Orchardgrass, Paiute	14.29	94	OR
Pubescent Wheatgrass, Luna	13.35	97	CAN
Crop: .23% Inert: 3.94% Weeds: .15% Net Wt: 27.9167# (25 pls) 1 ac			

H2 Salty Dog Mix (Lot 20195)

Kind and Variety	Pure%	Germ%	Origin
Newhy Saltlander Wheatgrass	36.34	97	MT
Western Wheatgrass	15.85	98	KS
Canada Wildrye	15.48	97	CAN
Indian Ricegrass	13.19	94	WA
Tall Fescue	8.61	91	OR
Alkali Grass, Fults	3.44	95	WA
Alkali Sacaton	.82	80	OK
Crop: .00% Inert: 5.75% Weeds: .52% Net Wt: 15.34# (13.78 pls) 1 ac			

Temporary and Permanent Seeding (TS/PS)

TS/PS

Sandy Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.4	9.0	15%
Intermediate Wheatgrass	Thinopyrum intermedia	4.5	9.0	15%
Sand Dropseed	Sporobolus cryptandrus	0.1	9.0	15%
Indian Ricegrass	Achnatherum hymenoides	2.8	9.0	15%
Green Needlegrass	Nassella viridula	2.2	9.0	15%
Sideoats Grama	Bouteloua curtipendula	2.05	9.0	15%
Switchgrass	Panicum virgatum	0.7	6.0	10%
Total	--	12.6	60.0	100%

Clay Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	3.3	12.0	20%
Sideoats Grama	Bouteloua curtipendula	2.7	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Green Needlegrass	Nassella viridula	1.4	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	11.8	60.0	100%

Temporary and Permanent Seeding (TS/PS)

TS/PS

Salty Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Alkaligrass (Fults)	Puccinellia distans	0.5	15.0	25%
Newhy Saltlander	Hybrid wheatgrass	4.3	12.0	20%
Tall Fescue	Festuca arundinacea	2.3	12.0	20%
Indian Ricegrass	Achnatherum hymenoides	1.9	6.0	10%
Alkali sacatons	Sporobolus airoides	0.1	6.0	10%
Western Wheatgrass	Pascopyrum smithii	1.2	3.0	5%
Canada Wildrye	Elymus Canadensis	2.3	6.0	10%
Total	--	12.6	60.0	100%

Lowland Equine Soil Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Green Needlegrass	Nassella viridula	2.9	12.0	20%
Timothy	Phleum Prantense	0.4	12.0	20%
Intermediate Wheatgrass	Thinopyrum intermedia	5.9	12.0	20%
Sand Dropseed	Sporobolus cryptandrus	0.1	12.0	20%
Sideoats Grama	Bouteloua curtipendula	1.4	6.0	10%
Little Bluestem	Schizachyrium scoparium	1.0	6.0	10%
Total	--	11.7	60.0	100%

Lowland Seed Mix

Common Name	Scientific Name	#PLS/acre	PLS/sq ft	% of Mix
Sandbergs Bluegrass	Poa secunda	0.6	12.0	20%
Switchgrass	Panicum virgatum	1.3	12.0	20%
Mountain brome	Bromus marginatus	5.8	12.0	20%
Blue grama	Bouteloua gracilis	0.6	12.0	20%
Slender Wheatgrass	Elymus trachycaulus	1.6	6.0	10%
Western Wheatgrass	Pascopyrum smithii	2.4	6.0	10%
Total	--	12.4	60.0	100%

Arkansas Valley Seed, Inc.

Premium Irrigated Pasture Mix

A mixture of perennial, cool season grasses formulated with varieties that produce the highest quality and yielding forage. These grasses are palatable and excellent for grazing and hay production. Performs well in the Intermountain West as well as the High Plains of the Rocky Mountain region.

Characteristics:

Grows 2-6 feet tall
Premium varieties
High yielding and quality irrigated forage

Seeding Rate:

New Seeding
Broadcast: 30-35 lbs/acre
Drilled: 20-25 lbs/acre
Overseeding
Broadcast: 15-20 lbs/acre
Drilled: 10-15 lbs/acre

Mix Contains:

25% Elite Tetraploid Perennial Rye

Bunchgrass with ermination in 5-10 days.
One of the most widely used grasses and is adaptable to a wide variety of soils and climate conditions. A leafy pasture type perennial rye.

25% Potomac Orchardgrass

Bunchgrass with germination in 14-21 days.
One of the earliest species to exhibit growth in the spring, making tremendous forage potential under cooler conditions. Performs well on different textured soils. Found throughout the west, this grass is great forage and hay producer.

20% Improved Meadow Brome

Bunchgrass with germination in 10-14 days.
Meadow Brome is a long-lived perennial that is slow to establish. It is very palatable and highly productive.

15% Crown Royale Orchardgrass

Bunchgrass with germination in 14-21 days.
Similar to Potomac, but with a later maturity date.

10% Manchar Smooth Bromegrass

Sod-forming grass with germination in 10-14 days.
Smooth bromegrass is resistant to drought and extremes in temperature. It is the most widely used of the cultivated brome grasses. Grows throughout most of the US.

Foothills Mix

A mixture developed for elevations of 3,000 to 8,000 feet to provide natural cover under dryland conditions. Contains both cool and warm season grasses adapted to the Western Great Plains and Southwest region. Has excellent cold and drought tolerance. Good for soil stabilization on poor soils.

Characteristics:

Grows 36-60 inches with average rainfall
Excellent natural cover for dryland areas

Seeding Rate:

New Seeding
Broadcast: 20-25 lbs/acre
Drilled: 15-20 lbs/acre
Overseeding
Broadcast: 10-15 lbs/acre
Drilled: 5-10 lbs/acre

Mix Contains:

25% Annual Ryegrass

Cool season bunchgrass with germination in 5-10 days.
Noted for quick germination. Provides fast green up and root structure to stabilize soil.

15% Slender Wheatgrass

Cool season bunchgrass with germination in 21-28 days.
A native species to the mountain and intermountain areas of the western United States and the northern Great Plains.

12% Pubescent Wheatgrass

Cool season bunchgrass with germination in 14-21 days.
Drought tolerant, and winter hardy grass with deep rooted system making an excellent soil binder.

10% Mountain Brome

A cool-season bunchgrass with germination in 10-14 days.
Survives on thin, dry or coarse soils, and displays strong winter hardiness. Will produce best in moist deep fertile soils.

10% Hard Fescue
Cools bunchgrass with germination in 7-10 days.
Well adapted to many soil types and often used for erosion control.

10% Canada Bluegrass
Cool season bunchgrass with germination in 14-21 days.
Often used for soil stabilization.

6% Sideoats Grama
Warm season bunch/sod forming grass with germination in 14-21 days.
A medium-sized perennial 15 – 30" tall, it is adapted to most soil conditions.

6% Big Bluestem
Warm season sod-former with germination in 14-21 days.
It is tall grass, reaching a height of 6 to 8 feet on most sites when left un-grazed.

5% Blue Grama (Coated)
Warm season bunchgrass with germination in 7-10 days.
This grass demonstrates good drought, fair salinity, and moderate alkalinity tolerances.

5% Switchgrass
Warm season bunchgrass with germination in 21-28 days.
Very tolerant of poor soils, flooding and drought. Often used in reclamation of sand dunes and dikes.

1% Sand Dropseed
Warm season bunchgrass with germination in 14-21 days.
Commonly grows on sandy soils but is adapted to medium textured soils also.

Landowners may also have special requests for specific seed mixes. In these cases, those seed mixes will take precedence.

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

References

Urban Drainage and Flood Control District (UDFCD), Urban Storm Drainage Criteria Manual Volume 3, November 2010.

Section 7

Dust Suppressant Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Kerr-McGee Oil & Gas Onshore LP (KMOG)
Dust Mitigation Plan - McGavin 6-19HZ

KMOG has developed this Dust Mitigation Plan in compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 427.

427.a(1) Soil Type



Map Unit Symbol	Map Unit Name
47	Olney fine sandy loam, 1 to 3 percent slopes
4	Aquolls and Aquepts, flooded
72	Vona loamy sand, 0 to 3 percent slopes

427.a(2) Proposed Vehicle Speed Limits to Minimize Dust

- 10 mph on lease road from CR 20/ Pine Cone Ave. south into location and 5 mph once vehicles reach well pad/ facility

427.a(3) Total Area of Disturbance (In Acres)

- 25.63 acres (Well pad and Facility)

427.a(4) Whether Access Roads are Paved

- Access roads are not paved

427.a(5) Number of Anticipated Truck Trips During Each Phase

- Construction Phase (includes pad and production facility construction) – 7,829 truck trips
- Drilling Phase – 15,236 truck trips
- Completions Phase – 23,046 truck trips
- Production Phase – 602 / average annual truck trips

427.a(6) A plan for Suppressing Fugitive Dust Caused Solely by Wind

- On active locations, in the event dust is caused solely by the wind KMOG will have fresh water deployed to suppress dust for the duration of the wind event
- In addition, disturbed soils will be placed to minimize ability for soil particles to become airborne. Various techniques to be used depending on soil type specific to each location:
    - Track pack/compact topsoil piles, consolidate soil used to construct perimeter ditch/berm and sediment traps
    - Hydro mulch and/or hydroseed topsoil piles and/or other stormwater BMP features
    - Seed/straw crimp disturbed soils where feasible
    - Place and compact gravel layer on working pad surfaces and access roads

427.a(7) Best Management Practices

- KMOG will proactively deploy fresh water to suppress dust along access road to well pad/ facility during all phases of pre-production operations
- Speed limits will be reduced to 10 mph on access road and 5 mph once vehicles reach well pad/ facility
- Access roads and Vehicle Tracking Control will receive maintenance as needed throughout operations
- In the event of high winds that generate dust that cannot be mitigated with an application of water, KMOG will shut down construction operations
- KMOG will proactively street sweep any sediment tracking that could have occurred from truck traffic onto CR 20/Pine Cone Ave. in front of our location entrance.

Section 8

Wildlife Assessment and Weed Management Plans

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

June 16, 2021

Joseph Riemer
Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Subject: Summary of the Environmental and Cultural Considerations Pertaining to the McGavin Project

Dear Mr. Riemer,

Two Dot Consulting, LLC (2DOT) has prepared this letter on behalf of Kerr-McGee Oil & Gas Onshore, LP (KMOG) to summarize the current environmental considerations pertaining to the environmental surface inspection (Survey) for the McGavin multi well pad and production facility (Project). The environmental and cultural considerations covered by the Survey include the following: a wildlife and wildlife habitat assessment, an evaluation of the impacts of the proposed operation on wildlife and wildlife habitat, an evaluation and assessment of Waters of the United States (WOTUS) and wetlands, an updated Phase I Environmental Site Assessment (ESA), a cultural desktop review, and a summary of the ecological site characteristics. 2DOT prepared this letter following a site survey performed on 6/16/2021.

1. Project Location and Site Conditions

The Project is located within the city of Firestone in section 19, township 2N, range 67W, Weld County, CO (**Appendix A**: *Figure 1*). The Project is approximately 25.6 acres and is situated entirely on agricultural land with an existing oil and gas wellhead located within the Project boundary (**Appendix A**: *Figure 1*). Weld County Road (WCR) 20 is located approximately 320 feet north and WRC 13 is approximately 500 feet west of the Project (**Appendix A**: *Figure 2*).

2. Wildlife and Wildlife Habitat Assessment/Evaluation of Impacts to Wildlife and Wildlife Habitat

A. Raptors

2DOT conducted the site visit on 3/11/2021. During the site visit, no raptor nests were observed within 0.5 mile of the Project (**Appendix A**: *Figure 3*). There are trees suitable for nesting raptors within close proximity to the Project. Raptor surveys are recommended if the Project is constructed between 2/15 and 7/31, or until nest has fledged if active nest is observed. No current constraints.

B. Eagles

There were no bald or golden eagle nests or bald eagle winter night roosts observed within 0.5 mile of the Project. The nearest mapped eagle nest, Nest_13, is located approximately 2.5 miles southeast of the Project. The nearest bald eagle winter night roost is located over three miles west of the Project along Boulder Creek. There are no current constraints pertaining to bald or golden eagles.

C. Burrowing Owls

Suitable burrowing owl habitat was not observed within 0.25 mile of the Project during the site visit on 3/11/2021. No current constraints.

D. Preble's Meadow Jumping Mouse

The Project is located within Colorado Parks and Wildlife (CPW) mapped Preble's Meadow Jumping Mouse (PMJM) overall range. The U.S. Fish and Wildlife Service (USFWS) recommends that projects within 300 feet of the 100-year floodplain associated with rivers, creeks, and their tributaries (and projects which may have potential secondary impacts to such areas) be assessed as to their potential direct and indirect impacts to PMJM and PMJM's habitat. A PMJM survey was performed on 4/22/2021, and 2DOT concluded that no suitable habitat was observed within the Project. On behalf of KMOG, 2DOT is requesting concurrence from the USFWS. No constraints are expected pertaining to PMJM.

E. Ute Ladies'-Tresses Orchid

No suitable habitat was identified for the Ute ladies'-tresses orchid. There are no current constraints pertaining to the Ute ladies'-tresses orchid.

3. WOTUS and Wetlands

A delineated freshwater emergent wetland is located adjacent to the western border of the Project (**Appendix A**: *Figure 2*). Potential Wetland 1 is located approximately 120 feet south of the Project Area. An NHD Mapped Stream, No Name Creek, is located approximately 175 feet southwest of the Project Area. Potential Wetland 1 is associated with No Name Creek. Potential Wetland 2 is located approximately 255 feet east of the Project Area. Ditch 1 is located approximately 319 feet west of the Project. Ditch 1 is associated with Potential Wetland 1 and No Name Creek. NWI Emergent Wetland 1 and NWI Pond 1 are located approximately 155 feet southwest of the Project. NHD Pond 1, NWI Emergent Wetland 2, and NWI Pond 2 are not present (**Appendix A**: *Figure 2*). All hydrologic features within ½ mile of the Project are shown on **Appendix A**: *Figure 3*.

4. Phase I Environmental Site Assessment (ESA) and Cultural Desktop Review

A. Phase I ESA

2DOT conducted an updated Phase I Environmental Site Assessment of the Project on 6/16/2021. No recognized environmental conditions, *de minimis* conditions, or business environmental risks were identified. See *(603-129) McGavin Updated Phase I ESA June 2021* for the full Phase I ESA report.

B. Cultural Desktop Review

A search of the Colorado Inventory of Cultural Resources was received from the Office of Archaeology and Historic Preservation on 7/7/2020. No cultural sites or surveys were located in the Project (**Appendix B**: *Cultural Review*).

5. Ecological Site Characteristics

A. Site Description

The Project is located within an agricultural field (**Appendix C**: *Photographs*). During the site visit on 3/11/2021 the field was cultivated with rye (*Secale cereale*). The topography is uniformly flat with very little elevation gain or loss. There was no sign of livestock observed within the Project.

An existing oil and gas wellhead is located in the south-central portion of the Project.

B. Soils

The Project is comprised of Olney fine sandy loam, 1 to 3 percent slopes; Vona loamy sand, 0 to 3 percent slopes; Aquolls and Aquepts, flooded, and Loup-Boel loamy sands, 0 to 3 percent slopes.

C. Vegetative Communities

There are two plant communities associated with the Project; a disturbed agricultural community, and an ephemeral drainage that has not been cultivated (**Appendix C**: *Photographs*). The agricultural community was dominated by a cultivated rye, kochia (*Bassia scoparia*), and cheatgrass (*Bromus arvensis*). Other species observed within the cultivated area include field bindweed (*Convolvulus arvensis*), prairie sunflower (*Helianthus petiolaris*), Russian thistle (*Salsola tragus*), thistle poppy (*Argemone polyanthemos*), and prickly lettuce (*Lactuca seriola*). The ephemeral drainage plant community exhibits both upland and hydrophytic species, and is comprised of Baltic rush (*Juncus balticus*), creeping spike rush (*Eleocharis palustris*), prickly lettuce, salt grass (*Distichlis spicata*), smooth brome (*Bromus inermis*), Russian olive (*Elaeagnus angustifolia*), musk thistle (*Carduus nutans*), showy milkweed (*Asclepias speciosa*), prickly lettuce, and cheatgrass. The wetland delineation performed in 2020 confirmed that no wetlands extend into the Project Area.

D. Noxious Weeds

The following Colorado Noxious Weeds were observed dispersed throughout the Project; musk thistle (List B), Russian olive (List B), field bindweed (List C), and cheatgrass (List C).

E. Proposed Mitigation to Address Impacts

The proposed mitigation to address the potential impacts to vegetation is to limit the potential of noxious weeds being introduced to the Project. Where needed, best management practices (BMPs) such as routine equipment inspections and wash down stations will limit the potential of introducing noxious weeds and impacts to vegetation. 2DOT also recommends chemically treating the noxious weeds within the Project. Herbicide application in compliance with the Colorado Department of Agriculture has been proven to effectively treat noxious weeds.

Upon KMOG's completion of the proposed disturbance, restoration and revegetation should occur as soon as practicable, in accordance with COGCC 1003, Interim Reclamation rules and regulations.

If the disturbance occurs on crop lands, then the following is recommended to be implemented: COGCC 1003.e(1): "All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour, and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established".

To obtain the final reclamation threshold for release of financial assurance, the following shall be met: COGCC 1004.c(1): “reclamation has been performed as per Rules 1003 and 1004, and observation by the Director over two growing seasons has indicated no significant unrestored subsidence.”

Please let me know if you have any questions.

Sincerely,



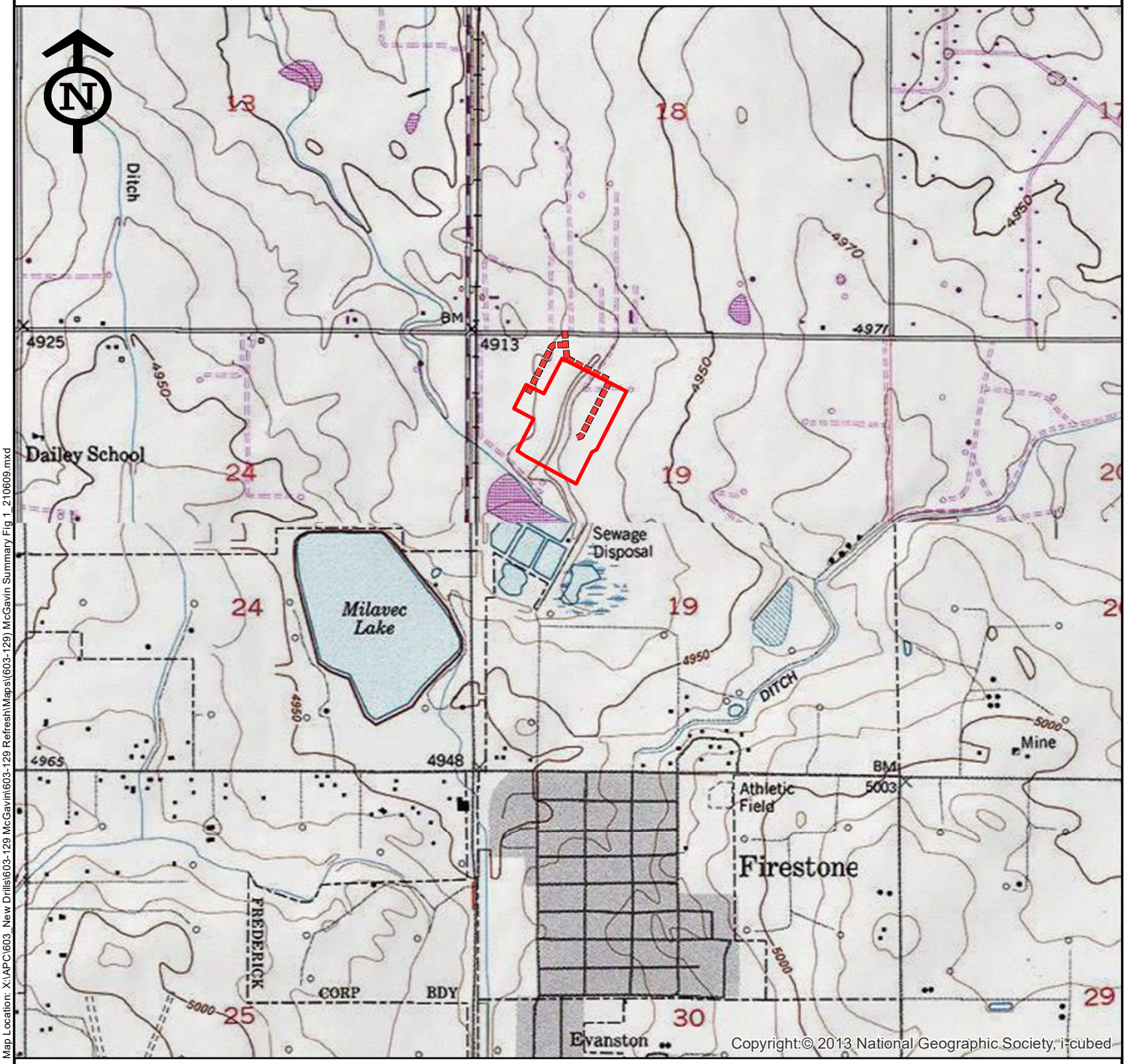
SAM JOSEPH
project manager ● NEPA ● wetlands
ARVADA, CO | LARAMIE, WY | SARATOGA, WY
Office: *303.953.2255* | Mobile: *570.337.4025*
joseph@2dot-consulting.com
www.2dotconsulting.com



Appendix A: *Figures*

McGavin

SECTION 29, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 Refresh\Maps\(603-129) McGavin Summary Fig 1_210609.mxd

Project Area

Access Road

PREPARED BY:

2. two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 2,400 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

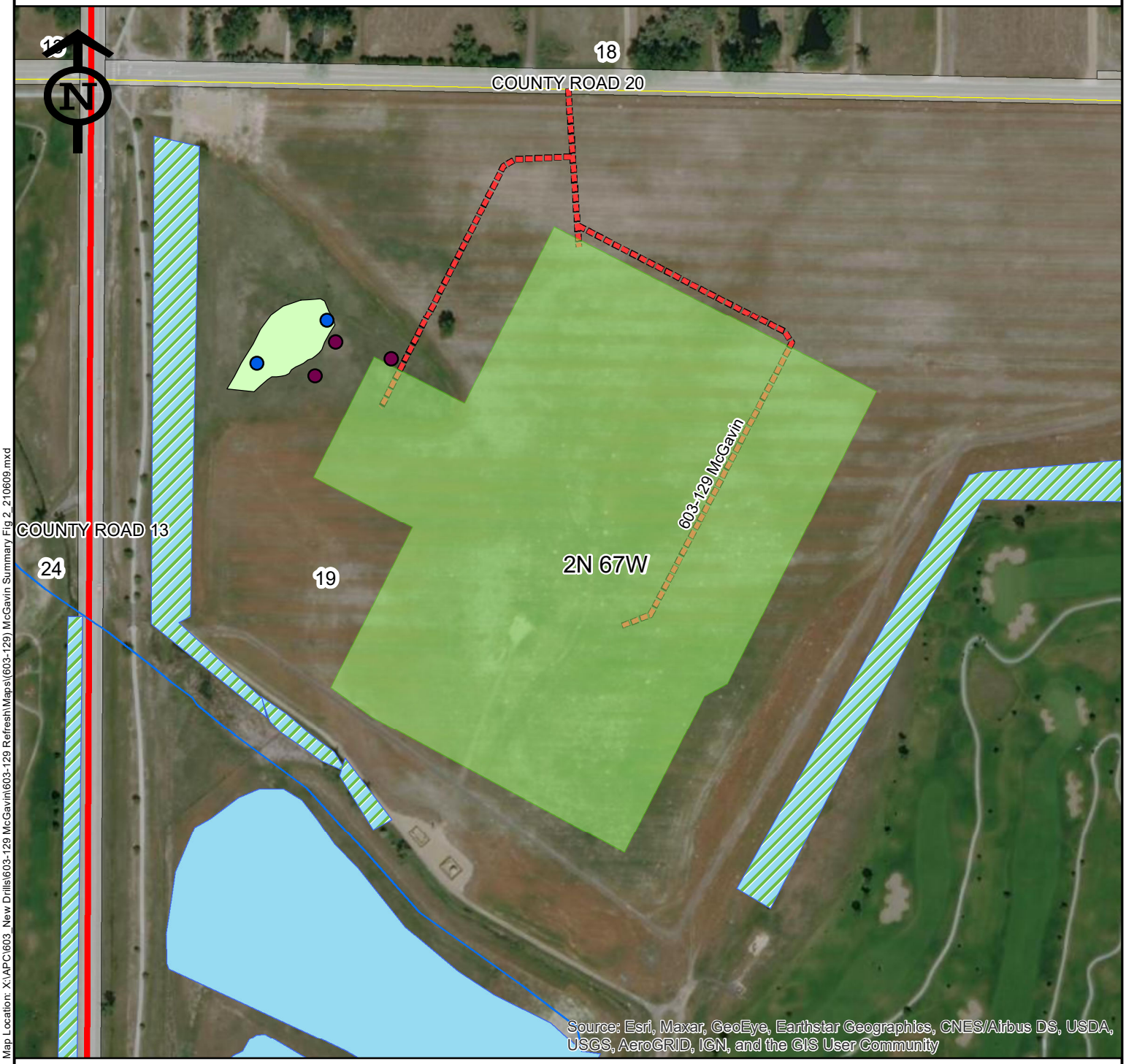
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Vicinity Map
Figure 1

(603-129) McGavin

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 RefreshMaps\(603-129) McGavin Summary Fig 2_210609.mxd

- Upland Soil Pit
- Wetland Soil Pit
- Delineated Wetland
- Potential Wetland
- Multi Well Pad and Prodcution Facility
- Access Road
- NHD Mapped Stream
- NHD Mapped Lake/Pond
- Township
- Section
- Weld County Road ROW

PREPARED BY:

two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 200 400 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated 2/2021

PREPARED FOR:

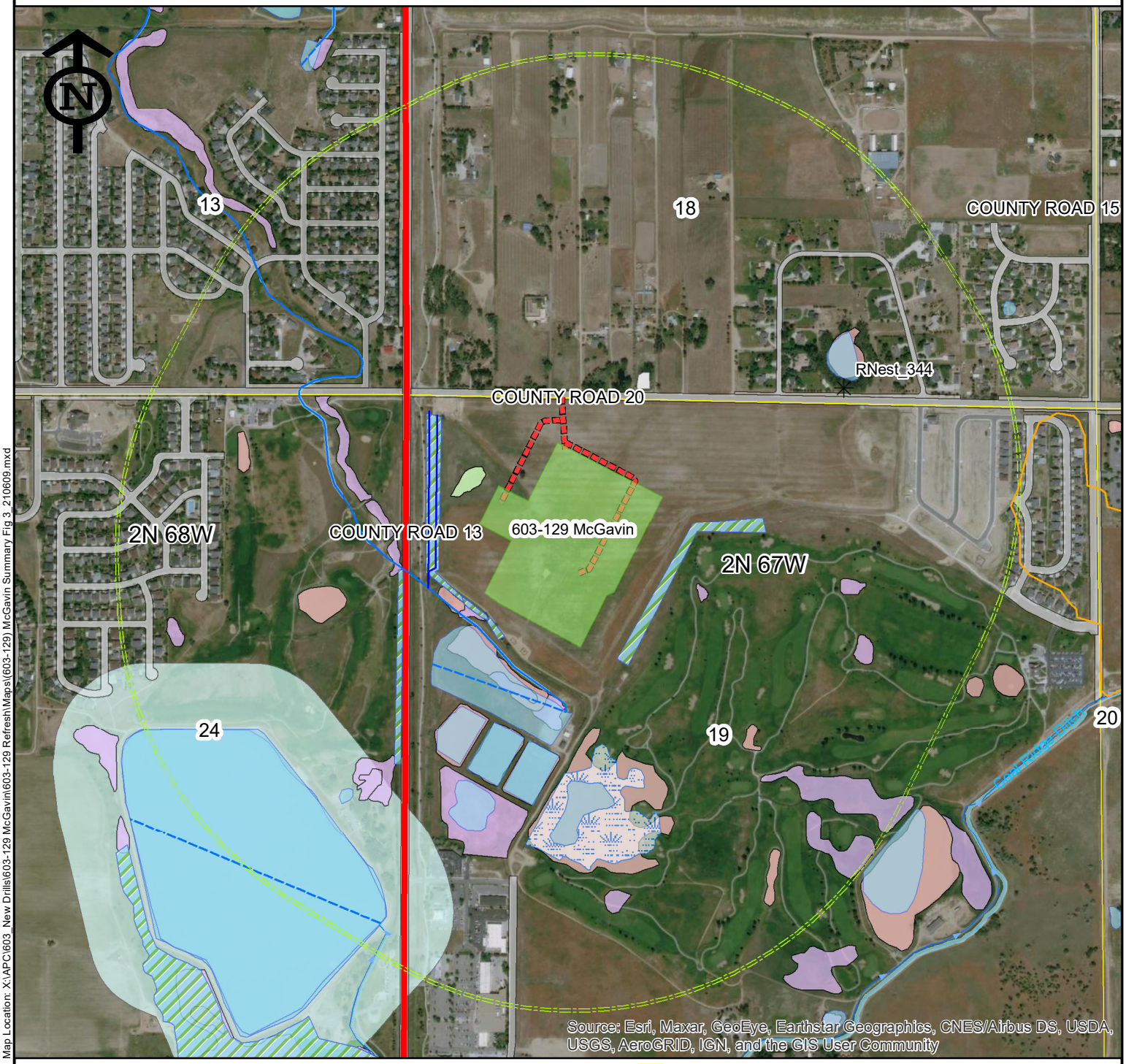
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Wetland Delineation
Figure 2

(603-129) McGavin

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 RefreshMaps\(603-129) McGavin Summary Fig 3_210609.mxd

- Ditch
- Ponds
- Delineated Wetland
- Potential Wetland
- Raptor Nest Removed
- Potential Burrowing Owl Habitat
- Multi Well Pad and Production Facility
- Kerr-McGee Facilities Half Mile Buffer
- Access Road
- NHD Mapped Ditch
- NHD Mapped Stream
- NHD Mapped Artificial Path
- NHD Mapped Lake/Pond
- NHD Mapped Reservoir
- NHD Mapped Swampmarsh
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Forested/Shrub Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Lake
- NWI Mapped Riverine
- Aquatic Sportfish Management Water

PREPARED BY:

two dot
7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 750 1,500 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

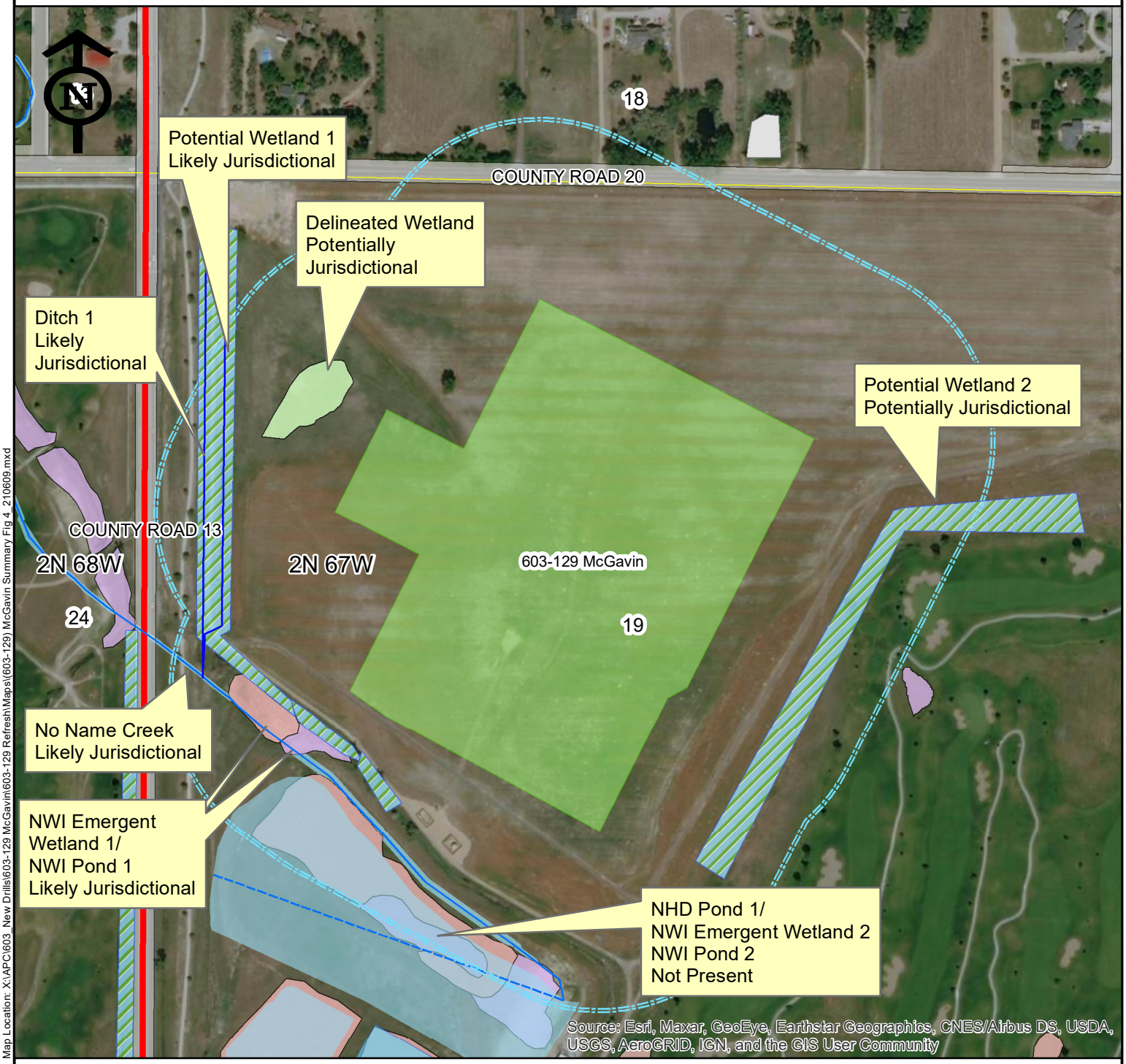
KerrMcGee

Projection: Nad83 UTM 13N Date: 6/9/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 3

(603-129) McGavin Refresh

SECTION 19, TOWNSHIP 2N, RANGE 67W, 6TH P.M. WELD COUNTY, CO



Map Location: X:\APC\603_New Drills\603-129 McGavin\603-129 Refresh\Maps\(603-129) McGavin Summary Fig 4_210609.mxd

- Ditch
- Ponds
- Delineated Wetland
- Potential Wetland
- Multi Well Pad and Production Facility
- Kerr-McGee Facilities 500ft Buffer
- NHD Mapped Stream
- NHD Mapped Artificial Path
- NHD Mapped Lake/Pond
- NHD Mapped Reservoir
- Township
- Section
- Weld County Road ROW
- NWI Mapped Freshwater Emergent Wetland
- NWI Mapped Freshwater Pond
- NWI Mapped Riverine

PREPARED BY:

two dot

7674 Grandview Ave., Ste. 210
Arvada, CO 80002

0 300 600 Feet

SOURCES:
Project Features, 2DOT 2021
and Kerr-McGee 2021.
Source Data Updated: 2/2021

PREPARED FOR:

KerrMcGee

Projection: Nad83 UTM 13N Date: 6/10/2021
Drafted By: MC Reviewed By: SJ

Environmental Map
Figure 4



Appendix B: *Cultural Review*

HISTORY COLORADO
Office of Archaeology and Historic Preservation
1200 Broadway, Denver, Colorado 80203

Morgan Colacone
Two Dot Consulting
7674 Grandview Ave, Ste. 210
Arvada, CO 80002

July 7, 2020

Re: McGavin
File Search No. 22884

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources within the area shown in the provided map, located in the following areas:

PM	T	R	S
6th	2N	67W	19

0 sites and 0 surveys were located in the designated area(s).

If information on any district, site, building, structure, or object in the project area was found, detailed information follows the summary. If no properties were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Our letter should not be interpreted as formal consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) or the Colorado Register of Historic Places (CRS 24-80.1). In the event that there is federal or state agency involvement, please note that it is the responsibility of the agencies to meet the requirements of these regulations.

We look forward to consulting with you regarding the effect of the proposed project on significant cultural resources in accordance with the Advisory Council on Historic Preservation regulations titled "Protection of Historic Properties" or the Colorado Register of Historic Places, as applicable (http://www.historycolorado.org/oahp/consultation-guidance).

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3392. Thank you for your interest in Colorado's cultural heritage.

Steve Turner, AIA
State Historic Preservation Officer

*Information regarding significant archaeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.



Appendix C: *Photographs*



Photograph 1. Center of Project Area.



Photograph 2. Center of Project Area.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Ephemeral drainage intersecting the Project Area. No wetlands are present within the Project Area.

Section 9

Phase I Environmental Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Phase I Environmental Site Assessment Update

McGavin Oil and Gas Multi-Well Pad and Production Facility
Town of Firestone, Colorado

June 2021

Prepared for:

Kerr-McGee Oil & Gas Onshore LP
PO Box 173779
Denver, Colorado 80217-3779

Prepared by:

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Acronyms and Abbreviations

2DOT	Two Dot Consulting, LLC
AAI	All Appropriate Inquiry
AIRSAFS	Aerometric Information Retrieval System / Air Facility Subsystem
AMSL	Above Mean Sea Level
APCDP	Air Pollution Control Division Permitted Facilities
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity Use Limitation
BER	Business Environmental Risk
BLVD	Boulevard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CREC	Controlled Recognized Environmental Condition
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FRSCO	Facility Registry System (Colorado)
HREC	Historical Recognized Environmental Condition
IPaC	Information for Planning and Consultation
KMOG	Kerr-McGee Oil & Gas Onshore LP
MRDS	Mineral Resource Data System
MSD	Minimum Search Distance
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
Site	McGavin Oil and Gas Facility, Town of Firestone, Colorado
T&E	Threatened and Endangered
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
WOTUS	Waters of the U.S.

Executive Summary

Two Dot Consulting, LLC (2DOT) has conducted an updated Phase I Environmental Site Assessment (Phase I ESA) of the McGavin Oil and Gas Facility located in the Town of Firestone, Colorado. This updated Phase I ESA has been prepared for Kerr-McGee Oil & Gas Onshore LP (KMOG) to determine the property's suitability for oil and gas operations.

The property, referenced herein as the "Site", encompasses approximately 25.6 acres and approximately 0.4 miles of access road. The Site is located in the Town of Firestone, Colorado; southeast of the intersection of County Road 13 and County Road 20 in section 19, township 2 north, range 67 west (**Appendix A: Figure 1**).

The Site is comprised of predominately agricultural land with an oil and gas wellhead located in the south-central portion of the Site. Land use adjacent to the Site consists of rangeland, golf courses, and residential properties.

A review of historical sources, including aerial photographs and historical topographic maps, indicates the Site has been primarily vacant and agricultural land since 1937.

The Phase I ESA was conducted in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM). Elements of the Phase I ESA include: (i) interviews with owners, operators, and occupants; (ii) searches for recorded environmental records; (iii) reviews of federal, tribal, state, and local government records; (iv) visual inspections of the property and of adjoining properties; and (v) the declaration by the environmental professional responsible for the assessment.

The objective of this Phase I ESA was to identify the presence or likely presence, use, or release on the Site of hazardous substances or petroleum products as defined in ASTM Practice E 1527-13 as a Recognized Environmental Condition (REC). This report includes a summary of the site reconnaissance conducted on July 8, 2020 and June 16, 2021, a review of environmental databases, and a review of historical data sources. Any exceptions to or deletions from these ASTM practices are described later in this report.

RECs

Recognized Environmental Condition (REC):

A REC is defined as - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

Based on conditions noted within the Site, 2DOT did not identify any RECs in connection with the Site.

Findings and Conclusions

2DOT has developed the following findings and conclusions:

- The Site is comprised of predominately agricultural land that contains oil and gas equipment. Adjacent properties support agriculture, recreation, and residential properties.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

1. Introduction

Two Dot Consulting, LLC (2DOT) conducted an updated Phase I Environmental Site Assessment (ESA) of the property proposed for the McGavin Oil and Gas Multi-Well Pad and Production Facility (Site) located in the Town of Firestone, Colorado (Site) on behalf of Kerr-McGee Oil & Gas Onshore LP (KMOG), in accordance with the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-13)* issued by the American Society for Testing and Materials (ASTM, 2013). This report documents our findings, opinions, and conclusions of the updated Phase I ESA.

1.1 Property Location and Description

The Site is a proposed oil and gas multi-well pad, production facility, and access road.

The Site is located in the town of Firestone, Colorado; southeast of the intersection of County Road 13 and County Road 20 in section 19, township 2 north, range 67 west The Site consists of approximately 25.6 acres for the proposed oil and gas multi-well pad and production facility, in addition to approximately 0.4 miles of proposed access roads. See **Appendix A: Figures.**

The Site currently operates as agricultural land that supports oil and gas production.

1.2 Purpose

2DOT understands that the purpose for conducting this updated Phase I ESA is to assess and document the current environmental conditions at the Site. The goal of the Phase I ESA is to identify recognized environmental conditions (RECs) in connection with the Site. ASTM Practice E 1527-13 defines the following categories of RECs:

Recognized Environmental Condition (REC):

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not RECs (see definition below).

ASTM E 1527-13 defines release as a release of any hazardous substance or petroleum product and shall have the same meaning as the definition of "release" in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 United States Code (U.S.C.) § 9601(22)).

Historical REC (HREC):

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Controlled REC (CREC):

A REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of

required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Additional conditions that are not included under the definitions of a REC, but are defined by ASTM Practice 1527-13 include:

De minimis:

A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Business Environmental Risk (BER):

A risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations.

1.3 Report Users

ASTM E1527-13, Section 3, Terminology, defines "user" as "the party seeking to use Practice E1527 to complete an ESA of the property. A user may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager. ASTM E1527-13, Section 10.7.1, defines "user" as "the person on whose behalf the Phase I Environmental Site Assessment is being conducted."

2DOT received authorization from KMOG to conduct a Phase I ESA of the Site on June 29, 2020. A request to perform an updated Phase I ESA was received on June 7, 2021. The Site is defined as approximately 25.6 acres of agricultural land that contains an oil and gas wellhead, and 0.4 miles of proposed access roads. This updated Phase I ESA has been prepared for KMOG, and only KMOG has the right to rely on the contents of this Phase I ESA without written authorization.

1.4 Scope of Services

ASTM Practice E 1527-13 states that there are four components of a Phase I ESA: 1) Records Review; 2) Site Reconnaissance; 3) Interviews; and 4) Report.

The scope of services provided for this Phase I ESA include:

- On-site assessment of the Site to identify environmental conditions.
- Observation of adjacent properties and the local area to evaluate the potential for adverse environmental impact to the Site.
- Review of available environmental documents for the Site.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the Site.
- Review historical data sources for the Site, including aerial photographs, topographic maps, ownership records, and other readily available development data.
- Interviews with persons represented to be familiar with the operation and history of the Site.

- Determine data gaps in the information obtained and comment on their significance in identifying RECs for the Site.
- Prepare a written report of methods, findings, opinions and conclusions.

The goal of this scope of services is to assist the user in identifying conditions at the Site that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three "defenses" identified in the 2002 Brownfields Amendments to the CERCLA Section 9607 (All Appropriate Inquiry [AAI] subsections). These three defenses include:

- The "innocent landowner" defense to potential liabilities under 42 U.S.C. § 9601
- The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
- The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. §9607r

Federal regulations at (42 U.S.C §9601(35)(A) & (B), §9607(b)(3), §9607(q); and §9607(r)), promulgated by the United States (U.S.) Environmental Protection Agency (EPA), require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-13: 3.2.6) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-13 as the party seeking to use Practice E 1527 to complete an ESA of the site and may include, without limitation, a potential purchaser of land at the site, a potential tenant of the site, an owner of land at the site, a lender, or a site manager.

Investigative areas not included in the standard ASTM ESA scope include: asbestos-containing building materials, radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, endangered species, indoor air quality, mold, biological agents, cultural and historic resources, ecological resources, health and safety, and industrial hygiene.

1.5 Significant Assumptions

2DOT has made certain assumptions in preparing the scope of this assessment:

- Boundaries of the Site were provided by KMOG. 2DOT assumed this information was accurate.
- Data gathered from public information sources (i.e. libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases and no intentional concealment of environmental conditions or releases has occurred.
- Interview information is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.
- Regulatory information is limited to sites identified after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

1.6 Limitations

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-13, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this updated Phase I ESA, and 2DOT's interpretation of the information obtained as part of this updated Phase I ESA. The findings and conclusions are limited to the Site and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs associated with a site within reasonable limits of time and cost. In conducting its services, 2DOT used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. This updated Phase I ESA conforms to the level of documentation required in ASTM Practice E 1527-13. However, 2DOT may omit discussion of certain records, i.e., sources deemed, in 2DOT's professional opinion, to be inapplicable, or of limited value, to the specific needs of KMOG. In accordance with ASTM, if the lack of available documentation results in a data gap, this data gap is identified herein, and its significance is discussed.

2. User-Provided Information

The user of the report provided a location drawing of the Site boundaries via pdf. Full access to the Site was granted to 2DOT.

3. Records Review

3.1 Environmental Records Review

GeoSearch was contracted by 2DOT to complete a database search of federal, state, and tribal environmental records for the Site and facilities in the ASTM-designated search radius. A computerized environmental information database search was performed by GeoSearch on July 2, 2020 and June 8, 2021. The databases searched included federal, state, local, and tribal databases as defined by ASTM E 1527-13. A summary of the sources and results of the database search where the number of records found were greater than zero is listed below in Table 1. A complete copy of the GeoSearch environmental database report (GeoSearch Radius Report) is included in **Appendix B: Environmental Records Review** (Geosearch, 2021f). The approximate minimum search distance (MSD) for this review is noted for each database listed below.

Table 1 - Summary of Environmental Database Search

Database	Description	Search Radius (MSD)	Records Found
Federal			
Resource Conservation & Recovery Act – Corrective Action Facilities	The Resource Conservation and Recovery Act (RCRA) gives the U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground	1 mi	1

Database	Description	Search Radius (MSD)	Records Found
	tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.		
Aerometric Information Retrieval System / Air Facility Subsystem (AIRSAFS)	The U.S. EPA modified the Aerometric Information Retrieval System to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem. Since this change in 2001, the management of the AIRSAFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.	Target Property	1
Facility Registry System (FRSCO)	The United States Environmental Protection Agency's Office of Environmental Information developed the Facility Registry System as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.	Target Property	1
Mineral Resource Data System (MRDS)	MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System originated in the U.S. Bureau of Mines, which is now part of USGS.	0.25 mi	1
State			
Air Pollution Control Division Permitted Facilities (APCDP)	This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.	0.5 mi	8
Total			12

The following table (Table 2) summarizes the site-specific information provided by the database and/or gathered by this office for identified facilities of potential concern to the Site. The remaining facilities listed in the database report do not appear to represent RECs to the Site based upon regulatory status, apparent topographic gradient, and/or distance from the Site.

Table 2 – Summary of facilities of potential concern to the Site

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
NOBLE ENERGY INC. **BATTERY #10086600**	Target Property	APCDP, AIRSAFS, FRSCO	No, based on site visit and aerial imagery. This location is likely mapped incorrectly, and likely does not affect the Site. Additionally, its operation status is listed as temporarily closed and in compliance with procedural requirements.
ST VRAIN (SAND AND GRAVEL CONSTRUCTION)	0.238 mi east / Upgradient	MRDS	No, based on regulatory status and distance from Site.

Facility Name	Estimated Distance / Direction/Gradient	Database Listings	Is a REC, CREC, or HREC to the Site
ARC COLORADO INC	0.652 mi east / Upgradient	USRCRAC	No, based on regulatory status and distance from the Site.

Well Search Report

A Water Well Report (Geosearch, 2021c) received from GeoSearch on June 9, 2021 listed 40 water wells within ½ mile of the Site boundary. No wells were listed within the Site. No water wells were observed within the Site during the ESA.

An Oil & Gas Report (**Appendix C: Oil & Gas Report**) (GeoSearch, 2021b) was received from GeoSearch that searched environmental databases for oil and gas well and pit locations. One oil & gas well is located within the Site, however, the 19-4N Rocky Mountain Fuel well, owned by KMOG is listed as shut in. There are two plugged and abandoned wells and one abandoned location located immediately adjacent to the Site.

3.2 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses at and in the vicinity of the Site and to assess these uses for potential hazardous materials impacts that may affect the Site. 2DOT reviewed those historical sources that were reasonably ascertainable and likely to provide useful information, as defined by the ASTM standard.

Historical Aerial Photographs

2DOT reviewed historical aerial photographs provided by GeoSearch (**Appendix D: Historical Aerial Photographs**) (GeoSearch, 2021d) for the following years: 1937, 1948, 1953, 1963, 1966, 1967, 1970, 1975, 1978, 1984, 1993, 1999, 2004, 2005, 2006, 2009, 2011, 2013, 2015, 2017, and 2019. Google Earth imagery from 9/29/2020 was also reviewed (Google Earth, 2021). The Site appears to have changed from undeveloped land and agriculture fields to agricultural fields with oil and gas operations present from 1937 to 2020.

1937-1963: The Site appears to be mostly vacant land surrounded by vacant land. There is what appears to be a ditch entering the Site from the southeastern corner. It splits into two ditches that exit the Site along the northern border. Some development likely associated with farming is located along the eastern edge by 1953.

1966-1967: The Site remains as vacant land bisected by agricultural ditches. There are three, rectangular, man-made ponds located a little over 1/8 mile south of the Site.

1970-1978: An additional, larger man-made pond is located adjacent to the southern border of the Site. There are residential roads and some structures located north of the Site across County Road 20.

1984-1993: There is additional development located north of County Road 20 and west of County Road 13. The ditches that bisect the Site appear to be gone. There is an oil and gas access road that enters the Site from the west and leads to the wellhead located within the south-central portion of the Site.

1999-2006: There is a golf course located east of the Site. The access road that entered the Site from the west appears to have been reclaimed and the road leading the wellhead now enters the Site from the south.

2009: The imagery shows some disturbance likely associated with pipeline construction located along the southwestern corner of the Site. There are some linear, trail-like features located within the Site.

2011-2020: The pipeline disturbance and trail-like features are not shown in the 2011 imagery. The ponds located to the south of the Site appear to have been filled in and planted as evidenced by mowing/harvesting lines. The adjacent properties appear to support agriculture, oil and gas operations, golf courses, and residential properties.

Historical Topographic Maps

2DOT reviewed historical topographic maps of the Site provided by GeoSearch (**Appendix E: Historical Topographic Maps**) (GeoSearch, 2021e). The following United States Geological Survey (USGS) 7.5 minute series topographic maps were reviewed: 1950, 1969, 1979, 1994, and 2013 Frederick, CO; and 1949, 1969, 1979, and 2013 Gowanda, CO. The 1902 30-minute Greeley, CO topographic map was also reviewed.

1902: The Site appears as vacant land with a stream feature that vertically bisects the Site. There are two two-track roads; one located along the southern border of the Site and the other is along on the northeast corner of the Site. A mine is depicted southeast of the Site.

1949/1950: The stream feature is depicted. The two-track road along the southern border is no longer depicted. There is a railroad running parallel along the eastern side of County Road 13, west of the Site.

1969: The Site appears as vacant land with a stream bisecting it. Adjacent properties also appear as vacant land with six ponds located south of the Site.

1979/1994: There is a two-track road, likely an oil and gas access road, located in the northern portion of the Site. The stream is no longer depicted. A well and sewage disposal are both depicted cross-gradient and south of the Site.

2013: The Site appears as vacant land. There are no roads or structures depicted within the Site. The railroad located along County Road 13 (Colorado Boulevard) is not mapped. The well that was depicted cross-gradient and south of the Site in 1979 is no longer depicted. Sewage disposal is not called out, however the ponds associated with it in 1994 are depicted cross-gradient and south of the Site.

Fire Insurance Maps

GeoSearch reviewed fire insurance maps (GeoSearch, 2021a) and determined there is no coverage available for this area.

City Directory Information

A City Directory Report (**Appendix F: City Directory**) was received from GeoSearch for the on County Road 13 [also known as Colorado Boulevard (Blvd)] for the years 1989-1990, 1996, 2001, 2006, 2011, 2014, 2016, 2019, and 2021. A City Directory Report was received from GeoSearch on County Road 20 for the years 1989-1990, 1996, 2001, 2006, 2011, 2016, and 2021 (Geosearch, 2021g).

All addresses listed on County Road 13 (Colorado Blvd) were residential, with exception of the following:

10141 County Rd 13	Pat C Greyhound Kennel Inc (2016-2021)
8080 County Rd 13	Heritage Bank (2006); Re/Max Horizons (2006)
8100 County Rd 13	Tip Toe Nails (2006); Carbon Valley Eye Care (2006); Jazzy Bean Coffee (2006); Wright H Lindsay O D (2006); Zadel And Associates Realty Inc (2006)
8134 County Rd 13	Safeway (2006)
8180 County Rd 13	Saddleback Grepes And Grians (2006)
8196 County Rd 13	Caribbean Tan Inc (2006); Curves For Women (2006); Mj Morrell Inc (2006); Subway Firestone (2006); Video Plus (2006)

9031 County Rd 13	Clever Technology Inc (2006-2021)
9350 County Rd 13	Transcribe Pro (2006)
9501 County Rd 13	Recycled Audio Inc (2006-2016); Samuel Joshua (2016)
9943 County Rd 13	Kens Pnt&Body Shp (2001-2011); Ken's Paint & Body Shop (2021)
10925 Colorado Blvd	Autozone (2011)
11040 Colorado Blvd	Chase (2011)
7133 Colorado Blvd	Discount Tire & Svc (2014-2021)
8080 Colorado Blvd	Premier Members Federal Credit Union (2011)
8110 Colorado Blvd	Carbon Valley Eye Care (2011); Great Clips (2011); Tip Toe Nails (2011); Wah Wok Chinese Food (2011)
8132 Colorado Blvd	0001 All Kings Locksmith (2011)
8134 Colorado Blvd	Safeway (2011)
8196 Colorado Blvd	Aaa Colorado Locksmith (2011); Chochos (2011); Liquor Carbon Valley Liquor (2011); Longs Peak Dental (2011); Neat Repeats Thrift And Gift (2011); Subway Sandwiches (2011)
8252 Colorado Blvd	Ace Hardware (2011)
8308 Colorado Blvd	Adams Bank & Trust (2011); Cardinal Health (2011); Flannagan Clint R Md (2011); North Vista Medical Center (2011); Smith Daniel Attorney (2011); Tusek David Md (2011)
8350 Colorado Blvd	Black Jack Pizza (2011); Dairy Queen (2011); Edward Jones Financial Advisor Br (2011); Emergency Locksmith 24 Hour (2011); Snap Fitness (2011)

The addresses listed on County Road 20 were residential, except for the following:

6171 County Rd 20	Coal Ridge Kennels (2006-2011); Coal Ridge Animal Hospital (2016-2021)
6271 County Rd 20	Woodsmith Construction (2006)

3.3 Environmental Liens and Activity and Use Limitations

GeoSearch performed an environmental lien and activity use limitations (AULs) search for the Site identified as Tax Parcel Number 131119200045 in July 2020. None were found. Based on GeoSearch's recommendation and with agreement from KMOG, environmental lien and AULs were not reordered for this June 2021 update since ownership has not changed.

4. Site Reconnaissance

On July 8, 2020, Shannon Regan and Morgan Colacone conducted a Phase I ESA site reconnaissance at the Site. The site reconnaissance included approximately 25 acres. On June 16, 2021, Sam Joseph conducted an updated Phase I ESA site reconnaissance consisting of approximately 25.6 acres of farmlands and oil and gas operations. The purpose of the site reconnaissance was to observe Site conditions and identify exposed features that could represent or indicate ASTM RECs. Features of interest included, but were not limited to, underground storage tanks (USTs), aboveground storage tanks (ASTs), chemical storage areas, transformers, stressed vegetation, and staining. Adjoining properties were observed from the property boundaries and public rights-of-way. During the walkover, photographs were taken of the Site and adjoining properties. Selected photographs are included in **Appendix G: Site Photographs**.

The Site was accessed from vehicle via lease roads located on the southern and western border of the Site as well as on foot for areas that could not be verified from the vehicle. Public roads were utilized to observe the surrounding and adjacent properties.

4.1 Methodology and Limiting Conditions

The Phase I ESA site reconnaissance consisted of visual observations of the Site and adjoining properties. The methodology for the site reconnaissance included walking and driving the Site to observe current conditions.

4.2 General Site Setting

The Site encompasses approximately 25.6 acres, in addition to 0.4 miles of proposed access roads. The Site is located in the Town of Firestone, Colorado; southeast of the intersection County Road 13 and County Road 20 in section 19, township 2 north, range 67 west. (**Appendix A: Figure 1**).

The Site is comprised of agricultural fields with an uncultivated ephemeral drainage located along the western edge (**Appendix A: Figure 2**). There is an oil and gas wellhead located in the south-central portion of the Site.

Adjacent land use surrounding the Site is agricultural, residential, recreational/commercial, and oil and gas operations.

Current Uses of the Site

The Site is comprised of vacant land and an oil and gas wellhead.

Past Uses of the Site

The Site has historically been used as cropland.

Adjoining Properties and Surrounding Area

South of the Site is an oil and gas pad and agricultural fields that appeared to historically support man-made mining or water treatment ponds. East of the project area is a golf course. West of the Site is potential wetland area, a recreational walking trail, and County Road 13. North of the Site is agricultural land, County Road 20, and residential properties.

Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

According to the United States Geologic Survey (Tweto, 1979) Special Geographic Map, the Site is located within the Eolian deposits map unit which dune sand and silt and Peoria Loess.

According to the Natural Resources Conservation Service's Soil Survey Geographic database, the Site is comprised of Olney fine sandy loam, 1 to 3 percent slopes; Vona loamy sand, 0 to 3 percent slopes; Aquolls and Aquepts, flooded, and Loup-Boel loamy sands, 0 to 3 percent slopes.

Topographic maps and aerial imagery indicate that the highest point is located along the eastern border at approximately 4,943 feet above mean sea level (AMSL). The lowest point is located along the western border at 4,919 feet AMSL. The Site consists of relatively flat fields with a slight depressional area located along the central western border. Elevation generally decreases to the northwestward.

Groundwater flow is assumed to follow topography and flows northwest.

General Description of Structures and Roads

There are no roads within the Site. There is an oil and gas access road located approximately 85 feet south of the Site. The only structure within the Site is an oil and gas wellhead.

Potable Water Supply

There is no potable water supply for the Site.

Sewage Disposal System

There is no sewage disposal system for the Site.

4.3 Exterior and Interior Observations

Hazardous Substances and Petroleum Products in Connection with Identified Users

There is an oil and gas wellhead located within the Site, owned by KMOG. No leaks or staining were observed during the field survey on June 16, 2021.

Storage Tanks – ASTs and USTs

There were no storage tanks observed within the Site.

Odors

No odors were observed.

Pools of Liquid

No abnormal puddles or pools of liquid were observed within the Site.

Drums

There were no drums observed within the Site.

Hazardous Substances and Petroleum Product Containers (Not Necessarily in Connection with Identified Uses)

No hazardous substances or petroleum product containers were located within the Site, that are not in connection with identified uses.

Unidentified Substance Containers

No unidentified substance containers were observed within the Site.

Utilities and PCBs

Although no longer commercially produced in the United States, Polychlorinated Biphenyl (PCB) may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include:

- Transformers and capacitors;
- Electrical equipment including voltage regulators, switches, re-closers, bushings, and electromagnets; and
- Oil used in motors and hydraulic systems.

No equipment likely to contain PCBs was observed within the Site.

Pits, Ponds, or Lagoons

During the field surveys on July 8, 2020 and June 16, 2021, a surface depression associated with a potential wetland was identified along the west-central border.

Stained Soil or Pavement

No surface staining was observed during the Site visit on June 16, 2021.

Stressed Vegetation

No areas of stressed vegetation were observed on June 16, 2021 within the Site.

Solid Waste

No solid waste was observed during the Site visit on June 16, 2021.

Wastewater

During the June 16, 2021 field visit, no wastewater or stormwater was observed within the Site.

Wells

One oil and gas well, 19-4N ROCKY MOUNTAIN FUEL, was located within the Site. This well is owned by KMOG and is currently listed as shut in.

5. Non-Scope Considerations

The following sections briefly discuss investigative areas that are not included in the standard ASTM Practice E 1527-13 scope. These items are presented as anecdotal information.

Radon

Radon testing was not conducted as part of this Phase I ESA.

Lead-in-Drinking Water

Drinking water at the Site was not tested for lead as part of the Phase I ESA.

Wetlands

A wetland delineation was performed on July 7, 2020 and determined that no wetlands are present within the Site. An uncultivated ephemeral drainage intersects the western edge of the Site (**Appendix G: Site Photo-graphs**). This drainage appears to convey surface water to an unnamed ditch west of the Site. The nearest wetland is 124 feet west of the Site.

Endangered Species Act

An Information for Planning and Consultation (IPaC) test for threatened and endangered (T&E) species from the United States Fish and Wildlife Service (USFWS) was run for the Site on June 10, 2021. Based on the results, the following T&E birds, fishes, and flowering plants were identified as potentially occurring in or near the Site:

- Preble's Meadow Jumping Mouse, *Zapus hudsonius preblei* (Threatened)
- Eastern Black Rail, *Laterallus jamaicensis ssp. Jamaicensis* (Threatened)
- Piping plover, *Charadrius melodus* (Threatened)
- Whooping Crane, *Grus americana* (Endangered)
- Pallid Sturgeon, *Scaphirhynchus albus* (Endangered)
- Ute Ladies'-tresses, *Spiranthes diluvialis* (Threatened)

- Western Prairie Fringed Orchid, *Platanthera* praeclara (Threatened)

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures. An IPaC test for migratory bird species from USFWS Birds of Conservation Concern list was review for the Site on June 10, 2021. Based on the results, the following migratory birds were identified as potentially occurring in or near the Site:

- Bald Eagle, *Haliaeetus leucocephalus*
- Burrowing Owl, *Athene cunicularia*
- Cassin's Sparrow, *Aimophila cassinii*
- Golden Eagle, *Aquila chrysaetos*
- Lark Bunting, *Calamospiza melanocorys*
- Lesser Yellowlegs, *Tringa avipes*
- Long-billed Curlew, *Numenius americanus*
- Mccown's Longspur, *Calcarius mccownii*
- Semipalmated Sandpiper, *Calidris pusilla*
- Willet, *Tringa semipalmata*

6. Interviews

Tom Crouch, Senior Landman for KMOG, completed a questionnaire regarding the history and current conditions of the Site in July 2020 and June 2021. The questions are below with Tom's answers from June 14, 2021 in **bold**.

To the best of your knowledge…

1. Have any current or past environmental permits been obtained? (solid waste, disposal permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits)…
    a. **Not to my knowledge.**
2. Are there any underground or above ground storage tanks on the property? If yes, what are their contents?
    a. **There is an oil and gas facility located on the property.**
3. Are you aware of any environmental investigations or problems on the property or on adjacent properties?
    a. **I am unaware of any environmental investigations or problems related to the property or adjacent properties.**
4. Have any past or current environmental violations relating to environmental laws occurred?
    a. **Not to my knowledge.**
5. Are there any underground injection systems on the property?

a. **I am unaware of any underground injection systems on the property**.

6. Were there any unreported spills?
    a. **I am unaware of any unreported spills. Might need to check with operations if there are any spills associated with the Oil & Gas wells and facilities.**
7. Are there any environmental liens on the property?
    a. **Not to my knowledge**
8. Is there any environmental waste on the property?
    a. **Not to my knowledge**
9. What has the property previously been used for? (back to what year are you aware of the property use)
    a. **Not sure**
10. What is the property presently used for?
    a. **The parcel is currently being used for agriculture. The parcel is being farmed by a tenant farmer.**
11. Are there any aboveground or underground storage tanks on the site such as gasoline tanks, diesel tanks?
    a. **Not that I am aware of.**
12. Are there any hazardous materials stored on the property such as drums, fuel, chemicals, pesticides, etc?
    a. **Not That I am aware of.**
13. Are there any oil or gas lines, wells, or pumps on the property?
    a. **The parcel does have active wells and facility located on the property.**
14. What are the adjacent properties used for?
    a. **Golf Course, Residential and Commercial.**
15. Has there ever been a fuel spill, fire, or emergency response at the property?
    a. **Not to my knowledge.**
16. Are there active water wells on the property? Have any of the wells ever been contaminated?
    a. **Not sure and not to my knowledge.**

7. Data Gap Analysis

The ASTM E 1527-13 standards require a listing of "data gaps," including data failure encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-13, Section 12.7, Data Gaps, requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this Site, the following items may constitute a data gap as defined by ASTM E 1527-13:

- Absence of aerial photography prior to 1937
- Absence of Sanborn Fire Insurance Maps
- Absence of Tax Map coverage
- Absence of previous landowner(s) interviews

These data gaps do not appear to be significant because the presence of other supporting historical information along with the lack of development in the area, both past and present, provided enough information to determine the historical usage of the Site.

8. Findings, Opinions, and Conclusions

2DOT has conducted a Phase I ESA of the McGavin proposed oil and gas multi-well pad and production facility and access road located in the Town of Firestone, CO. The updated Phase I ESA was performed in accordance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described previously in this report. Included in this updated Phase I ESA are summaries of site reconnaissance conducted on July 8, 2020 and June 16, 2021, the review of the environmental database search report (**Appendix B: Environmental Records Review**), historical data sources (**Appendix D, E, & F**) and other records.

8.1 Findings and Opinions

2DOT has developed the following findings and opinions:

- The Site is comprised of predominately agricultural land that contains oil and gas production equipment. Adjacent properties support agriculture, recreation, oil and gas operations, and residential properties.
- It should be noted that pesticides, herbicides, and fertilizers may have been used on the Site during active agricultural periods. Because they were likely applied in accordance with their intended purpose, these are not considered RECs. However, KMOG should be aware there are likely residual concentrations of pesticides, herbicides, and fertilizers that remain in the soils.

8.2 Conclusions

Based upon the Findings and Opinions, 2DOT concludes that no RECs have been identified in connection with the Site.

The following statement is required by ASTM E 1527-13 as a declaration of whether RECs were found:

> *2DOT has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of the Site (McGavin, Firestone, Colorado). Any exceptions to, or deletions from, this practice are described in previous sections of this report. This assessment has revealed zero RECs, zero HRECs, zero CRECs, zero de minimis conditions, and zero BERs in connection with the Site based on the site reconnaissance on June 16, 2021.*

2DOT recommends that KMOG consider the "shelf life" of Phase I documents in determining risk. ASTM Practice E 1527-13, Section 4.6, Continued Viability of Environmental Site Assessment, states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to 1-year timeframe. The report is valid for use in any of the CERCLA defenses ONLY if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM Practice E 1527-13 and the "All Appropriate Inquiries" protection described in 40 Code of Federal Regulations (CFR) 312 Subpart C.

9. Qualifications of Environmental Professionals

2DOT has performed an updated Phase I ESA for the McGavin Oil and Gas Facility located in the Town of Firestone, Colorado. We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in § 312.10 of 40 CFR § 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the "all appropriate inquiries" in conformance with standards and practices set forth in 40 CFR Part 312.

The scope of the ESA was consistent with practices and procedures set forth in ASTM Practice E 1527-13.

This Phase I ESA was performed by the following 2DOT personnel:



Qualified Environmental Professional, Sam Joseph

Site Reconnaissance, Project Manager

Bachelor of Science Degree in Wildlife & Fisheries Biology & Management Conservation Biology, a Bachelor of Science Degree Environment and Natural Resources, and a minor in Zoology. Mr. Joseph has worked in the environmental field over 5 years. Mr. Joseph has the following registrations and certifications relevant to the environmental field: OSHA 10-Hour Construction Program, OSHA 40-Hour HAZWOPER, OSHA H2S Safety, Wetland Training Institute Wetland Delineation Training, Boulder County Open Spaces T&E Species Identification, SafeLand USA Training.



Qualified Environmental Professional, Kathleen Madigan

Quality Assurance/ Quality Control

Ms. Kathleen Madigan, a qualified environmental professional, as defined by ASTM Practice E 1527 13, earned a Bachelor of Science Degree in Bioresource and Agricultural Engineering with a minor in Spatial Information Management Systems. Ms. Madigan has worked in the environmental field for more than 18 years as a project manager and field technician working on a variety of projects. Ms. Madigan has the following registrations and certifications relevant to the environmental field: SafeLand USA Training, Erosion Control Supervisor Certificate CDOT, and 40-Hour OSHA Hazwoper Training. Additionally, Ms. Madigan has taken online courses for ASTM E1527 Standard Practice for Environmental Site Assessments.

10. References

American Society for Testing and Materials (ASTM) Practice E 1527-13, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

GeoSearch, 2021a. Fire Insurance Map Abstract. McGavin, Longmont, Weld County, CO 80504. June 10, 2021.

GeoSearch, 2021b. GeoPlus Oil & Gas Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021c. GeoPlus Water Well Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021d. Historical Aerial Photographs. McGavin, Longmont, Weld County, CO 80504. June 11, 2021.

GeoSearch, 2021e. Historical Topographic Maps. McGavin, Longmont, Weld County, CO 80504. June 10, 2021.

GeoSearch, 2021f. Radius Report. McGavin, Longmont, Weld County, CO 80504. June 8, 2021.

GeoSearch, 2021g. City Directory. Longmont, Weld County, CO 80504. June 10, 2021.

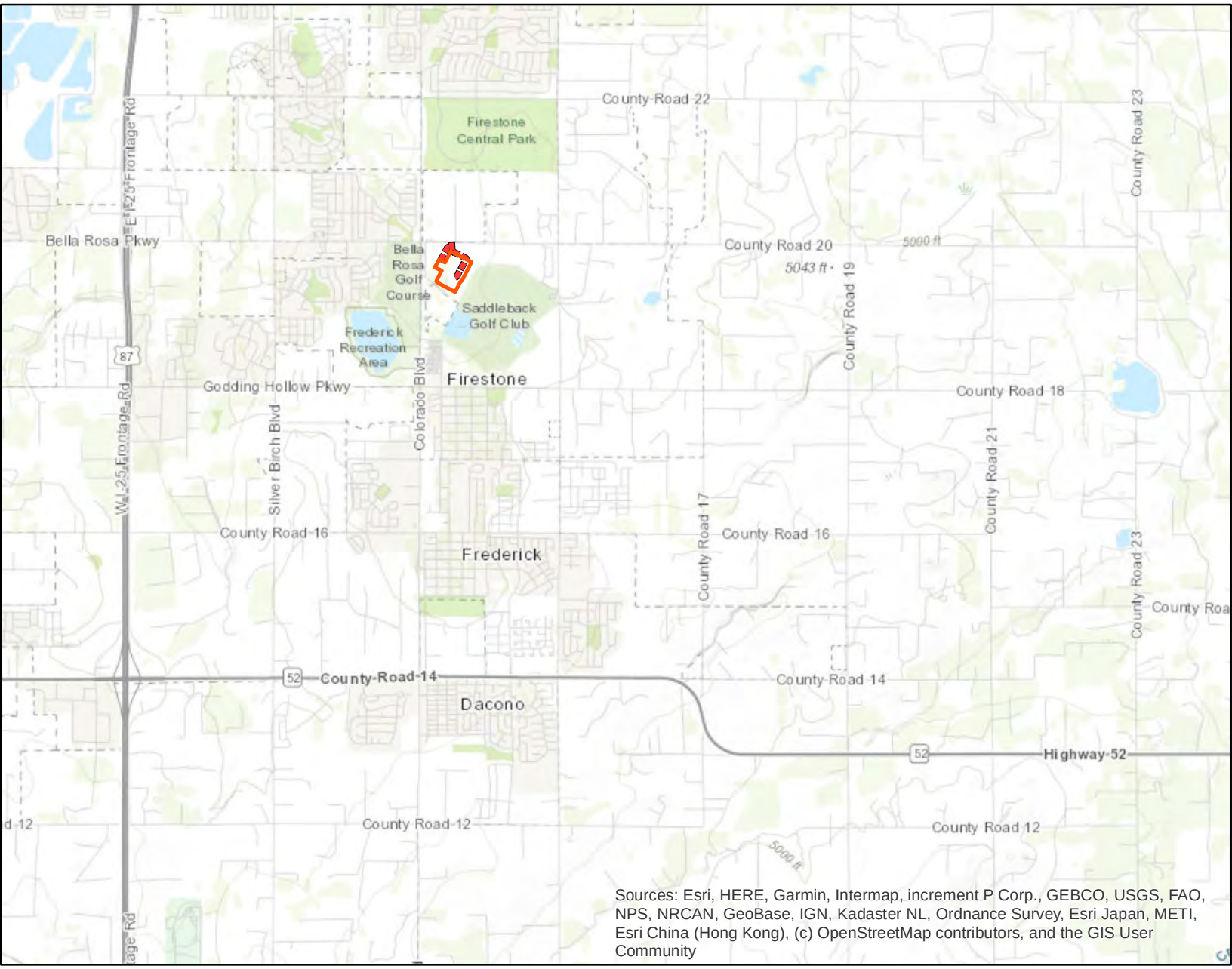
Google Earth, 2021. Aerial Imagery. 40.128504, -104.937976. Imagery date 9/29/2020.

Tweto, Ogden, 1979. Geologic Map of Colorado: U.S. Geological Survey Special Geologic Map, scale 1:500,000.

Appendix A: Figures

McGavin Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

2 two dot

PREPARED FOR:

KerrMcGee

Figure 1: Vicinity Map

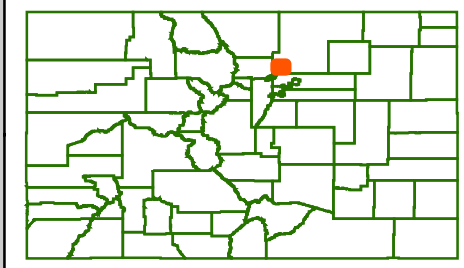
0 0.5 1 Miles

Project

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

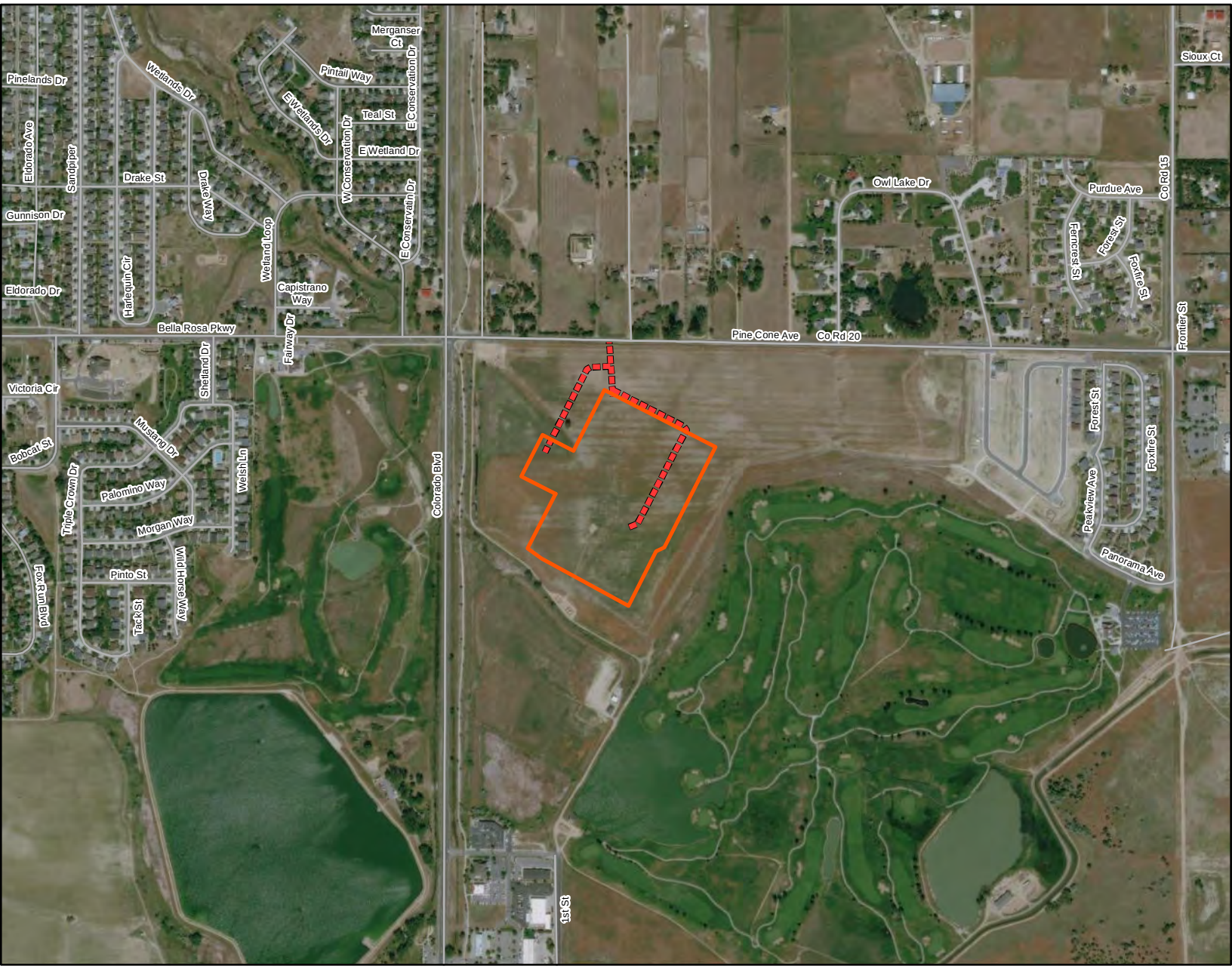
N



Weld County, Colorado

McGavin Multi-Well Pad and Production Facility

Town of Firestone, Colorado



PREPARED BY:

2 two dot

PREPARED FOR:

KerrMcGee

Figure 2: Site Location

0 500 1,000 Feet

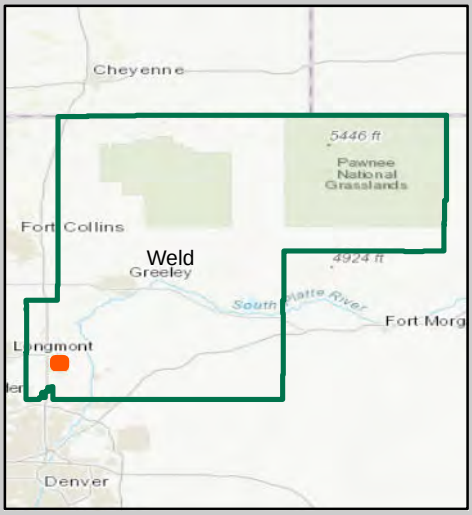
Weld County

Project

Access Road

Date: 6/15/2021 Drafted By: MC
Reviewed By: SJ
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Sources: Project Features from Kerr-McGee & 2DOT

N



Weld County, Colorado

Appendix B: Environmental Records Review

GeoSearch
On time. On target. In touch.™

Radius Report

GeoLens by GeoSearch

Target Property:

McGavin

Longmont, Weld County, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401

Job #: 412768

Project #: 603-129

Date: 06/08/2021

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Unlocatable Report . . . . . See Attachment

Zip Report . . . . . See Attachment

Disclaimer

This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquiries Rule (40 CFR ï¿½312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal,state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR ï¿½312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.

The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers And independent contractors cannot be held liable For actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

Target Property Summary

Target Property Information

McGavin
Longmont, Colorado 80504

Coordinates
Area centroid (-104.93778, 40.1284142)
4,927 feet above sea level

USGS Quadrangle
Gowanda, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504
Frederick CO: 80530

Database Summary

FEDERAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSCO	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	TP/AP
RCRA SITES WITH CONTROLS	RCRASC	0	0	TP/AP
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR	RCRAGR08	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR	RCRANGR08	0	0	0.1250
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - NON-CORRACTS TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM	SEMS	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM ARCHIVED SITE INVENTORY	SEMSARCH	0	0	0.5000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	1	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - SUBJECT TO CORRECTIVE ACTION FACILITIES	RCRASUBC	0	0	1.0000

SUB-TOTAL		1	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	1	0	TP/AP
BIENNIAL REPORTING SYSTEM	BRS	0	0	TP/AP
CERCLIS LIENS	SFLIENS	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	TP/AP
EPA DOCKET DATA	DOCKETS	0	0	TP/AP
ENFORCEMENT AND COMPLIANCE HISTORY INFORMATION	ECHOR08	0	0	TP/AP
FACILITY REGISTRY SYSTEM	FRSCO	1	0	TP/AP

Database Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR08	0	0	TP/AP
HAZARDOUS WASTE COMPLIANCE DOCKET FACILITIES	HWCD	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	0	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR08	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	PCSR08	0	0	TP/AP
SEMS LIEN ON PROPERTY	SEMSLIENS	0	0	TP/AP
SSEHRI PFAS CONTAMINATION SITES	SSEHRIPFAS	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	TP/AP
TOXICS RELEASE INVENTORY	TRI	0	0	TP/AP
ALTERNATIVE FUELING STATIONS	ALTFUELS	0	0	0.2500
FEMA OWNED STORAGE TANKS	FEMAUST	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
INTEGRATED COMPLIANCE INFORMATION SYSTEM DRYCLEANERS	ICISCLEANERS	0	0	0.2500
MINE SAFETY AND HEALTH ADMINISTRATION MASTER INDEX FILE	MSHA	0	0	0.2500
MINERAL RESOURCE DATA SYSTEM	MRDS	1	0	0.2500
OPEN DUMP INVENTORY	ODI	0	0	0.5000
SURFACE MINING CONTROL AND RECLAMATION ACT SITES	SMCRA	0	0	0.5000
URANIUM MILL TAILINGS RADIATION CONTROL ACT SITES	USUMTRCA	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMER MILITARY NIKE MISSILE SITES	NMS	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	FUSRAP	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000

SUB-TOTAL		3	0	

Database Summary

STATE (CO) LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ENVIRONMENTAL REAL COVENANTS LIST	COVENANTS	0	0	TP/AP
HAZARDOUS WASTE SITES- GENERATOR	HWSG	0	0	0.1250
ABOVEGROUND STORAGE TANK FACILITIES	AST	0	0	0.2500
UNDERGROUND STORAGE TANK FACILITIES	UST	0	0	0.2500
COLORADO BROWNFIELD SITES	BF	0	0	0.5000
HISTORICAL SOLID WASTE LANDFILLS	HISTSWLF	0	0	0.5000
LEAKING STORAGE TANK FACILITIES	LST	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS TRUST FUND SITES	LUSTTRUST	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	0	0.5000
VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM SITES	VCRA	0	0	0.5000
HAZARDOUS WASTE SITES- CORRECTIVE ACTION	HWSCA	0	0	1.0000
SUPERFUND SITES	SF	0	0	1.0000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ASBESTOS ABATEMENT AND DEMOLITION PROJECTS	ASBESTOS	0	0	TP/AP
COLORADO DISCHARGE PERMIT SYSTEM FACILITIES	CDPS	0	0	TP/AP
SPILLS LISTING	SPILLS	0	0	TP/AP
DRY CLEANING FACILITIES	CLEANERS	0	0	0.2500
AIR POLLUTION CONTROL DIVISION PERMITTED FACILITIES	APCDP	8	0	0.5000
HAZARDOUS WASTE SITES- TREATMENT, STORAGE & DISPOSAL	HWSTSD	0	0	0.5000
METHANE GAS STUDY SITES	METHANESITES	0	0	0.5000
REGISTERED RECYCLING FACILITIES	RECYCLERS	0	0	0.5000
URANIUM MILL TAILINGS SITES	UMTS	0	0	0.5000
SUB-TOTAL		8	0	

Database Summary

LOCAL LISTING

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
WELD COUNTY SOLID WASTE FACILITIES	WCSWF	0	0	0.5000
SUB-TOTAL		0	0	

TRIBAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR08	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR08	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		12	0	

Database Radius Summary

FEDERAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200	1	NS	NS	NS	NS	NS	1
BRS	0.0200	0	NS	NS	NS	NS	NS	0
CDL	0.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	0.0200	0	NS	NS	NS	NS	NS	0
EC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
ECHOR08	0.0200	0	NS	NS	NS	NS	NS	0
ERNSCO	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
FRSCO	0.0200	1	NS	NS	NS	NS	NS	1
HMIRSR08	0.0200	0	NS	NS	NS	NS	NS	0
HWCD	0.0200	0	NS	NS	NS	NS	NS	0
ICIS	0.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	0.0200	0	NS	NS	NS	NS	NS	0
LUCIS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
MLTS	0.0200	0	NS	NS	NS	NS	NS	0
NPDESR08	0.0200	0	NS	NS	NS	NS	NS	0
PADS	0.0200	0	NS	NS	NS	NS	NS	0
PCSR08	0.0200	0	NS	NS	NS	NS	NS	0
RCRASC	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SEMSLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SSEHRIPFAS	0.0200	0	NS	NS	NS	NS	NS	0
SSTS	0.0200	0	NS	NS	NS	NS	NS	0
TRI	0.0200	0	NS	NS	NS	NS	NS	0
TSCA	0.0200	0	NS	NS	NS	NS	NS	0
RCRAGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
RCRANGR08	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
ALTFUELS	0.2500	0	0	0	NS	NS	NS	0
FEMAUST	0.2500	0	0	0	NS	NS	NS	0
HISTPST	0.2500	0	0	0	NS	NS	NS	0
ICISCLEANERS	0.2500	0	0	0	NS	NS	NS	0
MRDS	0.2500	0	0	1	NS	NS	NS	1
MSHA	0.2500	0	0	0	NS	NS	NS	0
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
DNPL	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
NLRRCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**

Database Radius Summary

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ODI	0.5000	0	0	0	0	NS	NS	0
RCRAT	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMS	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SEMSARCH	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
SMCRA	0.5000	0	0	0	0	NS	NS	0
USUMTRCA	0.5000	0	0	0	0	NS	NS	0
DOD	1.0000	0	0	0	0	0	NS	0
FUDS	1.0000	0	0	0	0	0	NS	0
FUSRAP	1.0000	0	0	0	0	0	NS	0
NLRRCRAC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
NMS	1.0000	0	0	0	0	0	NS	0
NPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
PNPL	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RCRAC	**1.0000**	**0**	**0**	**0**	**0**	**1**	**NS**	**1**
RCRASUBC	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
RODS	1.0000	0	0	0	0	0	NS	0

SUB-TOTAL		2	0	1	0	1	0	4

Database Radius Summary

STATE (CO) LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ASBESTOS	0.0200	0	NS	NS	NS	NS	NS	0
CDPS	0.0200	0	NS	NS	NS	NS	NS	0
COVENANTS	**0.0200**	**0**	**NS**	**NS**	**NS**	**NS**	**NS**	**0**
SPILLS	0.0200	0	NS	NS	NS	NS	NS	0
HWSG	**0.1250**	**0**	**0**	**NS**	**NS**	**NS**	**NS**	**0**
AST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
CLEANERS	0.2500	0	0	0	NS	NS	NS	0
UST	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
APCDP	0.5000	1	0	2	5	NS	NS	8
BF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HISTSWLF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSTSD	0.5000	0	0	0	0	NS	NS	0
LST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
LUSTTRUST	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
METHANESITES	0.5000	0	0	0	0	NS	NS	0
RECYCLERS	0.5000	0	0	0	0	NS	NS	0
SWF	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
UMTS	0.5000	0	0	0	0	NS	NS	0
VCRA	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
HWSCA	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**
SF	**1.0000**	**0**	**0**	**0**	**0**	**0**	**NS**	**0**

SUB-TOTAL		1	0	2	5	0	0	8

Database Radius Summary

LOCAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
WCSWF	0.5000	0	0	0	0	NS	NS	0
SUB-TOTAL		0	0	0	0	0	0	0

Database Radius Summary

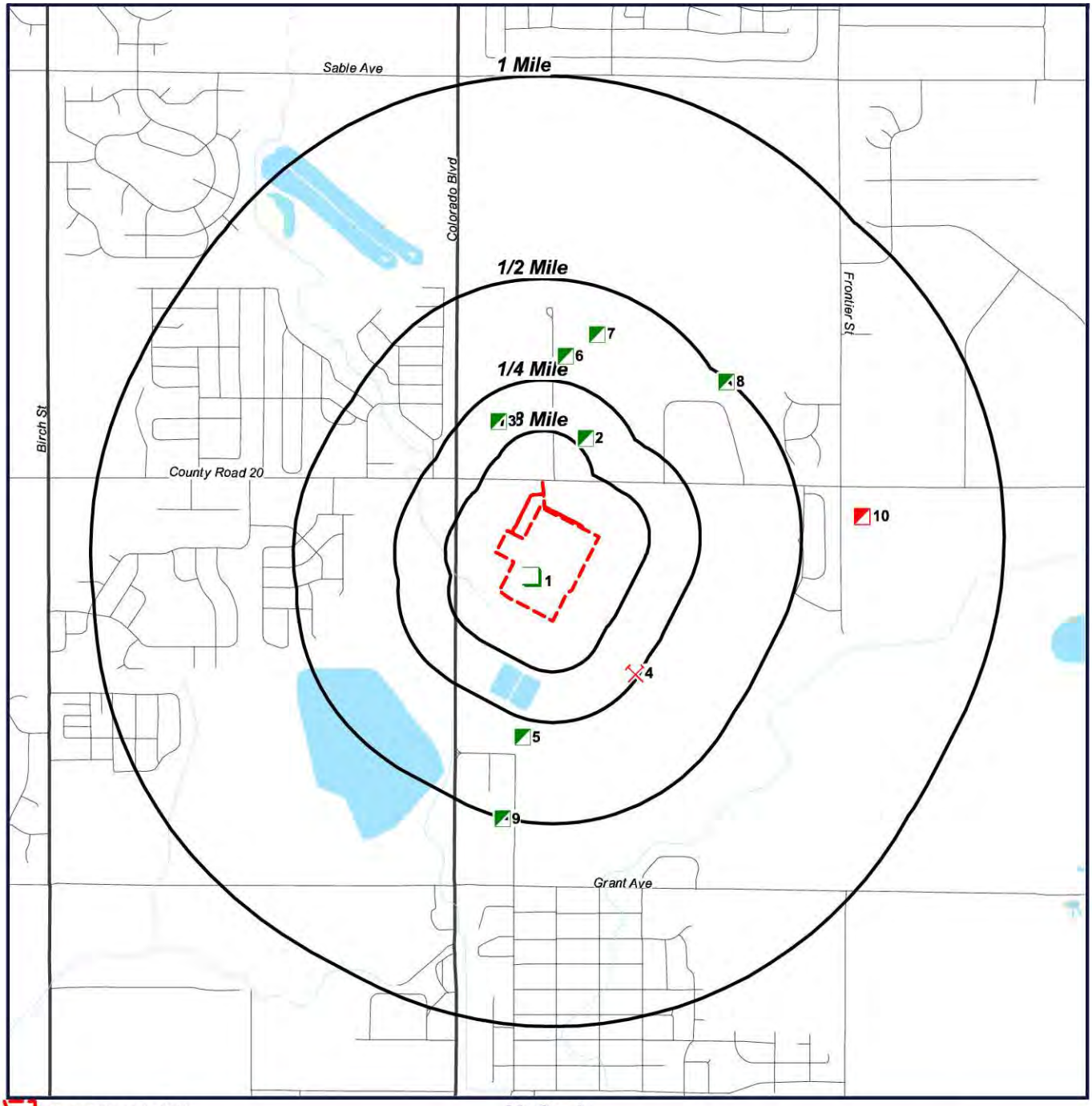
TRIBAL LISTING

*Standard environmental records are displayed in **bold**.*

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR08	**0.2500**	**0**	**0**	**0**	**NS**	**NS**	**NS**	**0**
LUSTR08	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
ODINDIAN	**0.5000**	**0**	**0**	**0**	**0**	**NS**	**NS**	**0**
INDIANRES	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	0	0	0	0	0	0
TOTAL		3	0	3	5	1	0	12

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

Radius Map 1



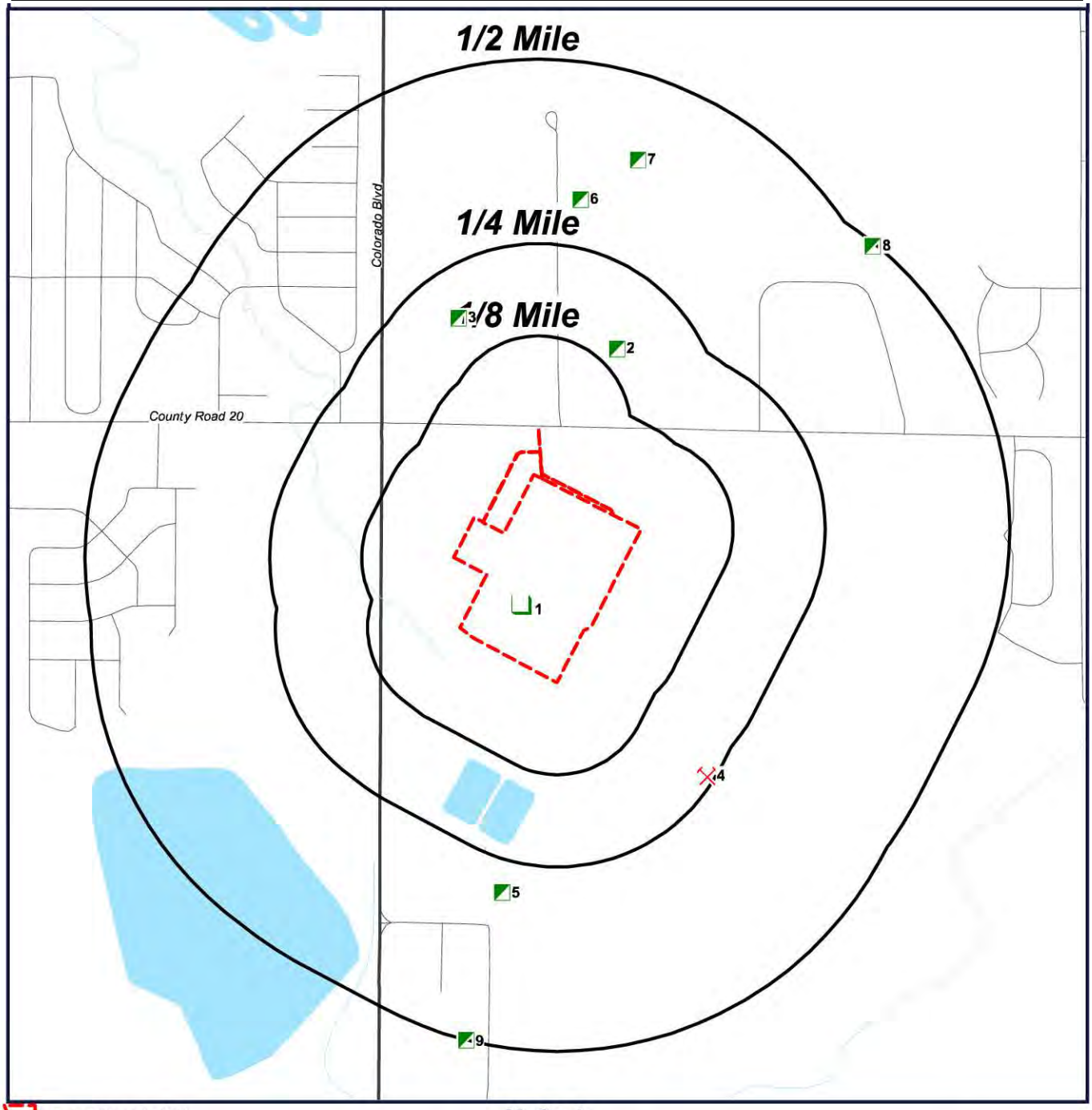
Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

McGavin
Longmont, Colorado
80504

N
W
E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Radius Map 2



Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

McGavin
Longmont, Colorado
80504

N
W E
S

0' 550' 1100' 1650'
SCALE: 1" = 1100'

Ortho Map



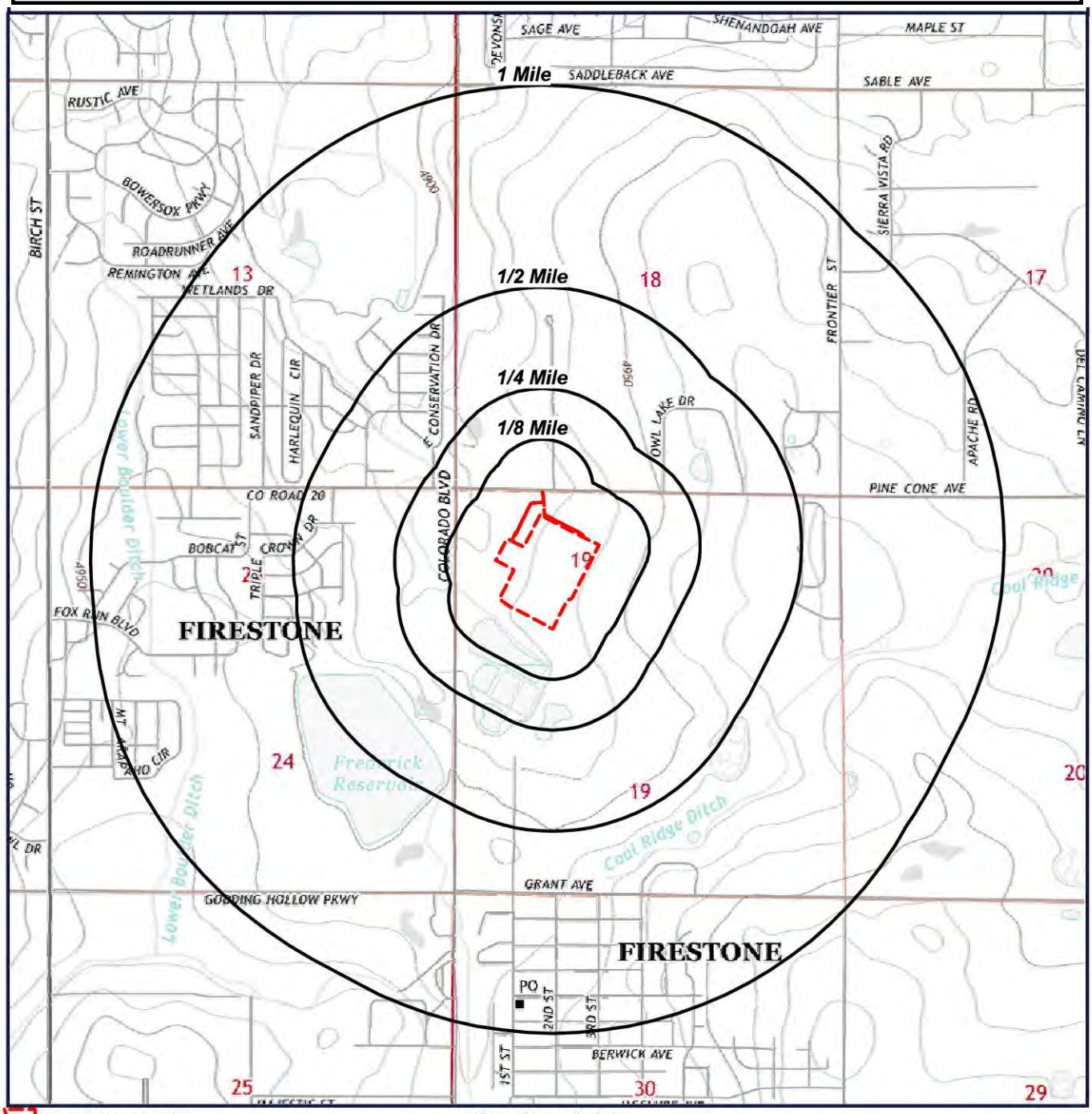
Target Property (TP)
FRSCO
APCDP
MRDS
RCRAC

Quadrangle(s):
Gowanda
McGavin
Longmont, Colorado
80504

N
W E
S

0' 550' 1100' 1650'
SCALE: 1" = 1100'

Topographic Map



Target Property (TP)

Quadrangle(s):
Gowanda
Source: USGS,
07/17/2013
McGavin
Longmont, Colorado
80504

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Located Sites Summary

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address	PAGE #
1	AIRSAFS	1022268	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	19
1	APCDP	123-1729	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504	23
1	FRSCO	110040916220	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	30
2	APCDP	123-2463	Higher (4,942 ft.)	0.153 mi. NE (808 ft.)	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504	31
3	APCDP	123-7754	Lower (4,920 ft.)	0.186 mi. NW (982 ft.)	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504	38
4	MRDS	10143018	Higher (4,942 ft.)	0.238 mi. ESE (1257 ft.)	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504	49
5	APCDP	123-5604	Higher (4,931 ft.)	0.292 mi. SSW (1542 ft.)	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520	50
6	APCDP	123-9421	Higher (4,937 ft.)	0.317 mi. NNE (1674 ft.)	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	61
7	APCDP	123-4030	Higher (4,937 ft.)	0.389 mi. NNE (2054 ft.)	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	69
8	APCDP	123-2363	Higher (4,967 ft.)	0.497 mi. NE (2624 ft.)	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504	74
9	APCDP	123-0594	Higher (4,949 ft.)	0.498 mi. SSW (2629 ft.)	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504	91
10	***RCRAC***	***COR000005207***	***Higher (4,977 ft.)***	***0.652 mi. E (3443 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***98***

Site Summary By Database

*NOTE: Standard environmental records are displayed in **bold**.*

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address
1	AIRSAFS	1022268	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504
1	APCDP	123-1729	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504
2	APCDP	123-2463	Higher (4,942 ft.)	0.153 mi. NE (808 ft.)	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504
3	APCDP	123-7754	Lower (4,920 ft.)	0.186 mi. NW (982 ft.)	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504
5	APCDP	123-5604	Higher (4,931 ft.)	0.292 mi. SSW (1542 ft.)	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520
6	APCDP	123-9421	Higher (4,937 ft.)	0.317 mi. NNE (1674 ft.)	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504
7	APCDP	123-4030	Higher (4,937 ft.)	0.389 mi. NNE (2054 ft.)	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504
8	APCDP	123-2363	Higher (4,967 ft.)	0.497 mi. NE (2624 ft.)	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504
9	APCDP	123-0594	Higher (4,949 ft.)	0.498 mi. SSW (2629 ft.)	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504
1	FRSCO	110040916220	Equal (4,927 ft.)	TP	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504
4	MRDS	10143018	Higher (4,942 ft.)	0.238 mi. ESE (1257 ft.)	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504
10	***RCRAC***	***COR000005207***	***Higher (4,977 ft.)***	***0.652 mi. E (3443 ft.)***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***

Elevation Summary

Elevations are collected from the USGS 3D Elevation Program 1/3 arc-second (approximately 10 meters) layer hosted at the NGTOC. .

Target Property Elevation: 4927 ft.

*NOTE: Standard environmental records are displayed in **bold**.*

EQUAL/HIGHER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
1	AIRSAFS	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	19
1	APCDP	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NW NW SEC 19 T2N R67W, FIRESTONE, CO 80504	23
1	FRSCO	4,927 ft.	NOBLE ENERGY INC. BATTERY #10086600	NWNW4 SEC19 T2N R67W, FIRESTONE, CO 80504	30
2	APCDP	4,942 ft.	KERR-MCGEE O&G ONSHORE - KUGEL	SE SW SEC 18 T2N R67W, FIRESTONE AREA, CO 80504	31
4	MRDS	4,942 ft.	ST VRAIN	WELD COUNTY, LONGMONT, CO 80504	49
5	APCDP	4,931 ft.	KERR-MCGEE 62406	NESW-19-2N-67W, FIRESTONE, CO 80520	50
6	APCDP	4,937 ft.	KERR-MCGEE OIL & GAS ONSHORE LP - 62137	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	61
7	APCDP	4,937 ft.	KERR-MCGEE 60174	NESW-18-2N-67W, FIRESTONE AREA, CO 80504	69
8	APCDP	4,967 ft.	KERR-MCGEE OIL & GAS - 34003763	NWSE-18-2N-67W, FIRESTONE, CO 80504	74
9	APCDP	4,949 ft.	SAFEWAY INC. # 4614	8134 COUNTY ROAD 13, FIRESTONE, CO 80504	91
10	***RCRAC***	***4,977 ft.***	***ARC COLORADO INC***	***7040 WCR 20, LONGMONT, CO 80504***	***98***

LOWER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
3	APCDP	4,920 ft.	KERR-MCGEE 60172	SWSW-18-2N-67W, FIRESTONE AREA, CO 80504	38

Aerometric Information Retrieval System / Air Facility Subsystem (AIRSAFS)

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

SITE INFORMATION

UNIQUE ID: **1022268**
PLANT ID: **1022268**
NAME: **NOBLE ENERGY INC. BATTERY #10086600**
ADDRESS: **NWNW4 SEC19 T2N R67W**
FIRESTONE, CO 80504
CLASSIFICATION: **POTENTIAL UNCONTROLLED EMISSIONS <100 TONS/YEAR**
OPERATION STATUS: **TEMPORARILY CLOSED**
STATE COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
FACILITY TYPE: **PRIVATELY OWNED/OPERATED**
CURRENT HIGH PRIORITY VIOLATOR: **NOT REPORTED**
SIC DESCRIPTION: **ESTABLISHMENTS PRIMARILY ENGAGED IN PRODUCING LIQUID HYDROCARBONS FROM OIL AND GAS FIELD GASES.**

ENFORCEMENT ACTIONS

NO ENFORCEMENT ACTIONS REPORTED

AIR PROGRAM

AIR PROGRAM STATUS: **TEMPORARILY CLOSED**
EPA COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
POLLUTANT COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**
POLLUTANT: **VOLATILE ORGANIC COMPOUNDS**

HISTORICAL COMPLIANCE AIR PROGRAM LEVEL

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1403**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1302**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0801**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1004**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1003**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**

COMPLIANCE DATE (YYYQ): **1203**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0704**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1401**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1002**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1201**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1304**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0902**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1001**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1204**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0903**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0904**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0702**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1104**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1101**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1402**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1102**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1301**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1103**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1202**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0804**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0901**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0701**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0703**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **1303**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0803**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0802**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

AIR PROGRAM: **SIP SOURCE**
COMPLIANCE DATE (YYYQ): **0604**
HISTORICAL COMPLIANCE STATUS: **IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS**

Back to Report Summary

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

SITE INFORMATION

SITE ID: **123-1729**

FACILITY NAME: **NOBLE ENERGY INC. BATTERY #10086600**

ADDRESS: **NW NW SEC 19 T2N R67W**
FIRESTONE, CO 80504

PERMIT NAME: **NOBLE ENERGY INC. BATTERY #10086600**

FACILITY CLASSIFICATION: **P**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**

ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**

CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**

NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**

STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**

SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**

PLANT AIR PROGRAM: **OZONE, AREA N2081**

PROPERTY AREA: **NOT REPORTED**

COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**

STANDARD INDUSTRIAL DESCRIPTION:

OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **ROB GARREN**

CONTACT PHONE: **(303)228-4299**

SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANKS**

COMMENTS:

NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #:

OWNER NAME:

ADDRESS:

,

OWNER MAIL NAME:

OWNER MAIL PHONE:

SITE OWNER DESCRIPTION:

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2010**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00689**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.02839**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.10647**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.10647**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.48503**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.48503**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2010**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **3.93609**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **16.20710**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00185	**0.03710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.05867	**21.17336**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2010**
EMISSION DATA SUBMITTED YEAR: **2008**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2007**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2007**
EMISSION RELEASE POINT (STACK): **VRU EXHAUST**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
1578.00000	**26.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
10.00000	**1.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
3.93609	**16.20710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.48503	**0.48503**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10647	**0.10647**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00689	**0.02839**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.05867	**21.17336**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2007**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2007**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00185	**0.03710**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

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Facility Registry System (FRSCO)

MAP ID# 1

Distance from Property: 0.000 mi. (0 ft.) X
Elevation: 4,927 ft. (Equal to TP)

FACILITY INFORMATION

REGISTRY ID: **110040916220**

NAME: **NOBLE ENERGY INC. BATTERY #10086600**

LOCATION ADDRESS: **NWNW4 SEC19 T2N R67W**
FIRESTONE, CO 80504

COUNTY: **WELD**

EPA REGION: **08**

FEDERAL FACILITY:

TRIBAL LAND:

ALTERNATIVE NAME/S:

NOBLE ENERGY INC. BATTERY #10086600

PROGRAM/S LISTED FOR THIS FACILITY

EIS - EIS

STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

211112 - NATURAL GAS LIQUID EXTRACTION.

211112 - NATURAL GAS LIQUID EXTRACTION.

Back to Report Summary

MAP ID# 2

Distance from Property: 0.153 mi. (808 ft.) NE
Elevation: 4,942 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-2463**
FACILITY NAME: **KERR-MCGEE O&G ONSHORE - KUGEL**
ADDRESS: **SE SW SEC 18 T2N R67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE O&G ONSHORE - KUGEL**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00989**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.19782**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.64527**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **12.90540**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00989**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.19782**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.64527**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **12.90540**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00113	**0.02260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.54799	**10.95998**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2019**
EMISSION DATA SUBMITTED YEAR: **2011**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS NO CONTROL DEVICE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**30.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**

EMISSION DATA SUBMITTED YEAR: **2009**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00989	**0.19782**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.64527	**12.90540**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
0.00113	**0.02260**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.54799	**10.95998**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00000	**0.00000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Air Pollution Control Division Permitted Facilities (APCDP)

MAP ID# 3

Distance from Property: 0.186 mi. (982 ft.) NW
Elevation: 4,920 ft. (Lower than TP)

SITE INFORMATION

SITE ID: **123-7754**
FACILITY NAME: **KERR-MCGEE 60172**
ADDRESS: **SWSW-18-2N-67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE 60172**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **06/25/09**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.77311**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **5.96456**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.06542**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.06542**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00426 **0.03474** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.01937 **0.21000** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

2.43620 **19.83076** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2019**
EMISSION DATA SUBMITTED YEAR: **2016**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):
(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

9747.00000 **162.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

20.00000 **2.84000** **0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2019**

EMISSION DATA SUBMITTED YEAR: **2016**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2010**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **5916.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **98.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.00000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.22060	**4.41206**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.65451	**13.09036**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00114	**0.02294**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **110543 - HEXANE,N-**

EMISSION DATA SUBMITTED YEAR: **2010**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.01003 **0.20066** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2016**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.55250	**1.55250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.06542	**0.06542**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.34798	**6.95960**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02575	**0.02575**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.43620	**19.83076**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00426	**0.03474**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2010**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00934	**0.00934**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

UNIT COMMENT

TANK NAME: 34003007

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Mineral Resource Data System (MRDS)

MAP ID# 4

Distance from Property: 0.238 mi. (1,257 ft.) ESE
Elevation: 4,942 ft. (Higher than TP)

FACILITY INFORMATION

GEOSEARCH ID: **10143018**
DEP ID: **10143018**
MINE NAME: **ST VRAIN**
ADDRESS: **WELD COUNTY**
LONGMONT, CO 80504
DEVELOPMENT STATUS: **PRODUCER**
MINERAL RESOURCE DATA SYSTEM (MRDS): **CLICK HERE**

COMMODITY DETAILS

COMMODITY: **SAND AND GRAVEL, CONS**
COMMODITY TYPE: **NON-METALLIC**
COMMODITY GROUP: **SAND AND GRAVEL**
IMPORTANCE: **PRIMARY**

MATERIAL DETAILS

NO MATERIAL DETAILS REPORTED

NAME DETAILS

SITE NAME: **ST VRAIN**
STATUS: **CURRENT**

Back to Report Summary

MAP ID# 5

Distance from Property: 0.292 mi. (1,542 ft.) SSW
Elevation: 4,931 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-5604**
FACILITY NAME: **KERR-MCGEE 62406**
ADDRESS: **NESW-19-2N-67W**
FIRESTONE, CO 80520
PERMIT NAME: **KERR-MCGEE 62406**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **04/11/06**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.07224**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.26109	**8.56250**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00540 **0.10800** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.04725 **0.94500** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

3.08250 **61.65000** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.03174 **0.03174** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
18.11825	**18.11825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2018**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2011**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2008**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07224	**0.07224**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38428	**7.68570**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02843	**0.02843**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
3.08250	**61.65000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00540	**0.10800**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04725	**0.94500**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.87680	**0.87680**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2008**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
18.11825	**18.11825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2008**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03174	**0.03174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 6

Distance from Property: 0.317 mi. (1,674 ft.) NNE
Elevation: 4,937 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-9421**

FACILITY NAME: **KERR-MCGEE OIL & GAS ONSHORE LP - 62137**

ADDRESS: **NESW-18-2N-67W**
FIRESTONE AREA, CO 80504

PERMIT NAME: **KERR-MCGEE OIL & GAS ONSHORE LP - 62137**

FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**

ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**

CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**

NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**

STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**

SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**

PLANT AIR PROGRAM: **OZONE, AREA N2081**

PROPERTY AREA: **NOT REPORTED**

COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

DATE COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**

STANDARD INDUSTRIAL DESCRIPTION:

OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**

CONTACT PHONE: **(720)929-6916**

SITE DESCRIPTION:**OIL & GAS PRODUCTION FACILITY**

COMMENTS:

NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**

OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**

ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*

OWNER MAIL NAME: **CARISSA KREY**

OWNER MAIL PHONE: **(720)929-6916**

SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.24073**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.81474**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00205**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03598**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **CO - CARBON MONOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.17032	**20.54316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.17032	**20.54316**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2011**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2011**

EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00178	**0.03572**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.07545	**0.07545**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR):	(TONS PER YEAR):	(TONS PER YEAR):
1.01962	**20.39246**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.19168	**0.19168**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.24073	**4.81474**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2011**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: (TONS PER YEAR):	UNCONTROLLED ESTIMATED EMISSIONS: (TONS PER YEAR):	EMISSIONS LIMIT: (TONS PER YEAR):
0.00026	**0.00026**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2011**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.15070	**0.15070**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 7

Distance from Property: 0.389 mi. (2,054 ft.) NNE
Elevation: 4,937 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-4030**
FACILITY NAME: **KERR-MCGEE 60174**
ADDRESS: **NESW-18-2N-67W**
FIRESTONE AREA, CO 80504
PERMIT NAME: **KERR-MCGEE 60174**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **MICAH CARTER**
CONTACT PHONE: **(720)929-6788**
SITE DESCRIPTION:**E&P CONDENSATE STORAGE TANK BATTERY**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2012**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
1.67825	**1.67825**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2008**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2005**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
5.80880	**5.80880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2018**

EMISSION DATA SUBMITTED YEAR: **2013**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE:	STACK GAS FLOW RATE (NEI COMPATIBLE):
(CUBIC FEET PER MINUTE):	*(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**

EMISSION DATA SUBMITTED YEAR: **2012**

EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **0.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2008**
EMISSION DATA SUBMITTED YEAR: **2005**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS NO CONTROL DEVICE**
STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):* **9747.00000**
STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):* **162.00000**
STACK HEIGHT: **20.00000**
STACK DIAMETER: **2.84000**
PLUME HEIGHT: **30.00000**
STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.57550**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2012**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.67825**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **1.67825**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2005**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
5.80880	**5.80880**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 8

Distance from Property: 0.497 mi. (2,624 ft.) NE
Elevation: 4,967 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-2363**
FACILITY NAME: **KERR-MCGEE OIL & GAS - 34003763**
ADDRESS: **NWSE-18-2N-67W**
FIRESTONE, CO 80504
PERMIT NAME: **KERR-MCGEE OIL & GAS - 34003763**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **B** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **BLANK** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM: **OZONE, AREA N2081**
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
OIL AND GAS EXTRACTION - NATURAL GAS LIQUIDS

SITE CONTACT INFORMATION

CONTACT NAME: **CARISSA KREY**
CONTACT PHONE: **(720)929-6916**
SITE DESCRIPTION:**E&P SITE (FARNSWORTH 9-18A/O...)**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920104636**
OWNER NAME: **KERR-MCGEE OIL & GAS ONSHORE LP**
ADDRESS: **P.O. BOX 173779**
DENVER, 08 80217-3779*
OWNER MAIL NAME: **CARISSA KREY**
OWNER MAIL PHONE: **(720)929-6916**
SITE OWNER DESCRIPTION: **OGCC#47120 NATURAL GAS COMPRES**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.00672**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13440**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.08241**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.08241**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.38432**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **7.68640**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03244**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.03244**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2019**

POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.00672 **0.13440** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.03244 **0.03244** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.38432 **7.68640** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:
(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.10605 **0.10605** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**

EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2013**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.78329	**11.50116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.00455 **0.04800** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24539	**0.24539**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2011**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03985	**0.42000**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **NOX - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.09659	**0.09659**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2014**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
2.59992	**27.40001**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**
EMISSION DATA SUBMITTED YEAR: **2017**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS WITH FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2017**
EMISSION DATA SUBMITTED YEAR: **2013**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY COMBUSTOR**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK FLASH EMISSIONS**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
9747.00000	**162.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.84000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2014**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **FLASH EMISSIONS CONTROLLED BY FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2011**
EMISSION DATA SUBMITTED YEAR: **2009**
EMISSION RELEASE POINT (STACK): **CONDENSATE TANK/FLARE**

STACK GAS FLOW RATE: *(CUBIC FEET PER MINUTE):*	STACK GAS FLOW RATE (NEI COMPATIBLE): *(CUBIC FEET PER MINUTE):*
5916.00000	**98.00000**

STACK HEIGHT:	STACK DIAMETER:	PLUME HEIGHT:
20.00000	**2.00000**	**0.00000**

STACK TYPE DESCRIPTION:
A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00672	**0.13440**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.08241	**0.08241**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.38432	**7.68640**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2017**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.03244	**0.03244**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.10605	**0.10605**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.56409	**11.28196**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NOX - NITROGEN OXIDES**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.04174	**0.04174**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*

0.04174 **0.04174** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.30527	**26.10536**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **NO2 - NITROGEN DIOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.09659	**0.09659**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **CO - CARBON MONOXIDE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.24539	**0.24539**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00228	**0.04574**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.02000	**0.40016**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2013**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.21920	**0.21920**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
1.29465	**1.29465**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.00226	**0.00226**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**
POLLUTANT NAME: **110543 - HEXANE,N-**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.01984	**0.01984**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

MAP ID# 9

Distance from Property: 0.498 mi. (2,629 ft.) SSW
Elevation: 4,949 ft. (Higher than TP)

SITE INFORMATION

SITE ID: **123-0594**
FACILITY NAME: **SAFEWAY INC. # 4614**
ADDRESS: **8134 COUNTY ROAD 13**
FIRESTONE, CO 80504
PERMIT NAME: **SAFEWAY INC. # 4614**
FACILITY CLASSIFICATION: **0**

AIR PROGRAM

AIR PROGRAM CLASSIFICATION: 'A'=Major, 'B'=Minor, 'SM'=Synthetic Minor, 'ND'=No Major Source Threshold Defined, 'C'=Unknown, 'BLANK'= BLANK FIELD

AIR PROGRAM CLASS: **MINOR**
ACID PRECIPITATION: **BLANK** APEN EXEMPT: **BLANK** CFC TRACKING: **BLANK**
CONDENSATE STORAGE TANK: **BLANK** FESOP (NON-TITLE V): **BLANK** MACT (SEC. 63 NESHAPS): **BLANK**
NESHAP: **BLANK** NON FEDERALLY REPORTABLE SOURCE: **BLANK** FEDERAL NSPS: **BLANK**
STATE NSPS: **BLANK** NSR: **BLANK** PSD: **BLANK** SIP SOURCE UNDER FEDERAL JURISDICTION: **BLANK**
SIP SOURCE: **B** TITLE V PERMITS: **BLANK** NATIVE AMERICAN: **BLANK**
PLANT AIR PROGRAM:
PROPERTY AREA: **NOT REPORTED**
COMPLIANCE MONITORING SYSTEM: **NOT REPORTED**
DATE COMPLIANCE MONITORING SYSTEM: **01/27/04**
STANDARD INDUSTRIAL DESCRIPTION:
AUTOMOTIVE DEALERS AND GASOLINE SERVICE STATIONS - GASOLINE SERVICE STATION

SITE CONTACT INFORMATION

CONTACT NAME: **PAUL GOFF**
CONTACT PHONE: **(303)843-7740**
SITE DESCRIPTION:**UNDERGROUND GASOLINE STORAGE TANKS**
COMMENTS:
NOT REPORTED

OWNER INFORMATION

OWNER CUSTOMER #: **9920105401**
OWNER NAME: **SAFEWAY INC.**
ADDRESS: **PO BOX 29096**
PHOENIX, 04 85038
OWNER MAIL NAME: **JACQUI RUSH**
OWNER MAIL PHONE: **(623)869-3765**
SITE OWNER DESCRIPTION: **FOOD STORE AND FUEL DISPENSING**

SITE POLLUTANT INFORMATION

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S.: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2020**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **0.13970**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)* **0.00000**

EFFECTIVE YEAR OF INVENTORY: **2019**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):* **4.83116**
EMISSIONS LIMIT: *(TONS PER YEAR):* **0.00000**
ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2018**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS:	UNCONTROLLED ESTIMATED EMISSIONS:	EMISSIONS LIMIT:
(TONS PER YEAR):	*(TONS PER YEAR):*	*(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**

POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.13970	**0.13970**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2017**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2015**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **71432 - BENZENE**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **NO**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2016**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
17.23656	**17.23656**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:
(TONS PER YEAR)
0.00000

EFFECTIVE YEAR OF INVENTORY: **2015**
POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**
EMISSION DATA SUBMITTED YEAR: **2009**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**
POLLUTANT IS A CRITERIA POLLUTANT: **YES**
POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**
POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**
POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**
ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

17.23656 **17.23656** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

STACK

EFFECTIVE YEAR OF INVENTORY: **2020**

EMISSION DATA SUBMITTED YEAR: **2015**

EMISSION RELEASE POINT (STACK): **3 UNDERGROUND GASOLINE TANKS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):

(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

0.00000 **0.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

0.00000 **0.00000** **30.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

EFFECTIVE YEAR OF INVENTORY: **2016**

EMISSION DATA SUBMITTED YEAR: **2009**

EMISSION RELEASE POINT (STACK): **3 UNDERGROUND GASOLINE TANKS**

STACK GAS FLOW RATE: STACK GAS FLOW RATE (NEI COMPATIBLE):

(CUBIC FEET PER MINUTE): *(CUBIC FEET PER MINUTE):*

0.00000 **0.00000**

STACK HEIGHT: STACK DIAMETER: PLUME HEIGHT:

0.00000 **0.00000** **30.00000**

STACK TYPE DESCRIPTION:

A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL DIRECTION

STACK POLLUTANT

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: UNCONTROLLED ESTIMATED EMISSIONS: EMISSIONS LIMIT:

(TONS PER YEAR): *(TONS PER YEAR):* *(TONS PER YEAR):*

0.13970 **0.13970** **0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS:

(TONS PER YEAR)

0.00000

EFFECTIVE YEAR OF INVENTORY: **2020**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2015**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
4.83116	**4.83116**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **VOC - VOLATILE ORGANIC COMPOUNDS**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **YES**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **NO**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
17.23656	**17.23656**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

EFFECTIVE YEAR OF INVENTORY: **NOT REPORTED**

POLLUTANT NAME: **71432 - BENZENE**

EMISSION DATA SUBMITTED YEAR: **2009**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT UNDER COLORADO SECTION 25-7-109.3 C.R.S: **NO**

POLLUTANT IS A CRITERIA POLLUTANT: **NO**

POLLUTANT IS REPORTABLE AS EPCRA (SARA TITLE III) COMPOUND ONLY: **NO**

POLLUTANT IS A HAZARDOUS AIR POLLUTANT LISTED UNDER THE FEDERAL CAAA SECTION 112: **YES**

POLLUTANT IS A OZONE DEPLETING COMPOUND LISTED UNDER COLORADO AQCC REGULATION 15 SECTION II.11.: **NO**

ESTIMATED EMISSIONS: *(TONS PER YEAR):*	UNCONTROLLED ESTIMATED EMISSIONS: *(TONS PER YEAR):*	EMISSIONS LIMIT: *(TONS PER YEAR):*
0.14584	**0.14584**	**0.00000**

ESTIMATED EMISSIONS WITH RULE EFFECTIVENESS: *(TONS PER YEAR)*

0.00000

UNIT COMMENT

-NO COMMENTS REPORTED

Back to Report Summary

Resource Conservation & Recovery Act - Corrective Action Facilities (RCRAC)

MAP ID# 10

Distance from Property: 0.652 mi. (3,443 ft.) E
Elevation: 4,977 ft. (Higher than TP)

FACILITY INFORMATION

EPA ID#: **COR000005207**
NAME: **ARC COLORADO INC**
ADDRESS: **7040 WCR 20**
LONGMONT, CO 80504
CONTACT NAME: **REES JONES**
CONTACT ADDRESS: **7040 WCR 20**
LONGMONT CO 80504
CONTACT PHONE: **303-833-6130**
NON-NOTIFIER:
DATE RECEIVED BY AGENCY: **03/02/2020**

OWNER TYPE: **PRIVATE**
OWNER NAME: **ARC COLORADO INC**
OPERATOR TYPE: **PRIVATE**
OPERATOR NAME: **ARC COLORADO INC**

CERTIFICATION

CERTIFICATION NAME:	CERTIFICATION TITLE:	CERTIFICATION SIGNED DATE:
KEVIN SCHWINDT	**CONTROLLER**	**02/15/2010**
KEVIN SCHWINDT	**GENERAL MANAGER**	**02/06/2012**
DEREK H SHELTON	**EH&S MANAGER**	**02/17/2014**
DEREK SHELTON	**EH&S DIRECTOR**	**02/29/2016**
SHAWN COWLING	**SHAWN COWLING**	**03/01/2018**
REES JONES	**METALLURGIST**	**02/28/2020**
DEREK SHELTON	**MGR**	**09/20/2011**
DEREK SHELTON	**EH&S MGR**	**08/15/2012**
REES JONES	**METALLURGIST**	**03/02/2020**
NICOLLE DESANTIS	**ENV MGR**	**09/16/2003**
NICOLLE E DESANTIS	**EHS COORDINATOR**	**10/31/2003**
DOUGLAS BALL	**ENV MGR**	**08/03/2004**
DOUGLAS G BALL	**EH & S COORDINATOR**	**10/18/2004**
MARK ROSE	**PRESIDENT**	**02/27/2006**
MIM DUFFY	**HR/SAFETY MGR**	**02/07/2007**
MIM DUFFY	**HR/SAFETY MGR**	**02/28/2008**

INDUSTRY CLASSIFICATION (NAICS)

332117 - POWDER METALLURGY PART MANUFACTURING
332999 - ALL OTHER MISCELLANEOUS FABRICATED METAL PRODUCT MANUFACTURING
33911 - MEDICAL EQUIPMENT AND SUPPLIES MANUFACTURING
339999 - ALL OTHER MISCELLANEOUS MANUFACTURING

CURRENT ACTIVITY INFORMATION

GENERATOR STATUS: **LARGE QUANTITY GENERATOR** LAST UPDATED DATE: **03/02/2020**
SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**
TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: **NO**
TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**
NON TSDFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **YES**
CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**
IMPORTER: **NO**
UNDERGROUND INJECTION: **NO**
MIXED WASTE GENERATOR: **NOT REPORTED**
UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**
TRANSFER FACILITY: **NO**
TRANSPORTER: **NO**
USED OIL FUEL BURNER: **NO**
ONSITE BURNER EXEMPTION: **NO**
USED OIL PROCESSOR: **NO**
FURNACE EXEMPTION: **NO**
USED OIL FUEL MARKETER TO BURNER: **NO**
USED OIL REFINER: **NO**
SPECIFICATION USED OIL MARKETER: **NO**
USED OIL TRANSFER FACILITY: **NO**
USED OIL TRANSPORTER: **NO**

COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION

EVALUATIONS

01/10/2006	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
01/29/2018	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
02/01/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/03/2004	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
02/11/2014	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
03/05/2012	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/05/2012	**SNN**	**NOT A SIGNIFICANT NON-COMPLIER**
03/06/2014	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
03/09/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
08/17/2017	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
10/28/2010	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
11/30/2010	**FCI**	**FOCUSED COMPLIANCE INSPECTION**
12/02/1999	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**CEI**	**COMPLIANCE EVALUATION INSPECTION ON-SITE**
12/15/2011	**SNY**	**SIGNIFICANT NON-COMPLIER**

VIOLATIONS

02/01/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
02/11/2014	**262.C**	**GENERATORS - PRE-TRANSPORT**
10/28/2010	**262.A**	**GENERATORS - GENERAL**
10/28/2010	**262.C**	**GENERATORS - PRE-TRANSPORT**
12/15/2011	**262.C**	**GENERATORS - PRE-TRANSPORT**

ENFORCEMENTS

02/01/2010	**175**	**COMPLIANCE ADVISORY**
02/11/2014	**175**	**COMPLIANCE ADVISORY**
03/08/2012	**310**	**FINAL 3008(A) COMPLIANCE ORDER**
10/28/2010	**175**	**COMPLIANCE ADVISORY**
12/15/2011	**175**	**COMPLIANCE ADVISORY**

HAZARDOUS WASTE

D001	**IGNITABLE WASTE**
D002	**CORROSIVE WASTE**
D003	**REACTIVE WASTE**
D006	**CADMIUM**
D007	**CHROMIUM**
D008	**LEAD**
D010	**SELENIUM**

D039	**TETRACHLOROETHYLENE**
D040	**TRICHLORETHYLENE**
F001	**THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE,TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE ANDCHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
F002	**THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE,TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE,CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001,F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.**
U228	**ETHENE, TRICHLORO-**
U228	**TRICHLOROETHYLENE**

UNIVERSAL WASTE

WASTE TYPE:	ACCUMULATED WASTE ON-SITE:	GENERATED WASTE ON-SITE:	SOURCE TYPE:
BATTERIES	**YES**		**NOTIFICATION**
OTHER	**YES**	**YES**	**NOTIFICATION**
LAMPS	**YES**		**NOTIFICATION**
PESTICIDES	**YES**		**NOTIFICATION**
MERCURY CONTAINING EQUIPMENT	**YES**		**NOTIFICATION**
A	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**
LAMPS	**YES**	**YES**	**ANNUAL/BIENNIAL REPORT**

CORRECTIVE ACTION AREA (RELEASE)

AREA NAME:	AIR:	GROUNDWATER:	SOIL:	SURFACE WASTE:
ENTIRE FACILITY		**Y**	**Y**	

CORRECTIVE ACTION EVENT

CA EVENT CODE: **CA375**
EVENT DESCRIPTION: **INTERIM DECISION FOR NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA400**
EVENT DESCRIPTION: **REMEDY DECISION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA550NR**
EVENT DESCRIPTION: **REMEDY CONSTRUCTION-NO REMEDY CONSTRUCTED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA900NC**
EVENT DESCRIPTION: **CA PERFORMANCE STANDARDS ATTAINED - NO CONTROLS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA999NF**
EVENT DESCRIPTION: **CA PROCESS IS TERMINATED-NO FURTHER ACTION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/29/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA190**
EVENT DESCRIPTION: **INVESTIGATION REPORT RECEIVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA370**
EVENT DESCRIPTION: **PETITION FOR NO FUR. ACTION RECEIPT DATE**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **01/17/2018**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA070YE**

EVENT DESCRIPTION: **DETERMINATION OF NEED FOR AN INVESTIGATION-INVESTIGATION IS NECESSARY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA075LO**
EVENT DESCRIPTION: **CA PRIORITIZATION-LOW CA PRIORITY**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA100**
EVENT DESCRIPTION: **INVESTIGATION IMPOSITION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA150**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN APPROVED**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/19/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA060**
EVENT DESCRIPTION: **NOTICE OF CONTAMINATION**
EVENT SEQUENCE NUMBER: **1**
EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

CA EVENT CODE: **CA110**
EVENT DESCRIPTION: **INVESTIGATION WORKPLAN RECEIVED**
EVENT SEQUENCE NUMBER: **1**

EVENT RESPONSIBLE AGENCY: **STATE**
ACTUAL DATE OF EVENT: **04/12/2017**
ORIGINAL SCHEDULE DATE OF EVENT:
NEW SCHEDULE DATE OF EVENT:

Back to Report Summary

Unlocated Sites Summary

This list contains sites that could not be mapped due to limited or incomplete address information.

No Records Found

Environmental Records Definitions - FEDERAL

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance. Enforcement and Compliance History Online (ECHO) Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014, the EPA retired this system for Clean Air Act stationary sources.

ALTFUELS Alternative Fueling Stations

VERSION DATE: 10/28/20

Nationwide list of alternative fueling stations made available by the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Bio-diesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE).

BF Brownfields Management System

VERSION DATE: 01/11/21

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment. This database includes tribal brownfield sites.

BRS Biennial Reporting System

VERSION DATE: 12/31/17

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 06/17/20

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

DNPL Delisted National Priorities List

VERSION DATE: 04/26/21

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

DOCKETS EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

DOD Department of Defense Sites

VERSION DATE: 12/01/14

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 04/27/21

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. The data displays remedy component information for Superfund decision documents issued in fiscal years 1982-2017, and it includes final and deleted NPL sites as well as sites with a Superfund Alternative Approach (SAA) agreement in place. The only sites included that are not on the NPL, proposed for NPL, or removed from proposed NPL, are those with an SAA Agreement in place. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the

potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ECHOR08 Enforcement and Compliance History Information

VERSION DATE: 11/28/20

The U.S. Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database, provides compliance and enforcement information for facilities nationwide. This database includes facilities regulated as Clean Air Act stationary sources, Clean Water Act direct dischargers, Resource Conservation and Recovery Act hazardous waste handlers, Safe Drinking Water Act public water systems along with other data, such as Toxics Release Inventory releases.

ERNSCO Emergency Response Notification System

VERSION DATE: 03/28/21

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FEMAUST FEMA Owned Storage Tanks

VERSION DATE: 12/01/16

This is a listing of FEMA owned underground and aboveground storage tank sites. For security reasons, address information is not released to the public according to the U.S. Department of Homeland Security.

FRSCO Facility Registry System

VERSION DATE: 03/02/21

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

FUDS Formerly Used Defense Sites

VERSION DATE: 12/31/18

The Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not

all properties currently have polygon data available. DISCLAIMER: This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

FUSRAP Formerly Utilized Sites Remedial Action Program

VERSION DATE: 03/04/17

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

HISTPST Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR08 Hazardous Materials Incident Reporting System

VERSION DATE: 03/24/21

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

HWCD Hazardous Waste Compliance Docket Facilities

VERSION DATE: 10/29/20

This list of the Federal Agency Hazardous Waste Compliance Docket Facilities is maintained by the United States Environmental Protection Agency (EPA). According to the EPA, Section 120(c) of CERCLA requires EPA to establish a listing, known as the Federal Facility Hazardous Waste Compliance Docket (Docket), of Federal facilities which are managing or have managed hazardous waste; or have had a release of hazardous waste. Thus, the Docket identifies all Federal facilities that must be evaluated to determine whether they pose a risk to human health and the environment and it makes this information available to the public. In order for the Docket to remain current and accurate it requires periodic updating.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 09/19/20

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISCLEANERS Integrated Compliance Information System Drycleaners

VERSION DATE: 09/19/20

This is a listing of drycleaner facilities from the Integrated Compliance Information System (ICIS). The U.S. Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments. The following Primary SIC Codes are included in this data: 7211, 7212, 7213, 7215, 7216, 7217, 7218, and/or 7219; the following Primary NAICS Codes are included in this data: 812320, 812331, and/or 812332.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 04/26/20

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. This database is provided by the U.S. Environmental Protection Agency.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 06/29/17

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements. Disclaimer: Due to agency regulations and policies, this database contains applicant/licensee location information which may or may not be related to the physical location per MLTS site.

MRDS Mineral Resource Data System

VERSION DATE: 03/15/16

MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps. A few updates last occurred 2015 and early 2016 for select mine site area/s.

MSHA Mine Safety and Health Administration Master Index File

VERSION DATE: 08/07/20

The Mine dataset lists all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970. It includes such information as the current status of each mine (Active, Abandoned, NonProducing, etc.), the current owner and operating company, commodity codes and physical attributes of the mine. Mine ID is the unique key for this data. This information is provided by the United States Department of Labor - Mine Safety and Health Administration (MSHA).

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 03/22/21

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 03/22/21

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

NMS Former Military Nike Missile Sites

VERSION DATE: 12/01/84

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline,

heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

NPDESR08 National Pollutant Discharge Elimination System

VERSION DATE: 04/01/07

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES database was collected from the U.S. Environmental Protection Agency (EPA) from December 2002 through April 2007. Refer to the ICIS and/or ICIS-NPDES database as source of current data. This database includes permitted facilities located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

NPL National Priorities List

VERSION DATE: 04/26/21

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

ODI Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

PADS PCB Activity Database System

VERSION DATE: 11/19/20

PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of Polychlorinated Biphenyls (PCB) who are required to notify the U.S. Environmental Protection Agency of such activities.

PCSR08 Permit Compliance System

VERSION DATE: 08/01/12

The historic Permit Compliance System tracked enforcement status and permit compliance of facilities controlled

by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. This database includes permitted facilities located in EPA Region 8 states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. This system has since been modernized by United States Environmental Protection Agency and is now integrated into the Integrated Compliance Information System (ICIS). Please refer to the ICIS database as the current source for this data.

PNPL Proposed National Priorities List

VERSION DATE: 04/26/21

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.

RCRAGR08 Resource Conservation & Recovery Act - Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities currently generating hazardous waste. EPA Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRANGR08 Resource Conservation & Recovery Act - Non-Generator

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities classified as non-generators. Non-Generators do not presently generate hazardous waste. EPA

Region 8 includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRASC RCRA Sites with Controls

VERSION DATE: 05/16/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with institutional controls in place.

RCRASUBC Resource Conservation & Recovery Act - Subject to Corrective Action Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities subject to corrective actions.

RCRAT Resource Conservation & Recovery Act - Non-CORRACTS Treatment, Storage & Disposal Facilities

VERSION DATE: 03/22/21

The Resource Conservation and Recovery Act (RCRA) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities recognized as hazardous waste treatment, storage, and disposal sites (TSD).

RODS Record of Decision System

VERSION DATE: 09/21/20

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

SEMS Superfund Enterprise Management System

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.

SEMSARCH Superfund Enterprise Management System Archived Site Inventory

VERSION DATE: 04/26/21

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System Archived Site Inventory (List 8R Archived) replaced the CERCLIS NFRAP reporting system in 2015. This listing reflects sites at which the EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program.

SEMSLIENS SEMS Lien on Property

VERSION DATE: 06/22/20

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs. This is a listing of SEMS sites with a lien on the property.

SFLIENS CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete. Please refer to the SEMSLIENS database as source of current data.

SMCRA Surface Mining Control and Reclamation Act Sites

VERSION DATE: 12/18/20

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as information on the cost associated with the reclamation of those problems.

The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

SSEHRIPFAS SSEHRI PFAS Contamination Sites

VERSION DATE: 12/12/19

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Please access the following source link for the most current information: https://pfasproject.com/pfas-contamination-site-tracker/

SSTS Section Seven Tracking System

VERSION DATE: 08/04/20

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. "Production" includes formulation, packaging, repackaging, and relabeling. For this database, the Product Information is only available for establishments up through 2014 or prior years, product details are no longer released by the EPA within the current SSTS non-Confidential Business Information data.

TRI Toxics Release Inventory

VERSION DATE: 12/31/18

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/31/16

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured,

imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency (EPA) authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site. The EPA has collected Chemical Data Reporting (CDR) data since in 1986 (as Inventory Update Reporting). Collections occur approximately every four years and reporting requirements changed from collection to collection.

USUMTRCA Uranium Mill Tailings Radiation Control Act Sites

VERSION DATE: 03/04/17

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Environmental Records Definitions - STATE (CO)

APCDP Air Pollution Control Division Permitted Facilities

VERSION DATE: 06/29/20

This list of Air Pollution Control Division Permitted Facilities is maintained by the Colorado Department of Public Health and Environment. The Stationary Sources Program evaluates and develops air permits for stationary sources in Colorado. The program inspects sources to determine compliance with air regulations and permit conditions and maintains a computerized inventory of air pollution emissions throughout the state.

ASBESTOS Asbestos Abatement and Demolition Projects

VERSION DATE: 12/28/17

The Colorado Department of Public Health and Environment’s Air Pollution Control Division assists schools and businesses to comply with air pollution laws regulating asbestos and asbestos containing materials. The regulation that governs asbestos in Colorado is the Colorado Air Quality Control Commission s Regulation No. 8, Part B, "Emission Standards for Asbestos." Notification is required for all demolitions of all facilities and all asbestos abatement projects that exceed the trigger levels, whatever is the lesser quantity. The notification requirements apply to both friable and non-friable asbestos materials. This database contains those related projects since January 2008.

AST Aboveground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of aboveground storage tank (AST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

BF Colorado Brownfield Sites

VERSION DATE: 11/12/20

This list of Colorado brownfields is maintained by the Colorado Department of Public Health & Environment (CDPHE) Hazardous Materials and Waste Management Division Brownfields Program in conjunction with the Voluntary Cleanup Program (VCUP). The brownfields database is an inventory of sites for which CPDHE has provided brownfields assistance in the form of targeted brownfields assessments, a revolving loan or grant through the Colorado Brownfields Revolving Loan Fund, and/or assistance through our state brownfields grants program. Most of these incentives are available only to local governments or nonprofits. In some cases, sites that receive state incentives also go through the VCUP program but most of the VCUP applicants are private entities not eligible for other state brownfields incentives.

CDPS Colorado Discharge Permit System Facilities

VERSION DATE: 02/03/19

The Colorado Department of Public Health & Environment's Water Quality Control Division regulates the

Colorado Discharge Permit System. This system controls stormwater discharges from construction activities by requiring a Stormwater Construction Permit to reduce pollutants from entering streams, river, lakes and wetlands as a result of runoff from residential, commercial and industrial areas. This database also includes facilities with Industrial Stormwater Permits.

CLEANERS Dry Cleaning Facilities

VERSION DATE: 04/16/21

This list of dry cleaners, which have obtained an air permit through the Air Pollution Control Division, is maintained by the Colorado Department of Public Health and Environment.

COVENANTS Environmental Real Covenants List

VERSION DATE: 11/23/20

This list of environmental covenants is maintained by the Colorado Division of Public Health and Environment. Senate Bill 01-145 gave authority to the Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental covenant. These covenants, which are recorded with the deed and run with the land, provide a mechanism to ensure that institutional controls that are part of environmental remediation projects are properly implemented and that engineered structures are protected and maintained, so that implemented remedies continue to be protective of human health and the environment for as long as any residual contamination remains a risk.

HISTSWLF Historical Solid Waste Landfills

VERSION DATE: NR

This historical solid waste landfills database contains data from the Hazardous Materials Waste Management Division (HMWMD) of the Colorado Department of Public Health and other various state and local agencies. In the early 1980s, the HMWMD conducted a survey of staff members and local agencies to compile this listing of sites that were known or thought to have waste issues. This Solid Waste Historical Data is not considered complete or verifiable and has not been maintained since the late 1980s. The HMWMD is not responsible and shall not be liable to the used for damages of any kind arising out of the use of this data or information.

HWSCA Hazardous Waste Sites- Corrective Action

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by Congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the Hazardous and Solid Waste Amendments (HSWA) were added to RCRA providing for corrective action at facilities subject to RCRA. That same year, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. Corrective action may be implemented as part of a RCRA Hazardous Waste Permit, an Order, or a Corrective Action Plan pursuant to the Colorado Hazardous Waste Regulations. Corrective action is the process by which regulated facilities investigate and remediate, as necessary, all contamination (soil, ground water, surface water, air) associated with their releases into the environment. Historic Corrective Action Sites are facilities that have

completed the RCRA Subtitle C corrective Action process. This data was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

HWSG Hazardous Waste Sites- Generator

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. This facility listing includes RCRA sites listed as generators of hazardous waste (Small Quantity Generators and Large Quantity Generators) and was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

Small Quantity Generators (SQG) generate, in any calendar month, more than 100 kg (220 lbs.) but less than 1,000 kg (2,200 lbs.) of RCRA hazardous waste; and generate, in any calendar month, or accumulate at any time, no more than 1 kg (2.2 lbs.) of acute hazardous waste and no more than 100 kg (220 lbs.) of material from the cleanup of a spill of acute hazardous waste; and accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time; or, the site is a Small Quantity Generator if the site met all other criteria for a Conditionally Exempt Small Quantity Generator, but accumulated, at any time, more than 1,000 kg (2,200 lbs.) of RCRA hazardous waste.

Large Quantity Generators (LQG) generate, in any calendar month, 1,000 kg (2,200 lbs.) or more of RCRA hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 1 kg (2.2 lbs.) of RCRA acute hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 100 kg (220 lbs.) of spill cleanup material contaminated with RCRA acute hazardous waste.

HWSTSD Hazardous Waste Sites- Treatment, Storage & Disposal

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. TSD facilities treat, store, dispose, or recycle hazardous waste on site in units and therefore are subject to RCRA permitting requirements. Historic TSDs are facilities that have completed closure and/or post-closure of the RCRA Subtitle C Regulated Unit(s) or the Treatment/Storage/Disposal Unit is no longer regulated. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

LST Leaking Storage Tank Facilities

VERSION DATE: 05/03/21

This database of aboveground and underground storage tank facilities with confirmed releases is a compilation of several lists maintained by the Colorado Department of Labor and Employment. Currently In Use, Never Installed/Existed, Never Installed-Permit Revoked, Not Regulated, Other, Pending Installation, Permanently Closed, Temporarily Out of Use tanks are included in this data. The next set of data is obtained from the Active

and Closed OPS Petroleum Release Events in Colorado database. This data includes the OPS Open Event locations, but also shows locations of closed events (releases that have been issued a No Further Action determination). The Events data utilized in this database includes the following status types: Brownfield, Closed, Enforcement, LUST Trust, Open and State Lead. Please note some Events (confirmed releases) may not have a contaminant present.

LUSTTRUST Leaking Underground Storage Tanks Trust Fund Sites

VERSION DATE: 01/01/00

Suspected tank leaks have been discovered at the sites are included in this database, but the facility responsible for the leak has not been identified. The state's investigation and search for responsible parties is paid for out of the state's Leaking Underground Storage Tank (LUST) Trust Fund. This data was originally collected in 2002 from the Colorado Department of Labor & Employment, Division of Oil & Public Safety, State Fund Section by a former environmental database company known as Satisfi. Please refer to State LST database as source of current LUST Trust sites.

METHANESITES Methane Gas Study Sites

VERSION DATE: 01/01/81

This Investigation of Methane Gas Hazards report was prepared by the Denver Office of Emergency Preparedness in 1981. The purpose of this study was to assess the actual and potential generation, migration, explosive and related problems associated with specified landfills, and to identify existing and potential problems, suggested strategies to prevent, abate, and control such problems and recommend investigative and monitoring functions as may be deemed necessary. The Colorado Department of Health selected eight landfills as priorities due to population density and potential hazards to population and property.

RECYCLERS Registered Recycling Facilities

VERSION DATE: 09/01/19

This list of registered recycling facilities in Colorado is maintained by the Colorado Department of Public Health & Environment. This list includes primarily processing facilities for recyclable materials, such as: material recovery facilities, industrial recycling operations, and recyclable material end user sites. Collection centers/drop-off locations are not included unless the site is also processing recyclable materials (separating, sorting, dismantling, grinding, baling, etc.).

SF Superfund Sites

VERSION DATE: 12/10/20

This list of Superfund Sites is maintained by the Colorado Department of Public Health and Environment. This list contains active, deleted and proposed "Superfund" hazardous waste sites, as well as those sites identified through the Natural Resource Damages section of Superfund legislation and one Private Non-Superfund Cleanup site. A site qualifies for the National Priorities List (NPL or Superfund list) when the U.S. Environmental Protection Agency (EPA) determines there is a release or threatened release of hazardous substances that may

endanger public health, welfare or the environment. In Colorado, the lead agency for Superfund remediation may be either the EPA or the Colorado Department of Public Health and Environment.

SPILLS Spills Listing

VERSION DATE: 02/28/21

The Colorado Department of Public Health and Environment's Division of Emergency Preparedness and Response maintains this listing of chemical spills and/or releases.

SWF Solid Waste Facilities

VERSION DATE: 12/18/20

The Colorado Department of Public Health and Environment maintains this database of solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants. As of 11-6-19, the Waste Grease list has been discontinued and no new sites will be added as waste grease.

UMTS Uranium Mill Tailings Sites

VERSION DATE: 08/09/02

There were nine uranium mill tailings sites in Colorado designated for cleanup under the federal Uranium Mill Tailings Radiation Control Act (UMTRA). These nine sites, know commonly as UMTRA sites, were remediated jointly by the State of Colorado and the U.S. Department of Energy during the late 1980's and early 1990's. Mill tailings were removed from 8 of the mill sites and relocated in engineered disposal cells. A disposal cell is designed to encapsulate the material, reduce radon emanation, and prevent the movement of water through the material. At one site, Maybell, CO, the tailings were stabilized in-place at the mill site. After remediation of the tailings was completed, the State and DOE began to investigate the residual impacts to groundwater at the mill sites. The groundwater phase of the UMTRA program is on-going. This database was provided by the Colorado Department of Public Health and Environment in 2008, please contact the agency directly to verify current site details.

UST Underground Storage Tank Facilities

VERSION DATE: 04/01/21

This list of underground storage tank (UST) facilities is maintained by the Colorado Department of Public Health and Environment. Types of tanks included are: currently in use, never installed/existed, never installed-permit revoked, not regulated, other, pending installation, permanently closed, temporarily out of use.

VCRA Voluntary Cleanup and Redevelopment Program Sites

VERSION DATE: 03/31/21

This list of Voluntary Cleanup and Redevelopment Program Sites is maintained by the Colorado Department of Public Health and Environment (CDPHE) and includes both voluntary cleanup and brownfield properties. The

Voluntary Cleanup and Redevelopment program was created in 1994. The objective of the program is to facilitate the redevelopment and transfer of contaminated properties. Properties that sit untouched because of their real or perceived contamination can be rehabilitated using the CDPHE's Brownfields Program in conjunction with the Voluntary Cleanup Program. Cleanup decisions are based on existing standards and the proposed use of the property. The actual cleanup and verification is the owner's responsibility.

Environmental Records Definitions - LOCAL

WCSWF Weld County Solid Waste Facilities

VERSION DATE: 01/25/18

This list of solid waste facilities is maintained by the Weld County Public Health Department. The Weld County Code (WCC), Section 23-4-380 is the only section of the WCC that pertains to solid waste operations. The siting, permitting and regulation of solid waste disposal sites is an area of dual jurisdiction between Colorado Department of Public Health and Environment and Weld County. The primary regulations that govern composting and solid waste facilities are the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). These regulations are implemented by the Colorado Department of Public Health & Environment. The Weld County Department of Public Health & Environment interacts with compost and solid waste facilities through the receipt of complaints, the land use planning process for facilities having a Use by Special Review (USR) Permit, site inspections, and investigations.

Environmental Records Definitions - TRIBAL

INDIANRES Indian Reservations

VERSION DATE: 09/27/17

This database is extracted from select geographic and cartographic information from the U.S. Census Bureau. The Bureau of Indian Affairs (BIA) within the U.S. Department of the Interior (DOI) provides the list of federally recognized tribes. The American Indian/Alaska Native/Native Hawaiian (AIANNH) Areas includes the following legal entities: federally recognized American Indian reservations and off-reservation trust land areas, state-recognized American Indian reservations, and Hawaiian home lands (HHLs). The boundaries for federally recognized American Indian reservations and off-reservation trust lands are as of January 2017. The boundaries for state-recognized American Indian reservations and for state designated tribal statistical areas were delineated by state governor-appointed liaisons for the 2010 Census through the State American Indian Reservation Program and Tribal Statistical Areas Program respectively.

LUSTR08 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

USTR08 Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/09/20

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

Appendix C: Well Search Report

GeoPlus Oil & Gas Report

GeoLens by GeoSearch

Target Property:

McGavin

Longmont, Weld County, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401

Job #: 412773

Project #: 603-129

Date: 06/08/2021

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Target Property Summary

Target Property Information

McGavin
Longmont, Colorado 80504

Coordinates
Area centroid (-104.93778, 40.1284142)

USGS Quadrangle
Gowanda, CO

Geographic Coverage Information

County/Parish: Weld (CO)
ZipCode(s):
Longmont CO: 80504

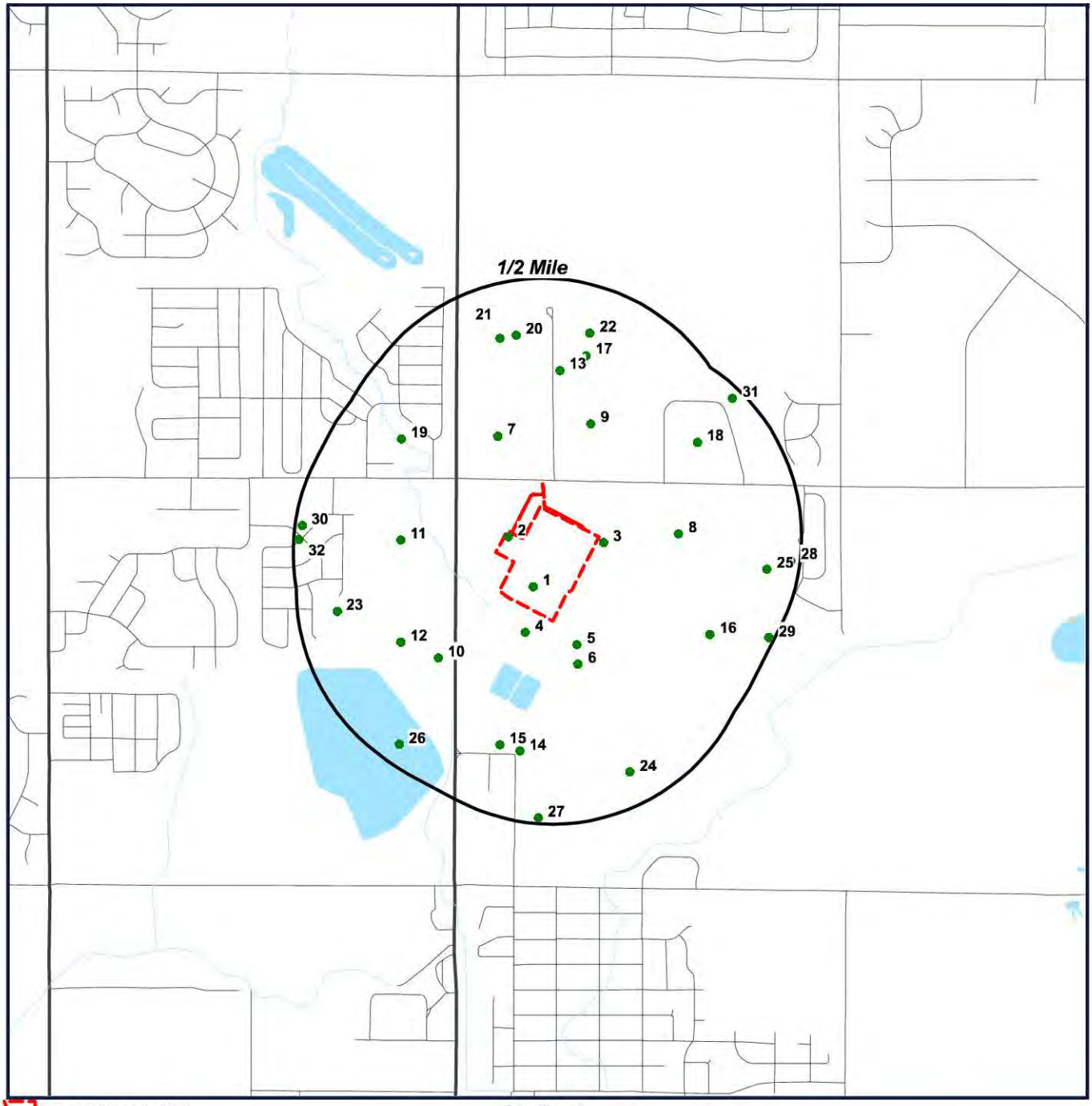
Database Radius Summary

STATE (CO) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
OG	0.5000	3	6	6	20	NS	NS	35
PITS	0.5000	0	0	2	5	NS	NS	7
SUB-TOTAL		3	6	8	25	0	0	42
TOTAL		3	6	8	25	0	0	42

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

OIL & GAS WELL MAP



Target Property (TP)

Well Location

McGavin
Longmont, Colorado
80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
1	OG	05-123-16476	TP	ROCKY MOUNTAIN FUEL	WELD COUNTY, LONGMONT, CO 80504
2	OG	05-123-16157	0.004 mi. NNE (21 ft.)	TRAVELERS	WELD COUNTY, LONGMONT, CO 80504
3	OG	05-123-08666	0.013 mi. ENE (69 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
4	OG	05-123-08667	0.039 mi. SW (206 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-19583	0.082 mi. SE (433 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20217	0.072 mi. ESE (380 ft.)	ROCKY MTN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20218	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20219	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-10317	0.107 mi. SE (565 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
7	OG	05-123-08668	0.170 mi. NW (898 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
7	PITS	103318	0.161 mi. NW (850 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-10318	0.199 mi. E (1051 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-11244	0.200 mi. NE (1056 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-20530	0.209 mi. SW (1104 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-08492	0.239 mi. W (1262 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20667	0.225 mi. WNW (1188 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	PITS	118742	0.239 mi. W (1262 ft.)	BATAA OIL INC	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-17665	0.265 mi. WSW (1399 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
13	OG	05-123-07379	0.295 mi. N (1558 ft.)	DREW	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-10315	0.312 mi. SSW (1647 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-21738	0.337 mi. SSW (1779 ft.)	SADDLEBACK	WELD COUNTY, LONGMONT, CO 80504

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
15	PITS	117994	0.313 mi. SSW (1653 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08531	0.344 mi. ESE (1816 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
17	OG	05-123-08679	0.346 mi. NNE (1827 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
18	OG	05-123-08579	0.350 mi. NE (1848 ft.)	BRETT	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-14402	0.355 mi. WNW (1874 ft.)	BUFFALO GARDENS U	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-15821	0.384 mi. NNW (2028 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
21	PITS	103319	0.385 mi. NNW (2033 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-10408	0.401 mi. NNE (2117 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
22	PITS	103321	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	112952	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-17664	0.401 mi. W (2117 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
24	OG	05-123-08527	0.401 mi. SE (2117 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08514	0.419 mi. E (2212 ft.)	ROCKY MOUNTAIN FUEL CO J	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-07516	0.434 mi. SW (2292 ft.)	FREDERICK	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08528	0.467 mi. S (2466 ft.)	ROCKY MTN FUEL D	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-22564	0.467 mi. S (2466 ft.)	SPECTRUM	WELD COUNTY, LONGMONT, CO 80504
28	OG	05-123-08675	0.475 mi. E (2508 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-10316	0.477 mi. ESE (2519 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-12771	0.485 mi. W (2561 ft.)	MOORE	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11551	0.488 mi. NE (2577 ft.)	DREW GAS UNIT TRUE	WELD COUNTY, LONGMONT, CO 80504
32	PITS	118634	0.488 mi. W (2577 ft.)	MACHII-ROSS PETROLEUM CO	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
1	OG	05-123-16476	4,927 ft.	TP	ROCKY MOUNTAIN FUEL	WELD COUNTY, LONGMONT, CO 80504
2	OG	05-123-16157	4,915 ft.	0.004 mi. NNE (21 ft.)	TRAVELERS	WELD COUNTY, LONGMONT, CO 80504
3	OG	05-123-08666	4,934 ft.	0.013 mi. ENE (69 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
4	OG	05-123-08667	4,927 ft.	0.039 mi. SW (206 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-19583	4,935 ft.	0.082 mi. SE (433 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20217	4,935 ft.	0.072 mi. ESE (380 ft.)	ROCKY MTN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20218	4,935 ft.	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
5	OG	05-123-20219	4,935 ft.	0.071 mi. ESE (375 ft.)	ROCKY MOUNTAIN FUEL V	WELD COUNTY, LONGMONT, CO 80504
6	OG	05-123-10317	4,935 ft.	0.107 mi. SE (565 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
7	OG	05-123-08668	4,913 ft.	0.170 mi. NW (898 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
8	OG	05-123-10318	4,947 ft.	0.199 mi. E (1051 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
9	OG	05-123-11244	4,942 ft.	0.200 mi. NE (1056 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
10	OG	05-123-20530	4,920 ft.	0.209 mi. SW (1104 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-08492	4,916 ft.	0.239 mi. W (1262 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
11	OG	05-123-20667	4,916 ft.	0.225 mi. WNW (1188 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
12	OG	05-123-17665	4,926 ft.	0.265 mi. WSW (1399 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
13	OG	05-123-07379	4,931 ft.	0.295 mi. N (1558 ft.)	DREW	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-10315	4,931 ft.	0.312 mi. SSW (1647 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
14	OG	05-123-21738	4,931 ft.	0.337 mi. SSW (1779 ft.)	SADDLEBACK	WELD COUNTY, LONGMONT, CO 80504
16	OG	05-123-08531	4,966 ft.	0.344 mi. ESE (1816 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
17	OG	05-123-08679	4,937 ft.	0.346 mi. NNE (1827 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
18	OG	05-123-08579	4,953 ft.	0.350 mi. NE (1848 ft.)	BRETT	WELD COUNTY, LONGMONT, CO 80504
19	OG	05-123-14402	4,910 ft.	0.355 mi. WNW (1874 ft.)	BUFFALO GARDENS U	WELD COUNTY, LONGMONT, CO 80504
20	OG	05-123-15821	4,916 ft.	0.384 mi. NNW (2028 ft.)	LINCOLN	WELD COUNTY, LONGMONT, CO 80504
22	OG	05-123-10408	4,937 ft.	0.401 mi. NNE (2117 ft.)	LISA	WELD COUNTY, LONGMONT, CO 80504
23	OG	05-123-17664	4,933 ft.	0.401 mi. W (2117 ft.)	FOX	WELD COUNTY, LONGMONT, CO 80504
24	OG	05-123-08527	4,942 ft.	0.401 mi. SE (2117 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
25	OG	05-123-08514	4,966 ft.	0.419 mi. E (2212 ft.)	ROCKY MOUNTAIN FUEL CO J	WELD COUNTY, LONGMONT, CO 80504
26	OG	05-123-07516	4,946 ft.	0.434 mi. SW (2292 ft.)	FREDERICK	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-08528	4,947 ft.	0.467 mi. S (2466 ft.)	ROCKY MTN FUEL D	WELD COUNTY, LONGMONT, CO 80504
27	OG	05-123-22564	4,947 ft.	0.467 mi. S (2466 ft.)	SPECTRUM	WELD COUNTY, LONGMONT, CO 80504
28	OG	05-123-08675	4,969 ft.	0.475 mi. E (2508 ft.)	ROCKY MOUNTAIN FUEL CO D	WELD COUNTY, LONGMONT, CO 80504
29	OG	05-123-10316	4,972 ft.	0.477 mi. ESE (2519 ft.)	ROCKY MOUNTAIN FUEL CO. D	WELD COUNTY, LONGMONT, CO 80504
30	OG	05-123-12771	4,923 ft.	0.485 mi. W (2561 ft.)	MOORE	WELD COUNTY, LONGMONT, CO 80504
31	OG	05-123-11551	4,967 ft.	0.488 mi. NE (2577 ft.)	DREW GAS UNIT TRUE	WELD COUNTY, LONGMONT, CO 80504
7	PITS	103318	4,913 ft.	0.161 mi. NW (850 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
11	PITS	118742	4,916 ft.	0.239 mi. W (1262 ft.)	BATAA OIL INC	WELD COUNTY, LONGMONT, CO 80504
15	PITS	117994	4,931 ft.	0.313 mi. SSW (1653 ft.)	AMOCO PRODUCTION COMPANY	WELD COUNTY, LONGMONT, CO 80504
21	PITS	103319	4,916 ft.	0.385 mi. NNW (2033 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	103321	4,937 ft.	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
22	PITS	112952	4,937 ft.	0.391 mi. NNE (2064 ft.)	HS RESOURCES INC	WELD COUNTY, LONGMONT, CO 80504
32	PITS	118634	4,923 ft.	0.488 mi. W (2577 ft.)	MACHII-ROSS PETROLEUM CO	WELD COUNTY, LONGMONT, CO 80504

Oil & Gas Well Report

MAP ID	API #	WELL # AND NAME	OPERATOR NAME	GRND ELEV.	LOCATION QUALIFIER	STATUS	LATITUDE	LONGITUDE
1	05-123-16476	19-4N ROCKY MOUNTAIN FUEL	KERR MCGEE OIL & GAS ONSHORE LP	4933 FT	ACTUAL LATLONG	SHUT IN	40.127820000	-104.938345000
2	05-123-16157	11-19 TRAVELERS	BASIN EXPLORATION INC	4910 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.129587000	-104.939529000
3	05-123-08666	8 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4935 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129386000	-104.935069000
4	05-123-08667	10 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4930 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.126190000	-104.938722000
5	05-123-19583	19-6JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4893 FT	ACTUAL LATLONG	PRODUCING	40.125387000	-104.936470000
5	05-123-20217	19-5JI ROCKY MTN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4935 FT	ACTUAL LATLONG	SHUT IN	40.125684000	-104.936364000
5	05-123-20218	19-3 JI ROCKY MOUNTAIN FUEL V	KERR MCGEE OIL & GAS ONSHORE LP	4935 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.125756000	-104.936305000
5	05-123-20219	19-4 JI ROCKY MOUNTAIN FUEL V	PATINA OIL & GAS CORPORATION	4935 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.125693000	-104.936375000
6	05-123-10317	13 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4935 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.125053000	-104.936259000
7	05-123-08668	1 LINCOLN	KERR MCGEE OIL & GAS ONSHORE LP	4913 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.133191000	-104.939995000
8	05-123-10318	12 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4954 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129709000	-104.931571000
9	05-123-11244	2 LISA	KERR MCGEE OIL & GAS ONSHORE LP	4939 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.133630000	-104.935664000
10	05-123-20530	42-24 FOX	PDC ENERGY INC	4919 FT	ACTUAL LATLONG	SHUT IN	40.125282000	-104.942772000
11	05-123-08492	1 FOX	BATAA OIL INC	4915 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.129481000	-104.944518000
11	05-123-20667	41-24 FOX	PDC ENERGY INC	4913 FT	ACTUAL LATLONG	SHUT IN	40.129724000	-104.944165000
12	05-123-17665	U 24-8 FOX	GERRITY OIL & GAS CORP	4916 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.125841000	-104.944532000
13	05-123-07379	1 DREW	KERR MCGEE OIL & GAS ONSHORE LP	4933 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.135532000	-104.937106000
14	05-123-10315	15 ROCKY MOUNTAIN FUEL CO. D	HS RESOURCES INC	4928 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.121955000	-104.938973000
14	05-123-21738	12-19A SADDLEBACK	KERR MCGEE OIL & GAS ONSHORE LP	4940 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.121613000	-104.939161000
16	05-123-08531	5 ROCKY MOUNTAIN FUEL CO D	KERR MCGEE OIL & GAS ONSHORE LP	4965 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.126122000	-104.930119000
17	05-123-08679	2 LINCOLN	HS RESOURCES INC	4940 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.136063000	-104.935885000
18	05-123-08579	2 BRETT	HS RESOURCES INC	4949 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.132969000	-104.930699000
19	05-123-14402	13-16 BUFFALO GARDENS U	BATAA OIL INC	4919 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.133094000	-104.944491000
20	05-123-15821	3 LINCOLN	KERR MCGEE OIL & GAS ONSHORE LP	4911 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.136785000	-104.939147000
22	05-123-10408	1 LISA	KERR MCGEE OIL & GAS ONSHORE LP	4939 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.136855000	-104.935708000
23	05-123-17664	U 24-1J FOX	PDC ENERGY INC	4929 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.126942000	-104.947501000
24	05-123-08527	4 ROCKY MOUNTAIN FUEL CO D	KERR MCGEE OIL & GAS ONSHORE LP	4944 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.121205000	-104.933845000
25	05-123-08514	6 ROCKY MOUNTAIN FUEL CO J	KERR MCGEE OIL & GAS ONSHORE LP	4965 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.128436000	-104.927453000
26	05-123-07516	3 FREDERICK	COLORADO ENERGY CORPORATION	4932 FT	PLANNED FOOTAGE	ABANDONED LOCATION	40.122201000	-104.944594000
27	05-123-08528	7 ROCKY MTN FUEL D	KERR MCGEE OIL & GAS ONSHORE LP	4940 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119576000	-104.938106000
27	05-123-22564	13-19 SPECTRUM	KERR MCGEE OIL & GAS ONSHORE LP	4950 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.119558000	-104.937895000
28	05-123-08675	9 ROCKY MOUNTAIN FUEL CO D	HS RESOURCES INC	4970 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.128759000	-104.926326000
29	05-123-10316	14 ROCKY MOUNTAIN FUEL CO. D	HS RESOURCES INC	4975 FT	PLANNED FOOTAGE	PLUGGED AND ABANDONED	40.126003000	-104.927361000
30	05-123-12771	31-24C MOORE	PDC ENERGY INC	4920 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.129997000	-104.949130000

31	05-123-11551	1 DREW GAS UNIT TRUE	KERR MCGEE OIL & GAS ONSHORE LP	4968 FT	ACTUAL LATLONG	PLUGGED AND ABANDONED	40.134536000	-104.929066000

Oil & Gas Pits Report

MAP ID	FACILITY #	PIT #	OPERATOR NAME	WELL # AND NAME	FIELD NAME	STATUS	LATITUDE	LONGITUDE
7	103318	PIT# 103318	HS RESOURCES INC	NOT REPORTED	SPINDLE	CLOSED	40.133056000	-104.939913000
11	118742	PIT# 118742	BATAA OIL INC	NOT REPORTED	WATTENBERG	CLOSED	40.129454000	-104.944529000
15	117994	PIT# 117994	AMOCO PRODUCTION COMPANY	NOT REPORTED	WATTENBERG	CLOSED	40.122190000	-104.939911000
21	103319	PIT# 103319	HS RESOURCES INC	NOT REPORTED	WATTENBERG	CLOSED	40.136669000	-104.939899000
22	103321	PIT# 103321	HS RESOURCES INC	NOT REPORTED	WATTENBERG	NOT REPORTED	40.136639000	-104.935450000
22	112952	PIT# 112952	HS RESOURCES INC	NOT REPORTED	WATTENBERG	CLOSED	40.136639000	-104.935450000
32	118634	PIT# 118634	MACHII-ROSS PETROLEUM CO	NOT REPORTED	WATTENBERG	NOT REPORTED	40.129501000	-104.949283000

Environmental Records Definitions - STATE (CO)

OG Oil and Gas Well Locations

VERSION DATE: 09/18/20

The Colorado Oil and Gas Conservation Commission maintains this database of active and plugged wells, including active and expired well permits. Some permitted locations were never drilled but locations are still included in the data.

PITS Oil and Gas Pit Locations

VERSION DATE: 09/18/20

This Colorado Oil and Gas Conservation Commission (COGCC) database maintains this list of oil and gas pit locations within Colorado. This data contains over 10,000 oil and gas related pit locations. The Colorado Department of Natural Resources (DNR) is not responsible and shall not be liable to the user for damages of any kind arising out of the use of data or information provided by the DNR, including the installation of the data or information, its use, or the results obtained from its use. Any data or information provided by the DNR is provided "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Appendix D: Historical Aerial Photographs

Historical Aerial Photographs

NEW: *GeoLens by Geosearch*

Target Property:

McGavin

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401
Job #: 412771
Project #: 603-129
Date: 6/10/2021

Target Property Summary

McGavin

Longmont, Weld, Colorado 80504

USGS Quadrangle: ***Gowanda***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.937914000, 40.131300000), (-104.937831000, 40.130403000), (-104.936074000, 40.129704000), (-104.936016000, 40.129640000), (-104.936034000, 40.129611000), (-104.935294000, 40.129317000), (-104.936558000, 40.127414000), (-104.936755000, 40.127329000), (-104.937435000, 40.126299000), (-104.939585000, 40.127190000), (-104.939941000, 40.127389000), (-104.939242000, 40.128436000), (-104.940087000, 40.128757000), (-104.939567000, 40.129548000), (-104.939350000, 40.129460000), (-104.939052000, 40.129908000), (-104.938468000, 40.130788000), (-104.938370000, 40.130830000), (-104.937878000, 40.130848000), (-104.937920000, 40.131301000)

Aerial Research Summary

Date	Source	Scale	Frame
2019	USDA	1" = 500'	N/A
2017	USDA	1" = 500'	N/A
2015	USDA	1" = 500'	N/A
2013	USDA	1" = 500'	N/A
2011	USDA	1" = 500'	N/A
2009	USDA	1" = 500'	N/A
2006	USDA	1" = 500'	N/A
2005	USDA	1" = 500'	N/A
2004	USDA	1" = 500'	N/A
10/04/1999	USGS	1" = 500'	N/A
06/27/1993	USGS	1" = 500'	6670-212
10/13/1984	USGS	1" = 500'	17-72
08/16/1978	USGS	1" = 500'	3-42
06/26/1975	USGS	1" = 500'	16-25
03/04/1970	USGS	1" = 500'	2-6
09/20/1967	USGS	1" = 500'	1-68
10/04/1966	USGS	1" = 500'	1-108
09/03/1963	ASCS	1" = 1320'	PI-14
09/10/1953	AMS	1" = 500'	4940
10/08/1948	USGS	1" = 500'	5-28
06/22/1937	ASCS	1" = 500'	2-11

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N
W E
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McGavin
USDA
2019

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
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McGavin
USDA
2017

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
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McGavin
USDA
2015

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2013

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2011

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2009

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2006

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2005

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USDA
2004

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USGS
10/04/1999

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
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McGavin
USGS
06/27/1993

GeoSearch

JOB #: 412771 - 06/10/2021

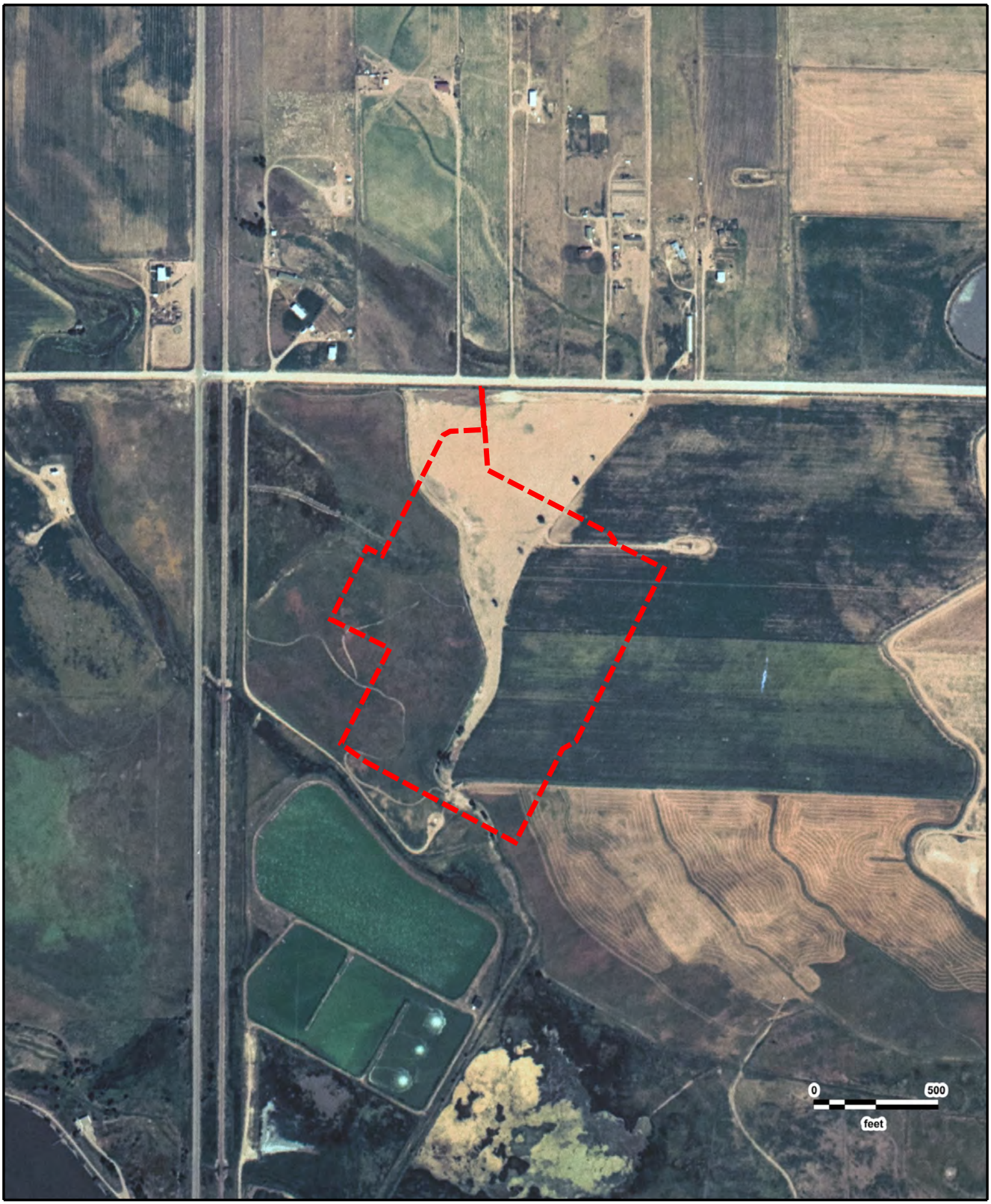


N
W E
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McGavin
USGS
10/13/1984

GeoSearch

JOB #: 412771 - 06/10/2021

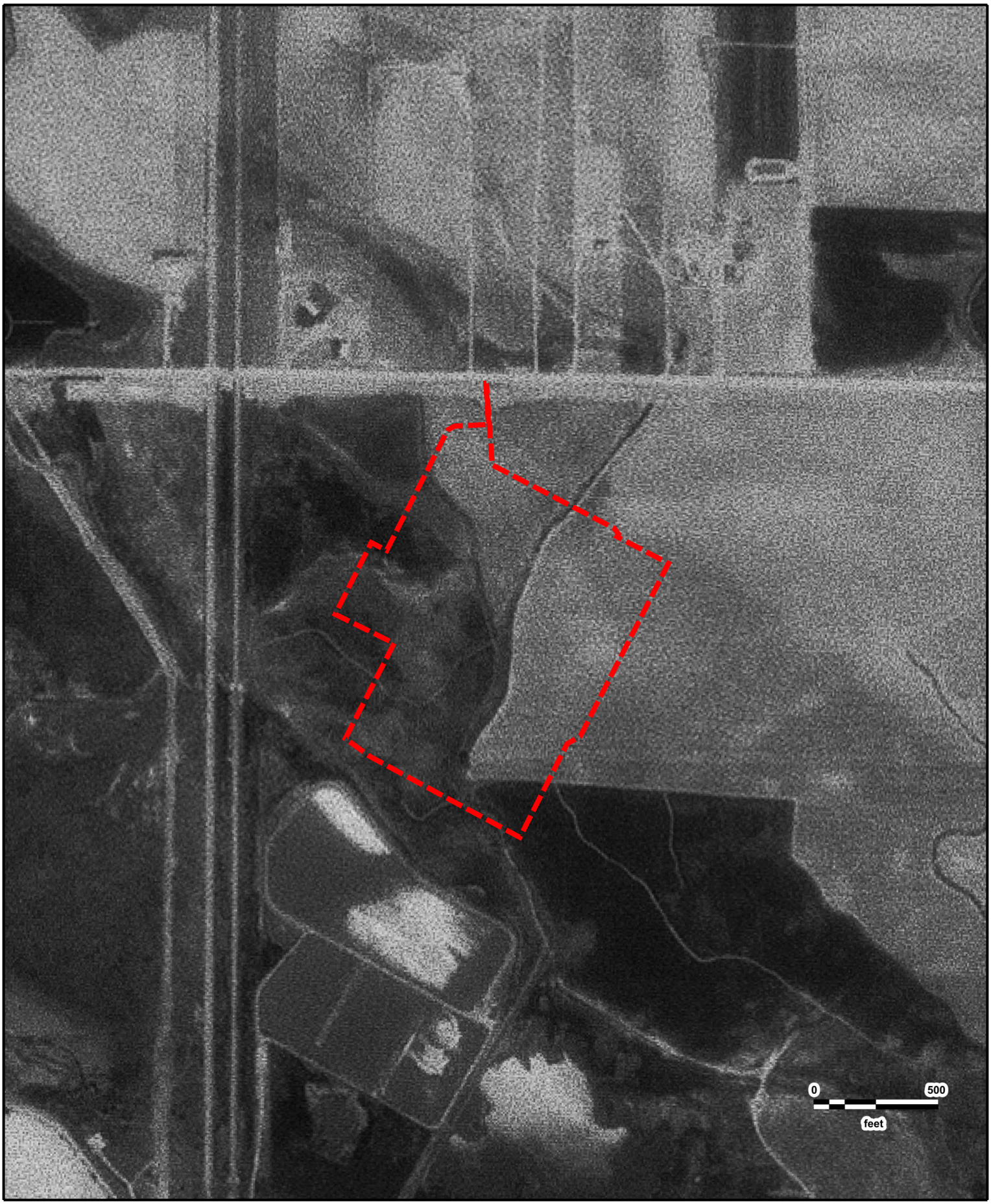


N
W E
S

McGavin
USGS
08/16/1978

GeoSearch

JOB #: 412771 - 06/10/2021

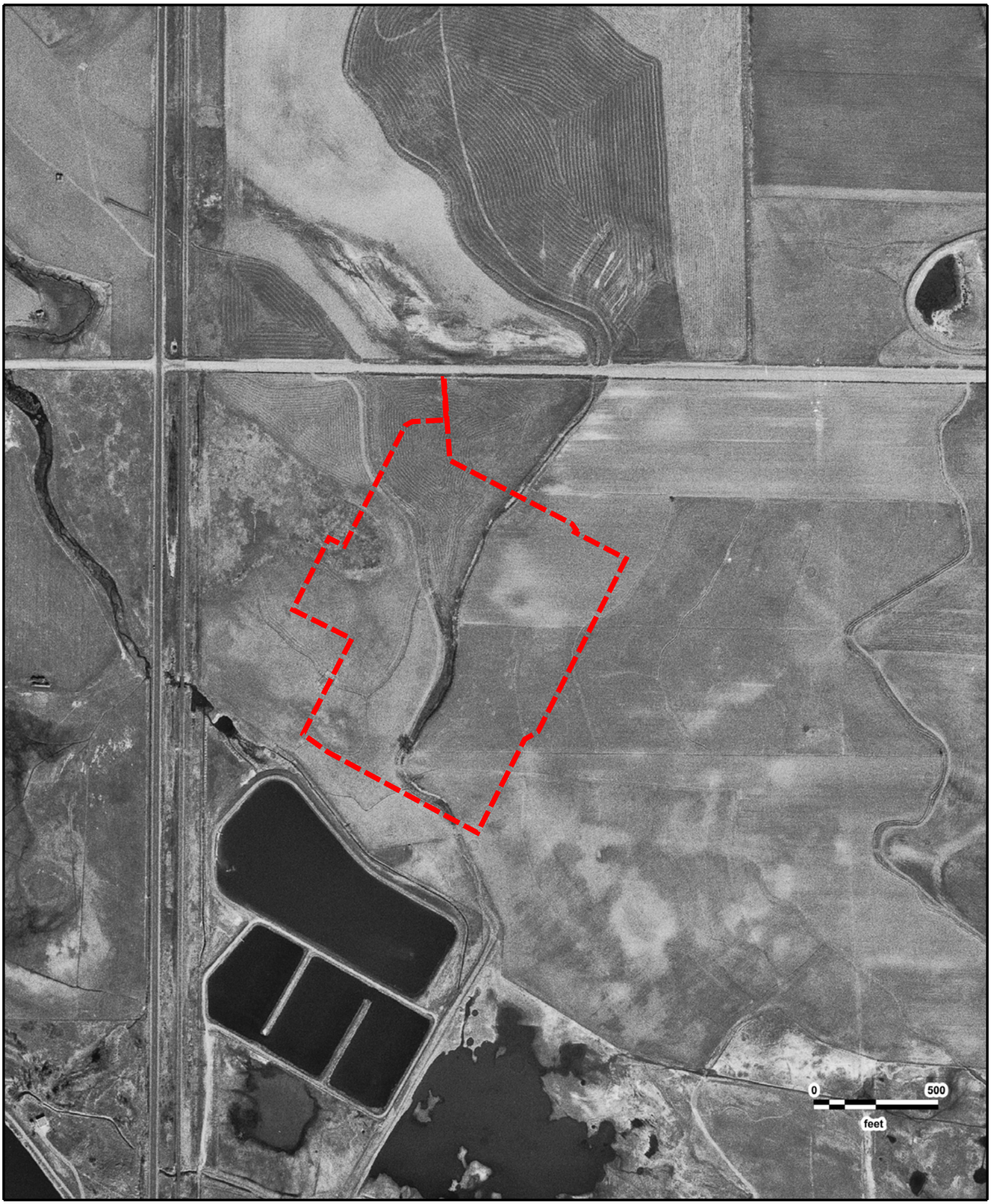


N
W E
S

McGavin
USGS
06/26/1975

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USGS
03/04/1970

GeoSearch

JOB #: 412771 - 06/10/2021

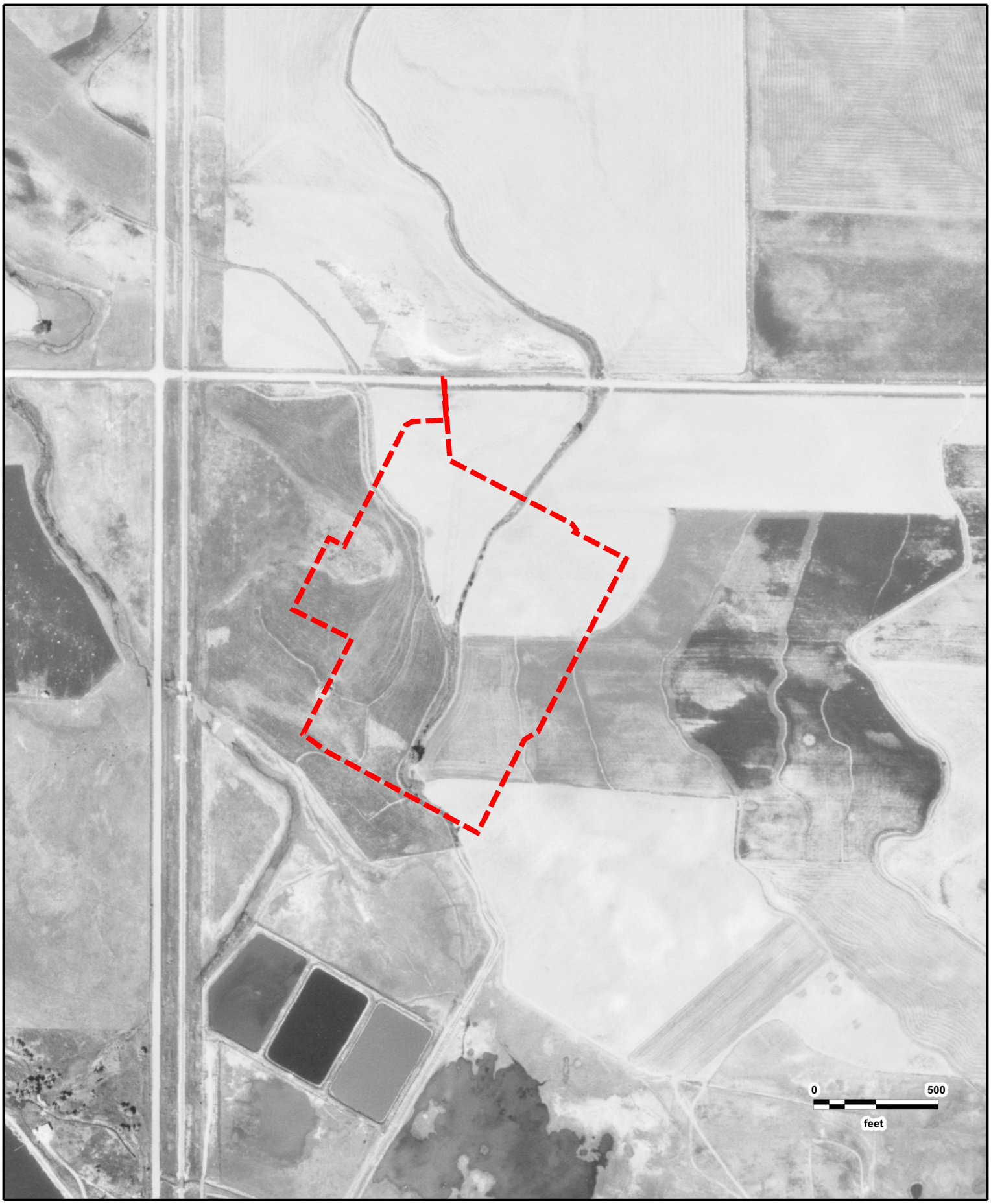


N
W E
S

McGavin
USGS
09/20/1967

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USGS
10/04/1966

GeoSearch

JOB #: 412771 - 06/10/2021

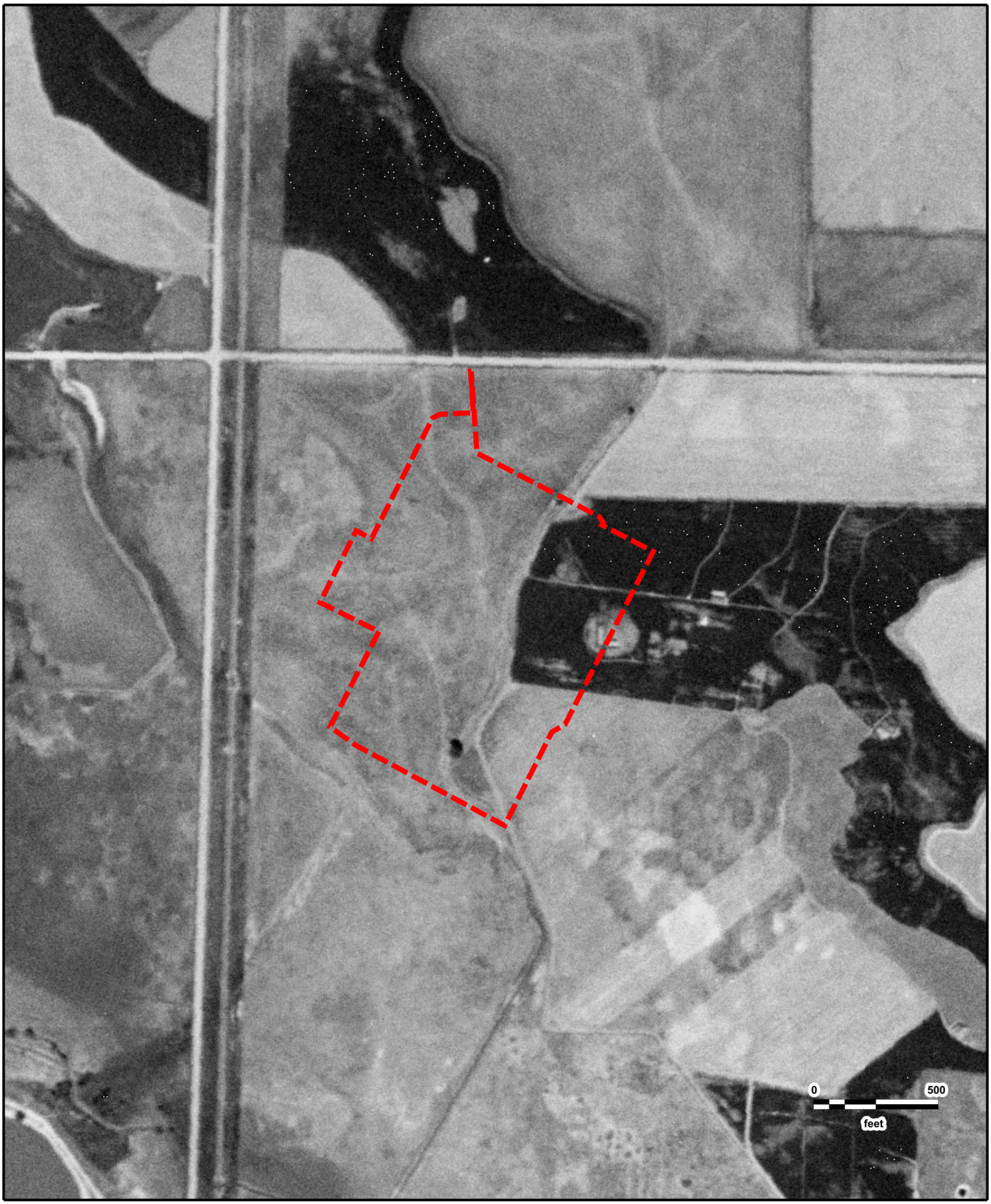


N
W E
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McGavin
ASCS
09/03/1963

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
AMS
09/10/1953

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
USGS
10/08/1948

GeoSearch

JOB #: 412771 - 06/10/2021



N
W E
S

McGavin
ASCS
06/22/1937

GeoSearch

JOB #: 412771 - 06/10/2021

Appendix E: Historical Topographic Maps

Historical Topographic Maps

NEW: *GeoLens by Geosearch*

Target Property:

McGavin

Longmont, Weld, Colorado 80504

Prepared For:

Two Dot Consulting, LLC

Order #: 166401
Job #: 412770
Project #: 603-129
Date: 6/10/2021

Target Property Summary

McGavin

Longmont, Weld, Colorado 80504

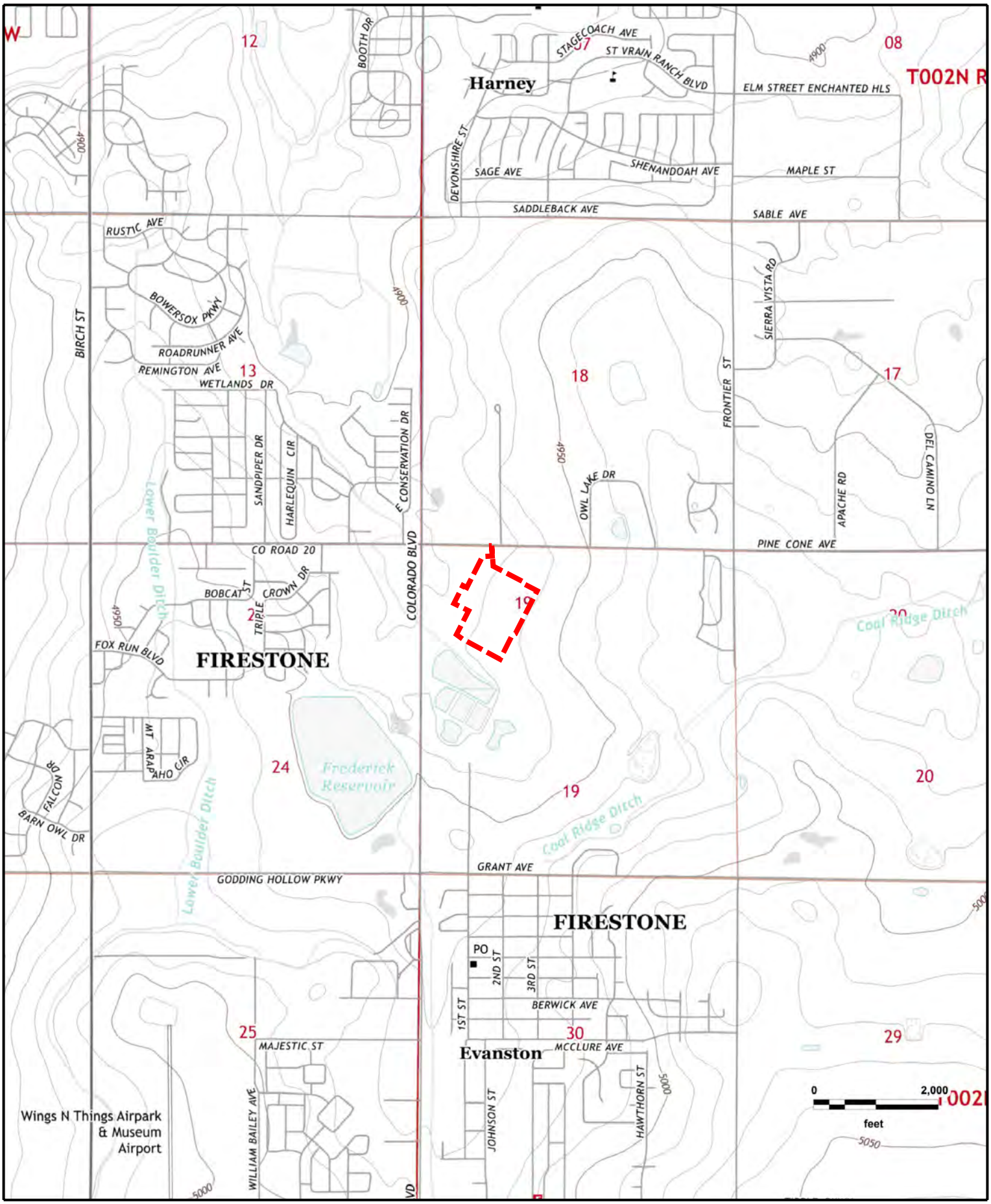
USGS Quadrangle: ***Gowanda***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-104.937914000, 40.131300000), (-104.937831000, 40.130403000), (-104.936074000, 40.129704000), (-104.936016000, 40.129640000), (-104.936034000, 40.129611000), (-104.935294000, 40.129317000), (-104.936558000, 40.127414000), (-104.936755000, 40.127329000), (-104.937435000, 40.126299000), (-104.939585000, 40.127190000), (-104.939941000, 40.127389000), (-104.939242000, 40.128436000), (-104.940087000, 40.128757000), (-104.939567000, 40.129548000), (-104.939350000, 40.129460000), (-104.939052000, 40.129908000), (-104.938468000, 40.130788000), (-104.938370000, 40.130830000), (-104.937878000, 40.130848000), (-104.937920000, 40.131301000)

Topographic Map Summary

Date	Quadrangle	Scale
2013	GOWANDA, CO (2013)	1" = 2000'
	FREDERICK, CO (2013)	
1950 REVISED 1994	GOWANDA, CO (1979)	1" = 2000'
	FREDERICK, CO (1994)	
1949 PHOTOREVISED 1979	GOWANDA, CO (1979)	1" = 2000'
	FREDERICK, CO (1979)	
1949 PHOTOREVISED 1969	GOWANDA, CO (1969)	1" = 2000'
	FREDERICK, CO (1969)	
1949	GOWANDA, CO (1949)	1" = 2000'
	FREDERICK, CO (1950)	
1902	GREELEY, CO	1" = 10420'

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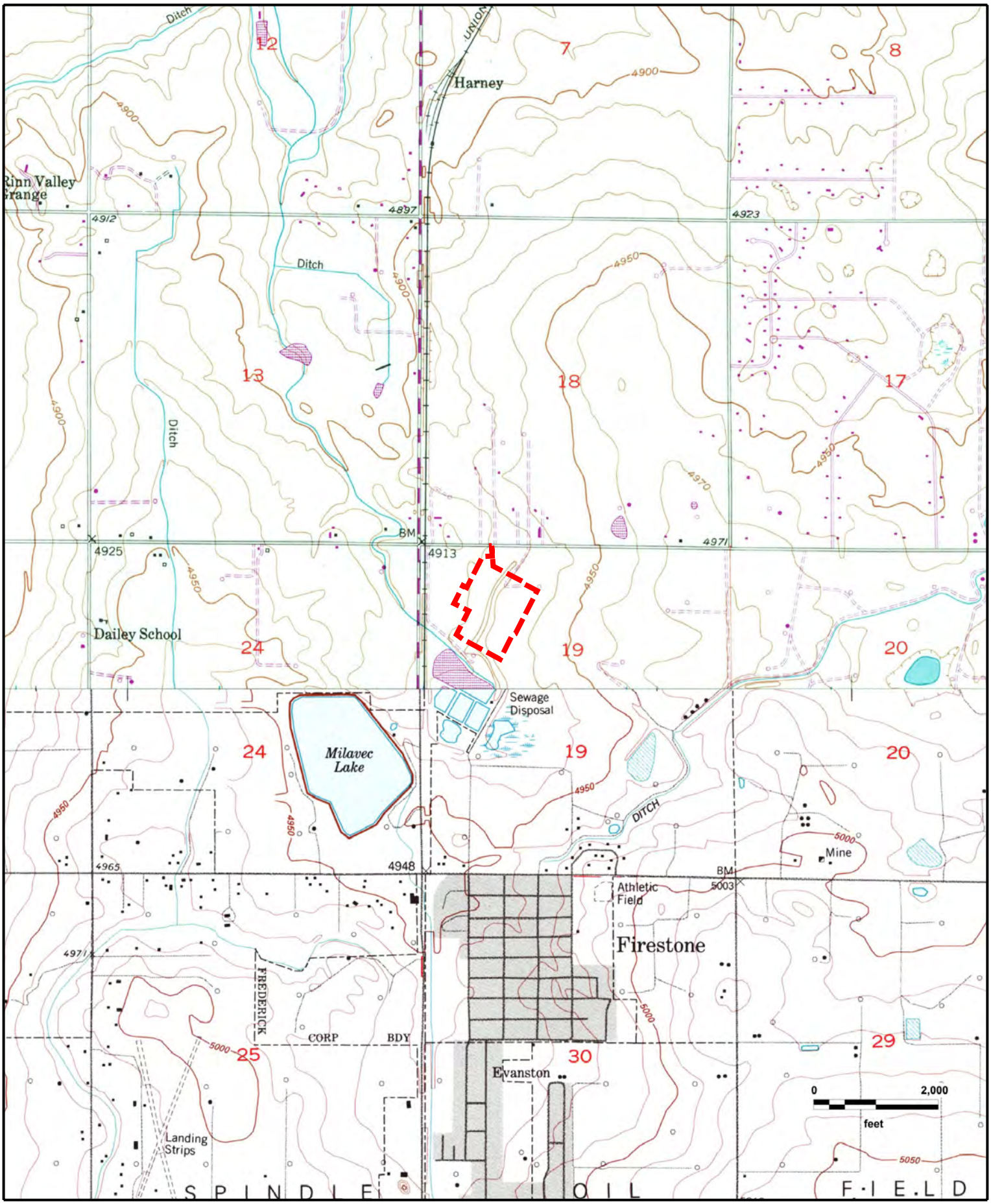


N
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McGavin
GOWANDA, CO (2013), FREDERICK, CO (2013)

GeoSearch

JOB #: 412770 - 06/10/2021

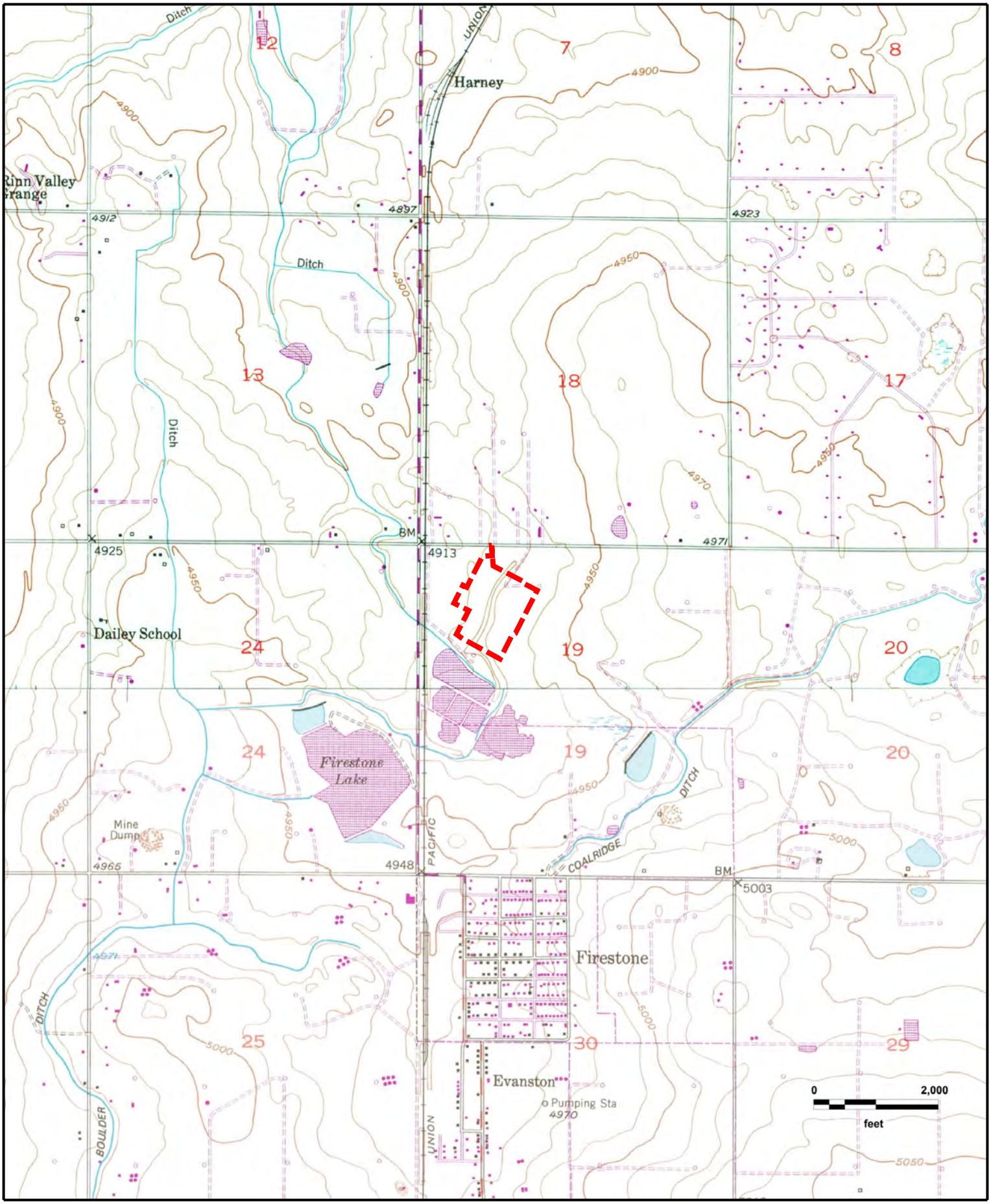


N
W E
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McGavin
GOWANDA, CO (1979), FREDERICK, CO (1994)

GeoSearch

JOB #: 412770 - 06/10/2021

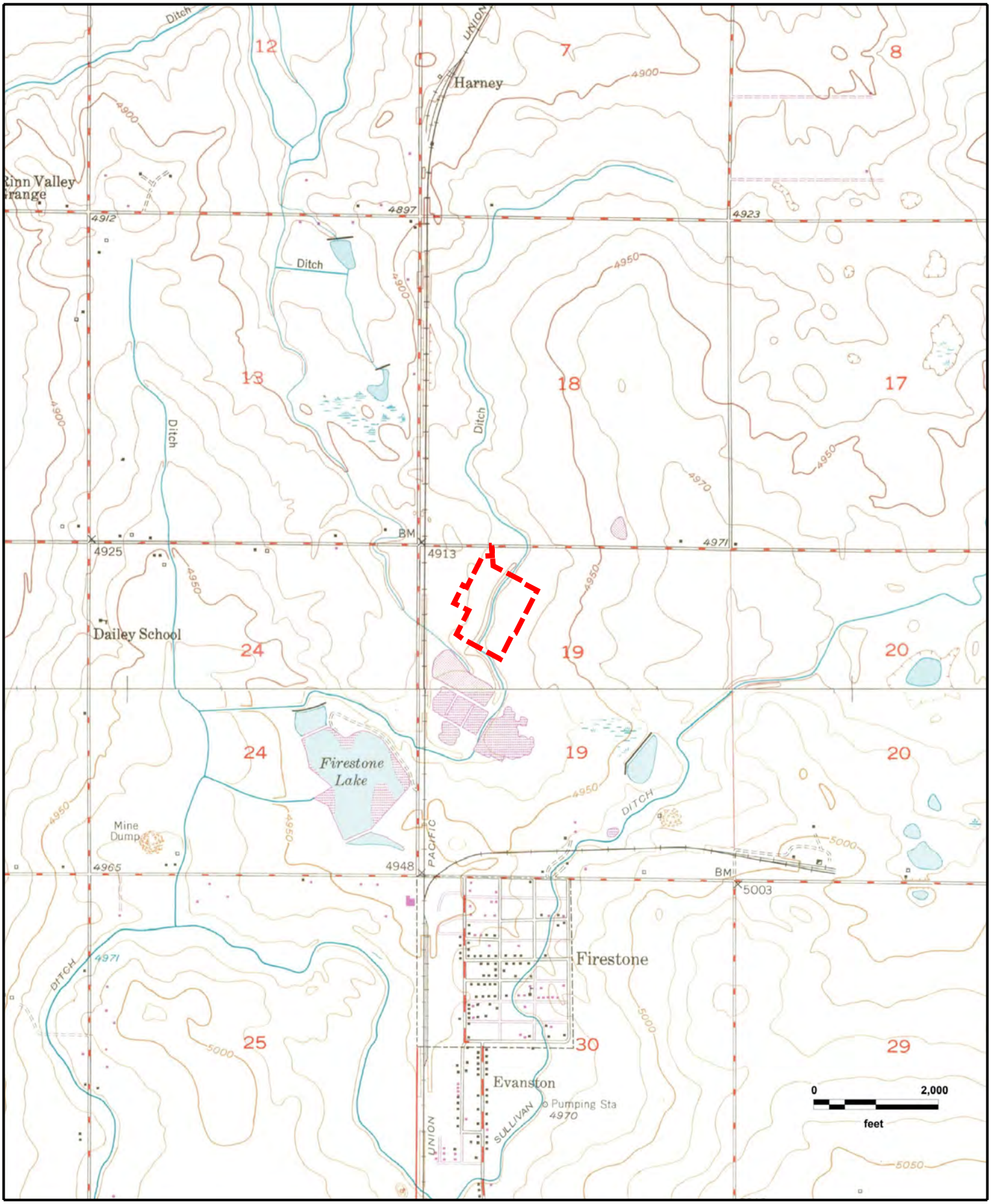


N
W E
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McGavin
GOWANDA, CO (1979), FREDERICK, CO (1979)

GeoSearch

JOB #: 412770 - 06/10/2021

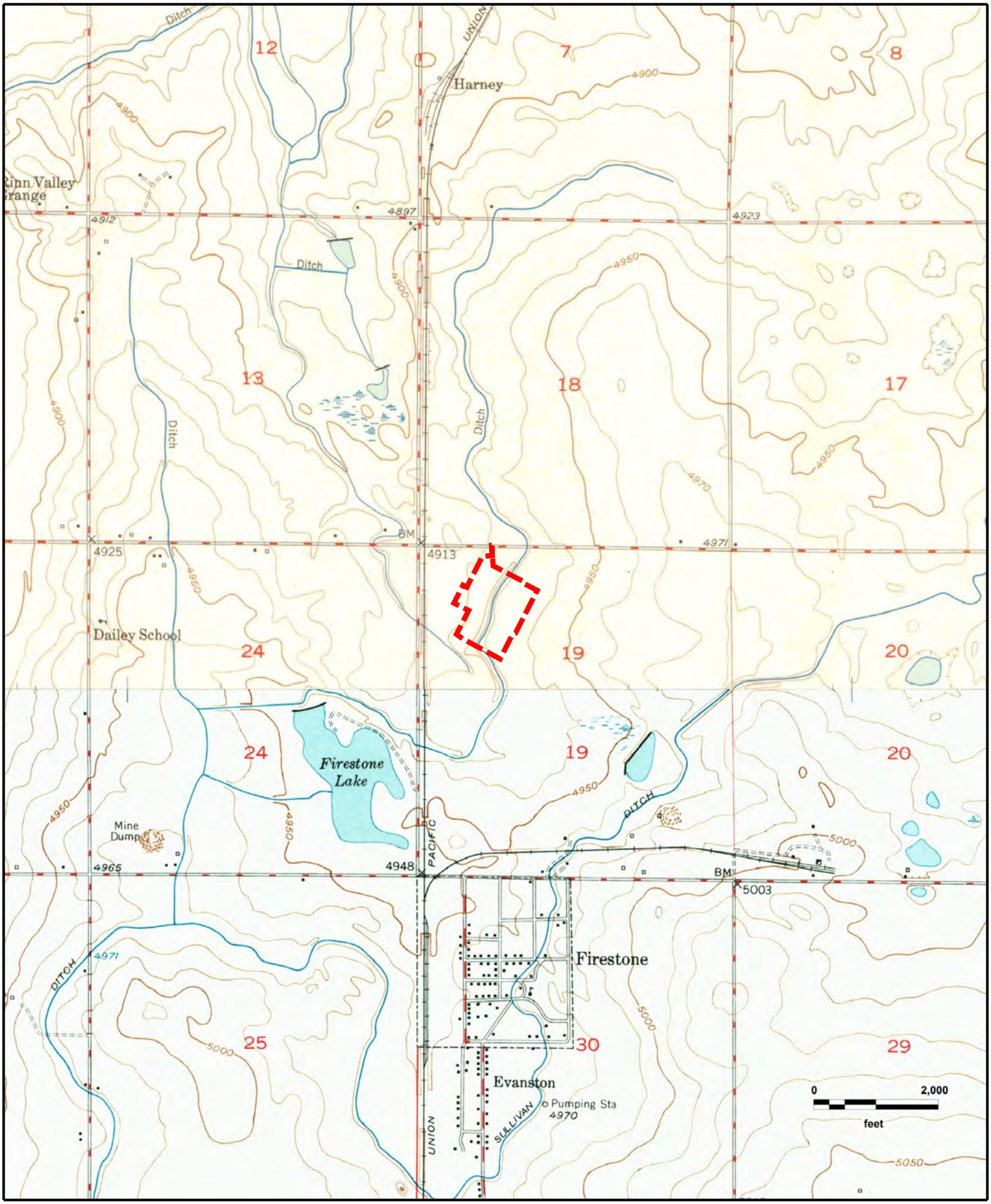


N
W E
S

McGavin
GOWANDA, CO (1969), FREDERICK, CO (1969)

GeoSearch

JOB #: 412770 - 06/10/2021

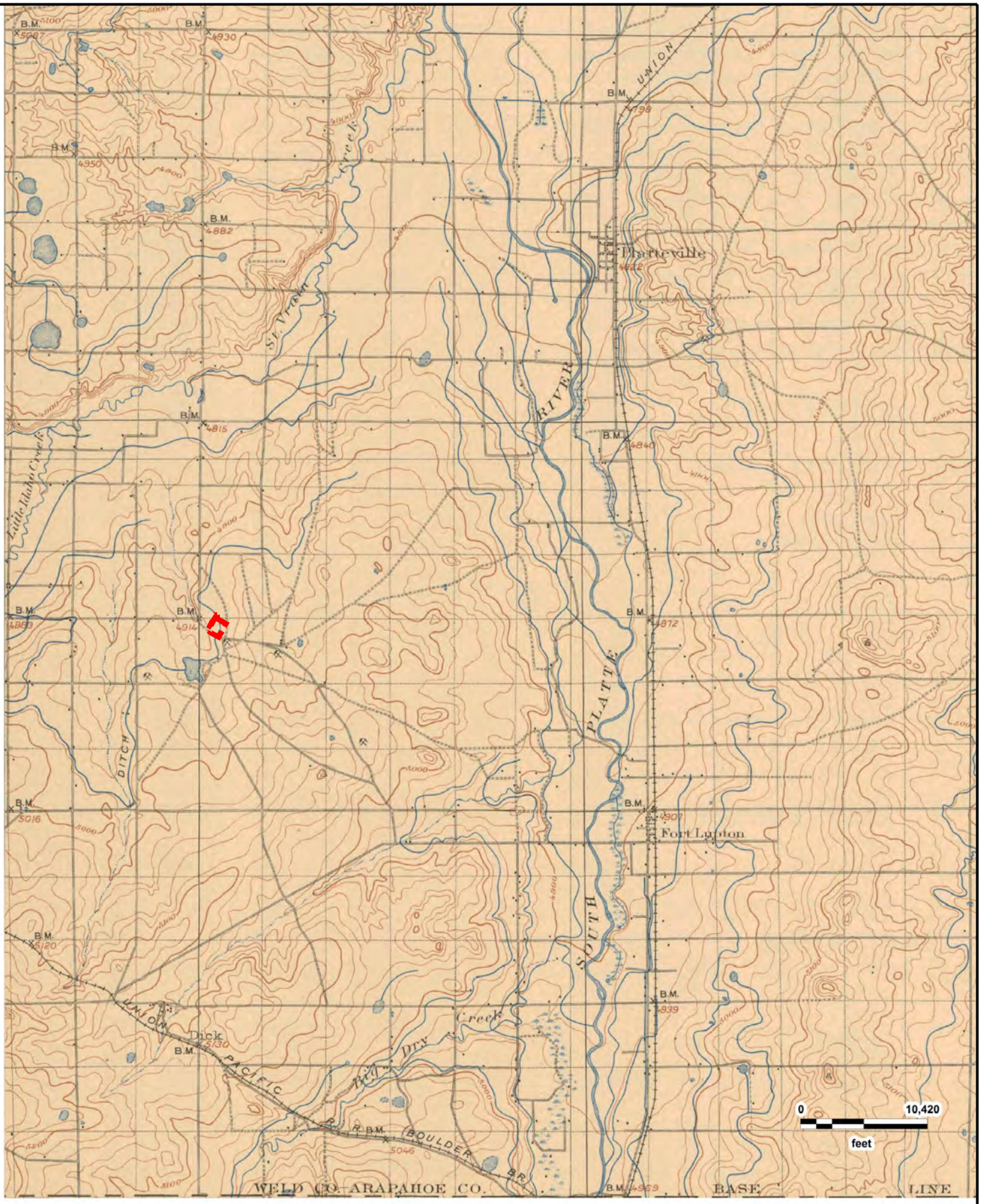


N
W E
S

McGavin
GOWANDA, CO (1949), FREDERICK, CO (1950)

GeoSearch

JOB #: 412770 - 06/10/2021



N
W E
S

McGavin
GREELEY, CO (1902)

GeoSearch

JOB #: 412770 - 06/10/2021

Appendix F: City Directory Report

City Directory Target Property Address

Target Property:

County Rd 13,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

County Rd 13, Longmont, CO 80504

1 COUNTY RD 13

2021	STREET BEGINS		INFOUSA	NORTH WEST
2016	STREET BEGINS		INFOUSA	NORTH WEST
2011	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
1996	STREET NOT LISTED		COLE DIRECTORY	LONGMONT
1989-90	RANGE NOT LISTED- BEGINS WITH 16219		US WEST	BOULDER - LONGMONT

8080 COUNTY RD 13

2006	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2006	HERITAGE BANK		COLE DIRECTORY	LONGMONT-BOULDER
2006	RE/MAX HORIZONS	200	COLE DIRECTORY	LONGMONT-BOULDER

8100 COUNTY RD 13

2006	TIP TOE NIALS		COLE DIRECTORY	LONGMONT-BOULDER
2006	CARBON VALLEY EYE CARE		COLE DIRECTORY	LONGMONT-BOULDER
2006	JAZZY BEAN COFFEE		COLE DIRECTORY	LONGMONT-BOULDER
2006	JAZZY BEAN COFFEEHOUSE LLC		COLE DIRECTORY	LONGMONT-BOULDER
2006	TIP TOE NIALS		COLE DIRECTORY	LONGMONT-BOULDER
2006	WRIGHT H LINDSAY O D		COLE DIRECTORY	LONGMONT-BOULDER
2006	NANCY WYCKOFF		COLE DIRECTORY	LONGMONT-BOULDER
2006	ZADEL AND ASSOCIATES REALTY INC		COLE DIRECTORY	LONGMONT-BOULDER

8134 COUNTY RD 13

2006	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER

8180 COUNTY RD 13

2006	SADDLEBACK GREPES AND GRIANS		COLE DIRECTORY	LONGMONT-BOULDER

8196 COUNTY RD 13

2006	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2006	CARIBBEAN TAN INC	N6	COLE DIRECTORY	LONGMONT-BOULDER
2006	CURVES FOR WOMEN	N5	COLE DIRECTORY	LONGMONT-BOULDER
2006	MJ MORRELL INC	N5	COLE DIRECTORY	LONGMONT-BOULDER
2006	SUBWAY FIRESTONE		COLE DIRECTORY	LONGMONT-BOULDER
2006	VIDEO PLUS		COLE DIRECTORY	LONGMONT-BOULDER

9031 COUNTY RD 13

2021	CLEVER TECHNOLOGY INC		INFOUSA	NORTH WEST
2021	CLEVER LARRY		INFOUSA	NORTH WEST
2016	CLEVER TECHNOLOGY INC		INFOUSA	NORTH WEST
2016	CLEVER LARRY		INFOUSA	NORTH WEST
2011	LARRY CURTIS CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SUSAN W CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2011	CLEVER TECHNOLOGY INC		COLE DIRECTORY	LONGMONT-BOULDER
2006	LARRY CURTIS CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	SUSAN W CLEVER		COLE DIRECTORY	LONGMONT-BOULDER
2006	CLEVER TECHNOLOGY INC		COLE DIRECTORY	LONGMONT-BOULDER
2001	LARRY CLEVER		COLE DIRECTORY	LONGMONT-BOULDER

9340 COUNTY RD 13

2021	KOSTELECKY DUANE		INFOUSA	NORTH WEST
2016	CLOWES PATRICK		INFOUSA	NORTH WEST
2016	KOSTELECKY DUANE		INFOUSA	NORTH WEST
2011	HEARST JAMES PRESSLY		COLE DIRECTORY	LONGMONT-BOULDER

2011	NANCY ANN PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2006	HEARST J PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2006	NANCY A PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER
2001	HEARST PRESSLY	COLE DIRECTORY	LONGMONT-BOULDER

9350 COUNTY RD 13

2016	JAQUISH JENNIFER	INFOUSA	NORTH WEST
2011	BERINIKAY K BEITZEL	COLE DIRECTORY	LONGMONT-BOULDER
2011	DONALD J BEITZEL	COLE DIRECTORY	LONGMONT-BOULDER
2006	FOREST E MCCONNELL	COLE DIRECTORY	LONGMONT-BOULDER
2006	JACQUELINE K MCCONNELL	COLE DIRECTORY	LONGMONT-BOULDER
2006	TRANSCRIBE PRO	COLE DIRECTORY	LONGMONT-BOULDER

9480 COUNTY RD 13

2021	FUERST JORDAN	INFOUSA	NORTH WEST
2016	FUERST JORDAN	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	DONNA MARIA PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN J PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER

9501 COUNTY RD 13

2021	PAYTON HARLIN II	INFOUSA	NORTH WEST
2021	ZRIMSEK SANDRA	INFOUSA	NORTH WEST
2016	RECYCLED AUDIO INC	INFOUSA	NORTH WEST
2016	SAMUEL JOSHUA	INFOUSA	NORTH WEST
2011	RECYCLED AUDIO INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	RECYCLED AUDIO INC	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOSHUA MOSES SAMUEL	COLE DIRECTORY	LONGMONT-BOULDER

2001	ITA CORTALE	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOSHUA SAMUEL	COLE DIRECTORY	LONGMONT-BOULDER

9661 COUNTY RD 13

2021	KINNEY WILLIAM	INFOUSA	NORTH WEST
2016	KINNEY WILLIAM	INFOUSA	NORTH WEST
2011	MARY JANE KINNEY	COLE DIRECTORY	LONGMONT-BOULDER
2011	WILLIAM E KINNEY	COLE DIRECTORY	LONGMONT-BOULDER
2006	WAYNE R POUND	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

9703 COUNTY RD 13

2021	MINNER JOSIAH	INFOUSA	NORTH WEST
2016	DURKIN JOHN JR	INFOUSA	NORTH WEST
2011	MICHELLE A JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2011	STEPHEN THOMAS JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2006	MICHELLE A JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2006	STEPHEN THOMAS JEFFRES	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

9783 COUNTY RD 13

2021	MAESTAS MATTHEW	INFOUSA	NORTH WEST
2021	MUMBY MARY	INFOUSA	NORTH WEST
2016	MAESTAS MATTHEW	INFOUSA	NORTH WEST
2011	DESERIE DAWN IARUSSI	COLE DIRECTORY	LONGMONT-BOULDER
2011	KEVIN J IARUSSI	COLE DIRECTORY	LONGMONT-BOULDER
2006	BETTY L VENO	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN T VENO	COLE DIRECTORY	LONGMONT-BOULDER

2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
2001	X [COUNTY ROAD 22 INTS]	COLE DIRECTORY	LONGMONT-BOULDER

9815 COUNTY RD 13

2021	MOORE GERALD	INFOUSA	NORTH WEST
2016	MOORE GERALD	INFOUSA	NORTH WEST
2011	CAROLINE M MOORE	COLE DIRECTORY	LONGMONT-BOULDER
2011	GERALD WAYNE MOORE SR	COLE DIRECTORY	LONGMONT-BOULDER
2006	CAROLINE M MOORE	COLE DIRECTORY	LONGMONT-BOULDER
2006	GERALD WAYNE MOORE SR	COLE DIRECTORY	LONGMONT-BOULDER

9943 COUNTY RD 13

2021	BROOKER KEN	INFOUSA	NORTH WEST
2021	KEN'S PAINT & BODY SHOP	INFOUSA	NORTH WEST
2016	BROOKER KEN	INFOUSA	NORTH WEST
2011	KENNETH T BROOKER	COLE DIRECTORY	LONGMONT-BOULDER
2011	SANDRA KAY BROOKER	COLE DIRECTORY	LONGMONT-BOULDER
2011	KENS PAINT AND BODY SHOP	COLE DIRECTORY	LONGMONT-BOULDER
2006	KENS PAINT AND BODY SHOP	COLE DIRECTORY	LONGMONT-BOULDER
2001	KENS PNT&BODY SHP	COLE DIRECTORY	LONGMONT-BOULDER
2001	X [COUNTY ROAD 24 INTS]	COLE DIRECTORY	LONGMONT-BOULDER

10141 COUNTY RD 13

2021	PAT C GREYHOUND KENNEL INC	INFOUSA	NORTH WEST
2021	COLLINS PATRICK	INFOUSA	NORTH WEST
2016	PAT C GREYHOUND KENNEL INC	INFOUSA	NORTH WEST
2016	COLLINS PATRICK	INFOUSA	NORTH WEST
2011	LENORA B COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2011	PATRICK L COLLINS	COLE DIRECTORY	LONGMONT-BOULDER

2011	X [BOOTH DR INTS]	COLE DIRECTORY	LONGMONT-BOULDER
2006	LENORA B COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2006	PATRICK L COLLINS	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER

Comment:

City Directory Target Property Address

Target Property:

Colorado Blvd,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

Colorado Blvd, Longmont, CO 80504

1 COLORADO BLVD

2021	STREET BEGINS		INFOUSA	NORTH WEST
2019	STREET BEGINS		INFOUSA	NORTH WEST
2014	STREET BEGINS		INFOUSA	NORTH WEST
2011	STREET BEGINS		COLE DIRECTORY	LONGMONT-BOULDER
2006	STREET NOT LISTED		COLE DIRECTORY	LONGMONT-BOULDER
2001	STREET NOT LISTED		COLE DIRECTORY	LONGMONT

7133 COLORADO BLVD

2021	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2021	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2019	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2019	X [END OF LISTINGS]		INFOUSA	NORTH WEST
2014	DISCOUNT TIRE & SVC		INFOUSA	NORTH WEST
2014	X [END OF LISTINGS]		INFOUSA	NORTH WEST

8080 COLORADO BLVD

2011	PREMIER MEMBERS FEDERAL CREDIT UNION		COLE DIRECTORY	LONGMONT-BOULDER

8110 COLORADO BLVD

2011	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2011	CARBON VALLEY EYE CARE		COLE DIRECTORY	LONGMONT-BOULDER
2011	GREAT CLIPS	S3	COLE DIRECTORY	LONGMONT-BOULDER
2011	TIP TOE NAILS		COLE DIRECTORY	LONGMONT-BOULDER
2011	WAH WOK CHINESE FOOD		COLE DIRECTORY	LONGMONT-BOULDER

8132 COLORADO BLVD

2011	0001 ALL KINGS LOCKSMITH		COLE DIRECTORY	LONGMONT-BOULDER

8134 COLORADO BLVD

2011	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER
2011	SAFEWAY		COLE DIRECTORY	LONGMONT-BOULDER

City Directory Target Property Address

Colorado Blvd, Longmont, CO 80504

8196 COLORADO BLVD

2011	AAA COLORADO LOCKSMITH		COLE DIRECTORY	LONGMONT-BOULDER
2011	CHOCHOS		COLE DIRECTORY	LONGMONT-BOULDER
2011	LIQUOR CARBON VALLEY LIQUOR		COLE DIRECTORY	LONGMONT-BOULDER
2011	LONGS PEAK DENTAL		COLE DIRECTORY	LONGMONT-BOULDER
2011	NEAT REPEATS THRIFT AND GIFT		COLE DIRECTORY	LONGMONT-BOULDER
2011	SUBWAY SANDWICHES		COLE DIRECTORY	LONGMONT-BOULDER

8252 COLORADO BLVD

2011	ACE HARDWARE		COLE DIRECTORY	LONGMONT-BOULDER

8308 COLORADO BLVD

2011	ADAMS BANK & TRUST		COLE DIRECTORY	LONGMONT-BOULDER
2011	CARDINAL HEALTH		COLE DIRECTORY	LONGMONT-BOULDER
2011	FLANNAGAN CLINT R MD		COLE DIRECTORY	LONGMONT-BOULDER
2011	NORTH VISTA MEDICAL CENTER		COLE DIRECTORY	LONGMONT-BOULDER
2011	SMITH DANIEL ATTORNEY		COLE DIRECTORY	LONGMONT-BOULDER
2011	TUSEK DAVID MD		COLE DIRECTORY	LONGMONT-BOULDER

8350 COLORADO BLVD

2011	BUILDING		COLE DIRECTORY	LONGMONT-BOULDER
2011	BLACK JACK PIZZA		COLE DIRECTORY	LONGMONT-BOULDER
2011	DAIRY QUEEN	190	COLE DIRECTORY	LONGMONT-BOULDER
2011	EDWARD JONES FINANCIAL ADVISOR BR	130	COLE DIRECTORY	LONGMONT-BOULDER
2011	EMERGENCY LOCKSMITH 24 HOUR		COLE DIRECTORY	LONGMONT-BOULDER
2011	SNAP FITNESS	150	COLE DIRECTORY	LONGMONT-BOULDER

10925 COLORADO BLVD			
2011	AUTOZONE	COLE DIRECTORY	LONGMONT-BOULDER
11040 COLORADO BLVD			
2011	CHASE	COLE DIRECTORY	LONGMONT-BOULDER
2011	X [END OF LISTINGS]	COLE DIRECTORY	LONGMONT-BOULDER

Comment: Listed in Longmont and Firestone.

City Directory Target Property Address

Target Property:

County Rd 20,

Longmont, CO 80504

Prepared For:
Two Dot Consulting, LLC

Order #: 166401

Project #: 603-129

Date: 6/10/2021

City Directory Target Property Address

County Rd 20, Longmont, CO 80504

1 COUNTY RD 20			
1996	STREET NOT LISTED	COLE DIRECTORY	LONGMONT
1989-90	STREET NOT LISTED	US WEST	BOULDER - LONGMONT
2832 COUNTY RD 20			
2021	COLCLASURE JACE	INFOUSA	NORTH WEST
2910 COUNTY RD 20			
2011	BETTY R MEYER	COLE DIRECTORY	LONGMONT-BOULDER
2011	WALLACE HARDIN MEYER	COLE DIRECTORY	LONGMONT-BOULDER
5830 COUNTY RD 20			
2006	JOSHUA GOODMAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	FINLEY JCK MSNG	COLE DIRECTORY	LONGMONT-BOULDER
6071 COUNTY RD 20			
2021	DUSO PEGGY	INFOUSA	NORTH WEST
2021	HARRISON TAFFYETTE	INFOUSA	NORTH WEST
2016	DUSO LAWRENCE SR	INFOUSA	NORTH WEST
2016	HARRISON TAFFYETTE	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	REBECCA A LYALL	COLE DIRECTORY	LONGMONT-BOULDER
2001	C CONGER	COLE DIRECTORY	LONGMONT-BOULDER
6073 COUNTY RD 20			
2021	GLEIM MARCY	INFOUSA	NORTH WEST
2021	KNOLLENBERG MARGARET	INFOUSA	NORTH WEST
2021	SELLERS MILLY	INFOUSA	NORTH WEST
2016	GLEIM JASON	INFOUSA	NORTH WEST
2011	WAYNE VANHEUSDEN	COLE DIRECTORY	LONGMONT-BOULDER
6075 COUNTY RD 20			
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

2006	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

6077 COUNTY RD 20

2006	JOHN PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER
2001	JOHN PAWLIK	COLE DIRECTORY	LONGMONT-BOULDER

6099 COUNTY RD 20

2021	NOFSINGER KAREN	INFOUSA	NORTH WEST
2021	TYMOEZKO DARRELL	INFOUSA	NORTH WEST
2011	LARRY OTIS FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2011	RICHARD L FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2006	LARRY OTIS FULTON	COLE DIRECTORY	LONGMONT-BOULDER
2006	RICHARD L FULTON	COLE DIRECTORY	LONGMONT-BOULDER

6171 COUNTY RD 20

2021	COAL RIDGE ANIMAL HOSPITAL	INFOUSA	NORTH WEST
2016	COAL RIDGE ANIMAL HOSPITAL	INFOUSA	NORTH WEST
2011	COAL RIDGE ANIMALS HOSPITAL	COLE DIRECTORY	LONGMONT-BOULDER
2006	COAL RIDGE KENNELS	COLE DIRECTORY	LONGMONT-BOULDER

6173 COUNTY RD 20

2021	KNUDSON KURT	INFOUSA	NORTH WEST
2016	KNUDSON KURT	INFOUSA	NORTH WEST
2011	ANITA ROSE KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2011	KUSRT E KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	ANITA ROSE KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2006	KURT E JNUDSON	COLE DIRECTORY	LONGMONT-BOULDER
2001	KURT KNUDSON	COLE DIRECTORY	LONGMONT-BOULDER

6247 COUNTY RD 20

2021	OCONNOR DANIEL	INFOUSA	NORTH WEST

2016	OCONNOR DANIEL	INFOUSA	NORTH WEST
2011	DANIEL J OCONNOR	COLE DIRECTORY	LONGMONT-BOULDER
2011	KAREN LAVON OCONNOR	COLE DIRECTORY	LONGMONT-BOULDER

6251 COUNTY RD 20

2021	BEILAND KEVIN	INFOUSA	NORTH WEST
2011	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER
2006	CARL MSMITH	COLE DIRECTORY	LONGMONT-BOULDER

6261 COUNTY RD 20

2011	JOHN ARTHUR KANE	COLE DIRECTORY	LONGMONT-BOULDER
2011	TRACY LEIGH KANE	COLE DIRECTORY	LONGMONT-BOULDER
2006	JOHN ARTHUR KANE	COLE DIRECTORY	LONGMONT-BOULDER
2006	TRACY LEIGH KANE	COLE DIRECTORY	LONGMONT-BOULDER

6271 COUNTY RD 20

2021	COOPER WALTER	INFOUSA	NORTH WEST
2016	COOPER WALTER	INFOUSA	NORTH WEST
2011	DEBORAH PETTIBONE COOPER	COLE DIRECTORY	LONGMONT-BOULDER
2011	WALTER LOUIS COOPER	COLE DIRECTORY	LONGMONT-BOULDER
2006	BRAIN J FAZIO JR	COLE DIRECTORY	LONGMONT-BOULDER
2006	KAREN M FAZIO	COLE DIRECTORY	LONGMONT-BOULDER
2006	WOODSMITH CONSTRUCTION	COLE DIRECTORY	LONGMONT-BOULDER
2001	NO CURRENT LISTING	COLE DIRECTORY	LONGMONT-BOULDER

6291 COUNTY RD 20

2021	LAM CRAIG	INFOUSA	NORTH WEST
2011	JERALD D KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
2011	HARRIET OPAL KLINETOBE	COLE DIRECTORY	LONGMONT-BOULDER

2006	HARRIET OPAL KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
2006	JERALD D KLIENTOBE	COLE DIRECTORY	LONGMONT-BOULDER
6297 COUNTY RD 20			
2021	CONIFF JEFFREY	INFOUSA	NORTH WEST
6325 COUNTY RD 20			
2021	GRAY JENNIFER	INFOUSA	NORTH WEST
2021	PENNER SAMUEL	INFOUSA	NORTH WEST
2016	FUCHS CHRISTOPHER	INFOUSA	NORTH WEST
2011	BERNA M BRYAN	COLE DIRECTORY	LONGMONT-BOULDER
2006	BERNA M BRYAN	COLE DIRECTORY	LONGMONT-BOULDER
2001	APARTMENTS	COLE DIRECTORY	LONGMONT-BOULDER
6343 COUNTY RD 20			
2021	RICH KEVIN	INFOUSA	NORTH WEST
6363 COUNTY RD 20			
2021	DVORAK KATHERINE	INFOUSA	NORTH WEST
2016	DVORAK KATHERINE	INFOUSA	NORTH WEST
2011	KATHERINE M DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
2011	ROBERT J DOVRAK	COLE DIRECTORY	LONGMONT-BOULDER
2006	KATHERINE M DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
2006	ROBERT J DOVRAK	COLE DIRECTORY	LONGMONT-BOULDER
2001	ROBERT DVORAK	COLE DIRECTORY	LONGMONT-BOULDER
6395 COUNTY RD 20			
2011	JENNIFER S ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER
2011	LOWELL M ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER
2006	LOWELL M ALDERFER	COLE DIRECTORY	LONGMONT-BOULDER

City Directory Target Property Address

County Rd 20, Longmont, CO 80504

6399 COUNTY RD 20

2021	CLEMMER JAMES	INFOUSA	NORTH WEST
2016	CLEMMER JAMES	INFOUSA	NORTH WEST
2001	MIKE BLUE	COLE DIRECTORY	LONGMONT-BOULDER

Comment:

Appendix G: Site Photographs



Photograph 1. Center of Project Area.



Photograph 2. Center of Project Area.



Photograph 3. Center of the Project.



Photograph 4. Center of the Project.



Photograph 5. Ephemeral drainage area intersecting the Project Area. No wetlands are present within the Project Area.

Section 10

Cultural Assessment

The cultural assessment is included in the Phase I Environmental Study in Section 9

Section 11

Lighting Plan

Lighting Mitigation Plan

For



KerrMcGee

Kerr McGee Oil & Gas Onshore LP

McGavin 6-19 HZ

Project Number: 21010

Originators:	D. Nowicki / L. Ohl	Date	6-3-21
Project Engineer Approval:	D. Nowicki	Date	6-3-21
Project Manager Approval:	B. Primeaux	Date	6-3-21
Client Approval:		Date	

Rev. No.	By	Revisions	Approval	Date
0	DN/LO	Issued for Attachment for Permit	BP	6-14-21
1	DN/LO	Issued for Attachment for Permit	BP	6-30-21

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1.0 EXECUTIVE SUMMARY

Kerr McGee Oil & Gas Onshore LP commissioned Samuel Engineering to develop a lighting mitigation plan for the McGavin 6-19 HZ pad site. The purpose of this report is to demonstrate compliance with the various State and Local lighting regulations, predict lighting impacts for the different development phases, and to detail the various lighting mitigation techniques used to limit light pollution.

Specially, the key points of the study are:

- Demonstrate compliance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 424.
- Identify the light level impacts associated with each phase of the facility operations on surrounding buildings.
- Demonstrate compliance with the total lighting used based on site working surfaces.
- Demonstrate the various lighting mitigation techniques that were implemented.

Site specific three-dimensional lighting models were developed for each of the phases to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems.

The following Table 1.0 summarizes the calculated maximum values compared to the regulatory limits:

Calculated Lighting Values and Regulatory Limits Summary			
	Calculated Value	**Regulatory Limit**	**Code Reference**
Max. Light Impact on Surrounding Building	1.6 lux	≤ 4.0 lux	*COGCC 424.f*
Pre-Production – Drilling Phase (Lumens / Hardscape)	5.3 lm/ft²	≤ 12 lm/ft²	
Pre-Production – Completions Phase (Lumens / Hardscape)	9.2 lm/ft²	≤ 12 lm/ft²	
Production (Lumens / Hardscape)	< 0.1 lm/ft²	≤ 2.5 lm/ft²	*COGCCC Rule 424.d.(2) for Agricultural/Commercial*

Table 1.0 - Calculated Lighting Values and Regulatory Limits

All calculated values are within prescribed regulatory limits.

2.0 INTRODUCTION AND DEFINITION OF TECHNICAL TERMS

2.1 INTRODUCTION

Light mitigation plans seek to quantify and prescribe methods to address the negative effects of multiple forms of light pollution. Effective lighting mitigation plans address light pollution by limiting the impacts on the surrounding communities, preserving the overall night-sky aesthetics, and maintaining existing ecosystems, all while maintaining a safe work environment.

There are a number of standards, best practices, and regulations which are used as guidelines when developing lighting plans for reducing the negative effects of artificial lighting. The applicable regulation used for this report is COGCC Rule 424.

2.2 DEFINITION OF TECHNICAL TERMS

A number of technical terms are used throughout this report and, as an aid to the reader, are defined below.

Illuminance (lx)

Illuminance is defined as the amount of light falling on a surface area. It is measured in Lux (lx). One lux is equal to one lumen per square meter. As an example, the photo in Figure 2.2 shows the lux levels decreasing on the sidewalk, as the distance from the light source increases.

Illuminance is often associated with values for lighting levels for safe operation in various standard codes. In addition, photometric plans are used to predict the illuminance on surfaces of an area to provide minimum lighting levels and for mitigation of light trespass into adjoining properties or areas. Most lighting meters units used today are in lux and used to measure these values at a given distance. It should be noted that the measured value is dependent on angle, sensitivity, and optics.

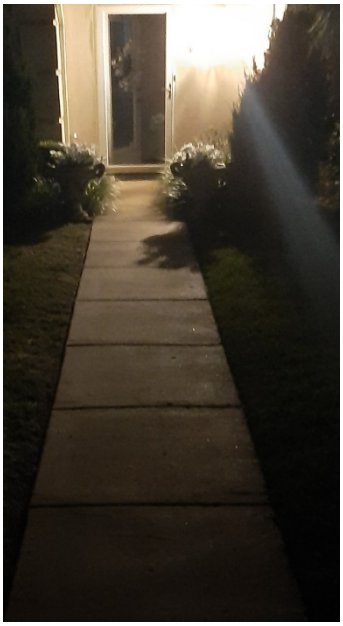


Figure 2.2–Illuminance (lx) level decreasing with distance from light source.

Table 2.2 below provides examples of typical Lux values.

Typical Lux Values	
Clear night, no moon:	0.002 lx
Clear night, full Moon:	0.27 to 1 lx
Family Living Room	50 lx
Sunrise/sunset	300-500 lx
Overcast day:	1000 lx
Daylight:	10,000-25,000 lx
Direct sunlight:	32,000-130,000 lx

Table 2.2 – Typical Lux Values

Luminous Flux(lm)

Luminous Flux is defined as the amount of light energy produced per unit time and is measured in Lumens (lm). It is a physical property of light and, in general terms, is a measurement of the total amount of light emanating from a source. It is important to note that the luminous flux value of a given source is independent of where a measurement is taken.

For example, a 60-watt light bulb produces approximately 800 lumens, regardless of if the measurement is taken at 1 foot, 10 miles, or 10,000 miles away from the source.

3.0 MODEL AND ANALYSIS DEVELOPMENT

Site-specific three-dimensional models were developed for each of the major project development phases. These phases are Pre-Production Drilling, Pre-Production Completions, and final Production. Elements incorporated into the models, among others, were the local site topographical information, major lighting obstructions (sound wall, large equipment, etc), individual luminaire lighting qualities, lighting mounting characteristics and surrounding building units.

The site geographical information was obtained using USGS topographical information to model the surrounding 1-mile landscape.

To determine the lighting impacts on local building units, 25-foot vertical walls were modeled at the units' locations, at the USGS identified elevations.

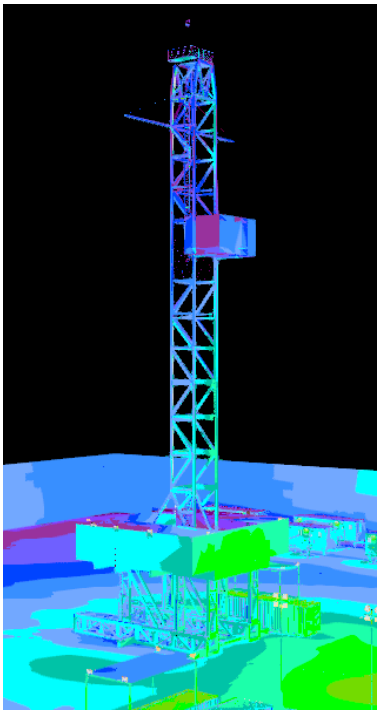


Figure 3.0–Screenshot from a representative 3-D model showing a false color rendering

Modeling of site-specific information (including large equipment, type of luminaire, and sound wall locations) were based on inspections of operational representative sites, provided vendor information, and research into various available lighting systems. The major pieces of equipment modeled included:

- Drilling: Drill rig floor, derrick, substructure, temporary lighting, sound barriers, backyard, and trailers.
- Completions: Temporary lighting, sound barriers, completion fleet equipment, and trailers.
- Production: LACT skids, separators, large tanks, and associated equipment.

Once site-specific topographical information and equipment were modeled, lighting characteristics were placed within the model. These characteristics were obtained from the various manufacturers and were specific to the make/model of the light to be used. The luminaires information included in the model were the type, quantity, mounting height, orientation, and tilt angle.

Models for each of the various project phases were developed in a similar manner and the resulting calculated lighting impacts were tabulated. An Excel spreadsheet was used to total the site lumens for each fixture and compared it to the site working pad surface (hardscape).

In the Pre-Production phases, temporary lighting fixtures were based on currently available rental units and on observations from representative sites. The temporary lighting system that will be used might vary based on rental availability at the time of procurement but is expected to be representative of the lumens values used in this analysis.

4.0 LIGHTING ANALYSIS RESULTS

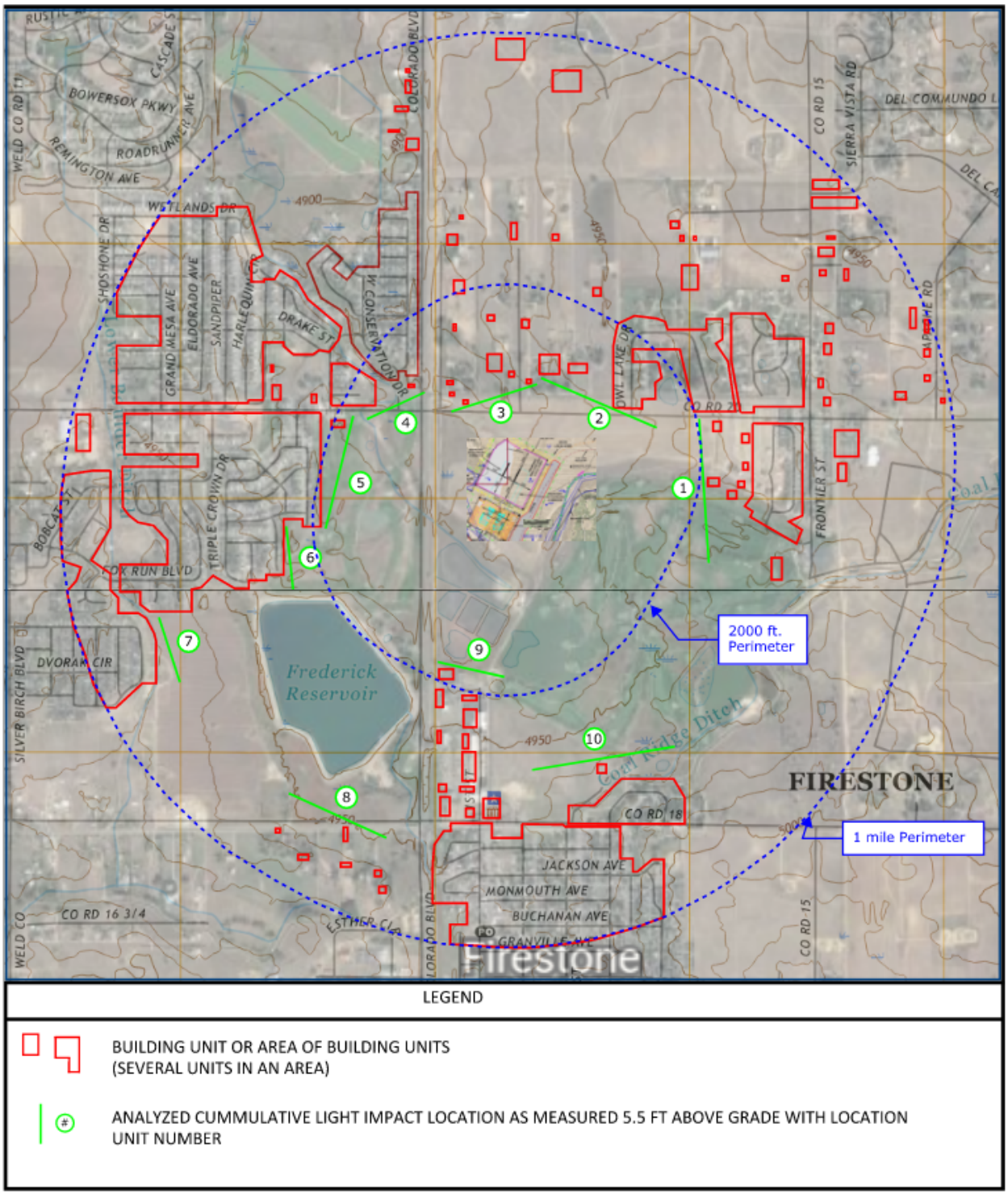
4.1 CUMULATIVE LIGHTING IMPACTS

Applicable Code Reference: COGCC Rule 424.f:
"Operators will develop site lighting to reduce cumulative nighttime light intensity from all Oil and Gas Facilities to 4 lux at any Residential Building Unit or High Occupancy Building Unit within 1 mile of any Oil and Gas Facility, measured at 5.5 feet above grade in a direct line of sight to the brightest light fixture onsite."

Due to the large number of building units located within the 1-mile radius of the site, buildings were grouped into clusters and a representative "wall" location was selected for analysis. These analyzed "wall" locations were selected to determine an upper cumulative light impact limit for that clustered group, considering the local topography, orientation, and distance to the site.

Figure 4.1 shows the building units that are located within a 1-mile radius of the McGavin 6-19 HZ site.

Figure 4.1 –Building Units Within a 1-Mile Radius of McGavin 6-19 HZ



Calculated Lighting Impact Results Building Units				
Location Unit No.	**Pre-Production Drilling**	**Pre-Production Completions (Single Crew)**	**Production**	**Regulatory Limit (COGCC 424.f)**
1	0.11 lux	0.32 Lux	< 0.1 lux	4 lux
2	1.6 lux	0.98 lux	< 0.1 lux	4 lux
3	1.1 lux	0.64 lux	< 0.1 lux	4 lux
4	0.12 lux	< 0.1 lux	< 0.1 lux	4 lux
5	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
6	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
7	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
10	< 0.1 lux	0.11 lux	< 0.1 lux	4 lux

Table 4.1 –Calculated Lighting Impact Results Building Units

Table 4.1 demonstrates compliance with COGCC Rule 424.f.

4.2 HARDSCAPE AND LUMEN LEVEL RESULTS

Lumens per Hardscape calculations were performed based on the number of exterior fixtures, light output (lumens) and the working pad surface (hardscape). These values were then compared to the regulatory allowed site lumens per square foot to demonstrate compliance.

4.2.1 PRE-PRODUCTION DRILLING LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Drilling Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	444,748 ft²	
Site Hardscape Acres:	10.21 Acres	
Site Total Lumens:	2,369,107 lm	See Section 5.2
Site Allowance Initial Lumens Total:	5,336,964 lm	
Calculated Site (Lumens / ft²):	5.3 lm/(ft²)	Construction Site is Verified

Table 4.2.1 –Pre-Production Drilling Operation Compliance Calculation

Based on the calculation shown in Table 4.2.1, the estimated site lighting during the Pre-Production Drilling operation phase is 5.3 lumens per square foot.

4.2.2 PRE-PRODUCTION COMPLETIONS LUMENS PER HARDSCAPE COMPLIANCE

Pre-Production Completions Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	444,748 ft²	
Site Hardscape Acres:	10.21 Acres	
Site Total Lumens:	4,082,512 lm	See Section 5.5
Site Allowance Initial Lumens Total:	5,336,964 lm	
Calculated Site (Lumens / ft²):	9.2 lm/(ft²)	Construction Site is Verified

Table 4.2.2 –Pre-Production Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.2, the estimated site lighting during the Pre-Production Completions operation phase is 9.2 lumens per square foot.

4.2.3 PRODUCTION LUMENS PER HARDSCAPE COMPLIANCE

Production Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	155,944 ft²	
Site Hardscape Acres:	3.58 Acres	
Site Total Lumens:	6,484 lm	See Section 5.6
Calculated Site Value:	< 0.1 lm/(ft²)	Production Site is Verified
Regulatory Allowed Limit:	2.5 lm/(ft²)	COGCC Rule 424.d.(2)

Table 4.2.3 –Pre-Production / Construction Completions Operation Compliance Calculation

Based on the calculation shown in Table 4.2.3, the estimated site lighting during the Production operation phase is less than the regulatory maximum value and in compliance with COGCC Rule 424.d.(2) for Commercial/Agricultural.

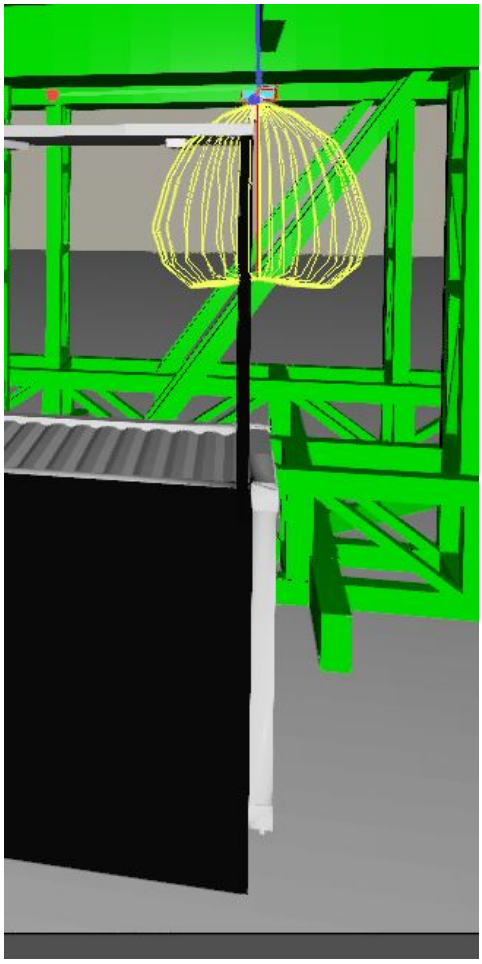
5.0 SITE LIGHTING POSITIONS AND ORIENTATION

5.1 SITE LIGHTING NOTES

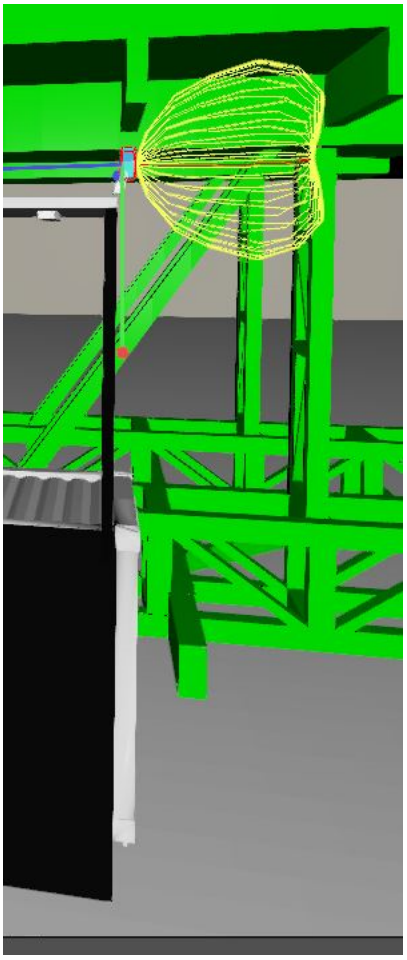
Applicable Code Reference: COGCC Rule 424(a)(2)(A)(ii)
Pertaining to Pre-Production activities: *"The proposed anticipated location, mounting, height, and orientation of all outdoor lighting fixtures on the site during pre-production activities"*

The following figures and tables in this section show the lighting location, mounting, height, and orientations for the Pre-Production Drilling, Completions, and Production Operations, in accordance with COGCC Rule 424(a)(2)(A)(ii). The following notes apply:

1) Stated tilt at zero (0) degrees represents a luminaire facing directly downward.



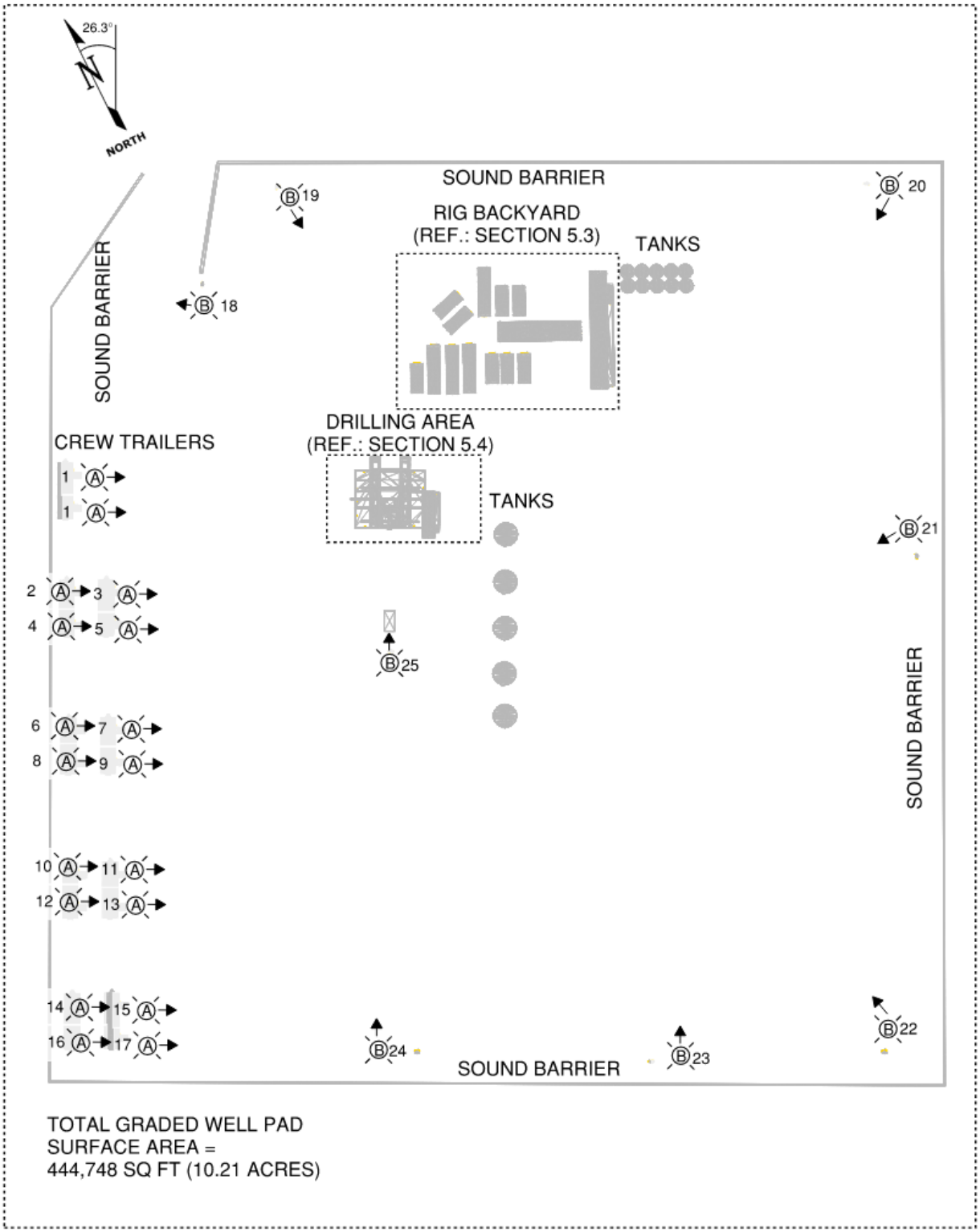
Example 0 degrees



Example 90 degrees

2) Intermittent sources of lights such as glow from on-site combustor and alarm lights are not included in this analysis.
3) Temporary lighting where necessary for safety reasons per COGCC 424.a.2.A.iii have not been modeled or accounted for in this analysis.
4) The quantity of lights and calculated values shown represents an estimated upper limit to the actual values that will be present on-site.
5) Refer to Attachment A for further lighting fixture information.

5.2 PRE-PRODUCTION - DRILLING SITE LAYOUT AND LUMINAIRE SCHEDULE



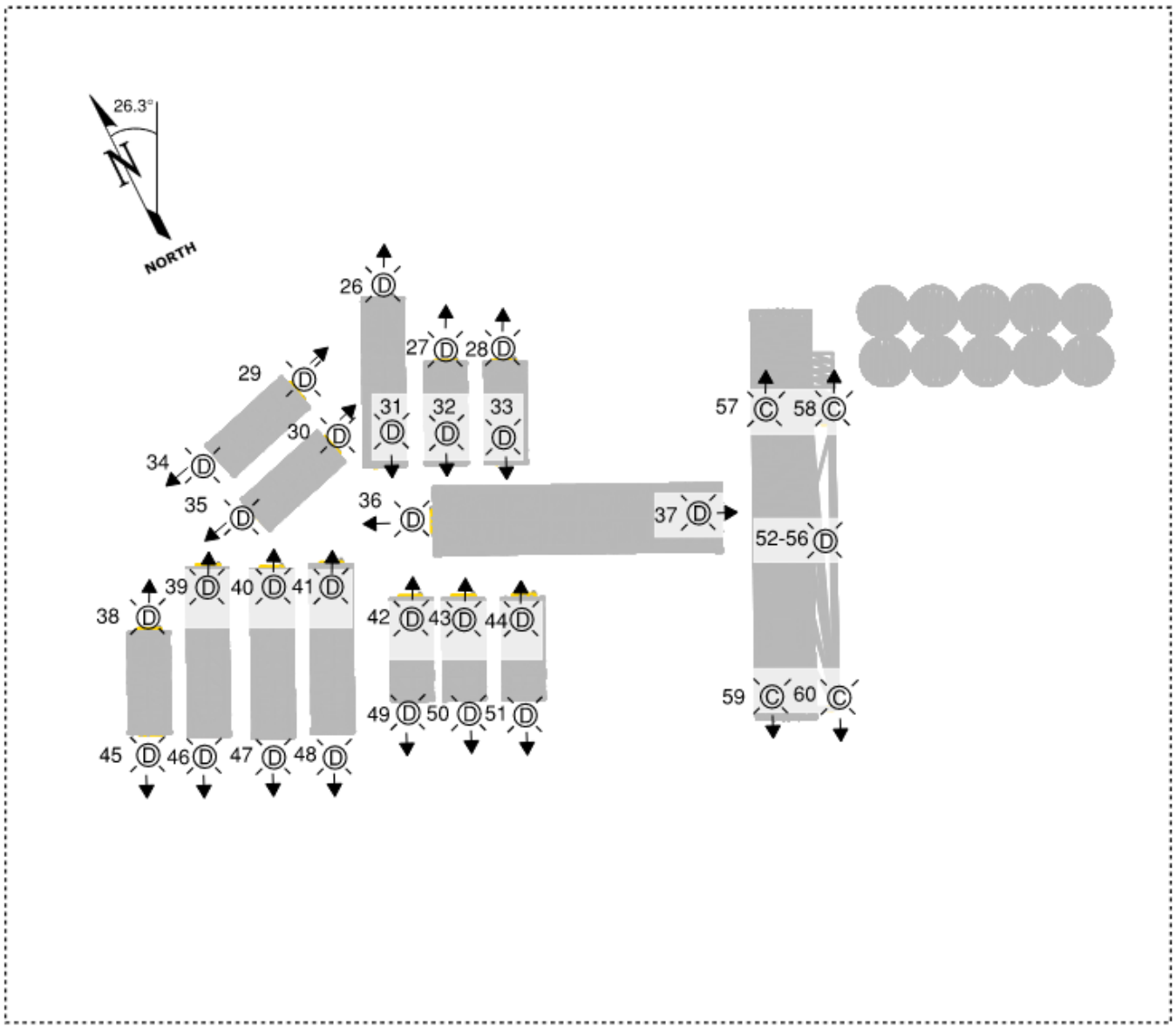
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – OVERALL PRE-PRODUCTION
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800 lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
1	11	90	A	5,800 lm
2	11	90	A	5,800 lm
3	11	90	A	5,800 lm
4	11	90	A	5,800 lm
5	11	90	A	5,800 lm
6	11	90	A	5,800 lm
7	11	90	A	5,800 lm
8	11	90	A	5,800 lm
9	11	90	A	5,800 lm
10	11	90	A	5,800 lm
11	11	90	A	5,800 lm
12	11	90	A	5,800 lm
13	11	90	A	5,800 lm
14	11	90	A	5,800 lm
15	11	90	A	5,800 lm
16	11	90	A	5,800 lm
17	11	90	A	5,800 lm
18	11	90	A	5,800 lm
19	30	75	B	213,648 lm
20	30	75	B	213,648 lm
21	30	75	B	213,648 lm
22	30	75	B	213,648 lm
23	30	75	B	213,648 lm
24	30	75	B	213,648 lm
25	30	75	B	213,648 lm

Total Lumens Calculation	
Subtotal Area Calculation:	1,599,936 lm
Total Section 5.3 Lumens:	332,553 lm
Total Section 5.4 Lumens:	436,618 lm
Total Area Lumens:	2,369,107 lm

5.3 PRE-PRODUCTION - DRILLING –RIG BACKYARD- SITE LAYOUT AND LUMINAIRE SCHEDULE



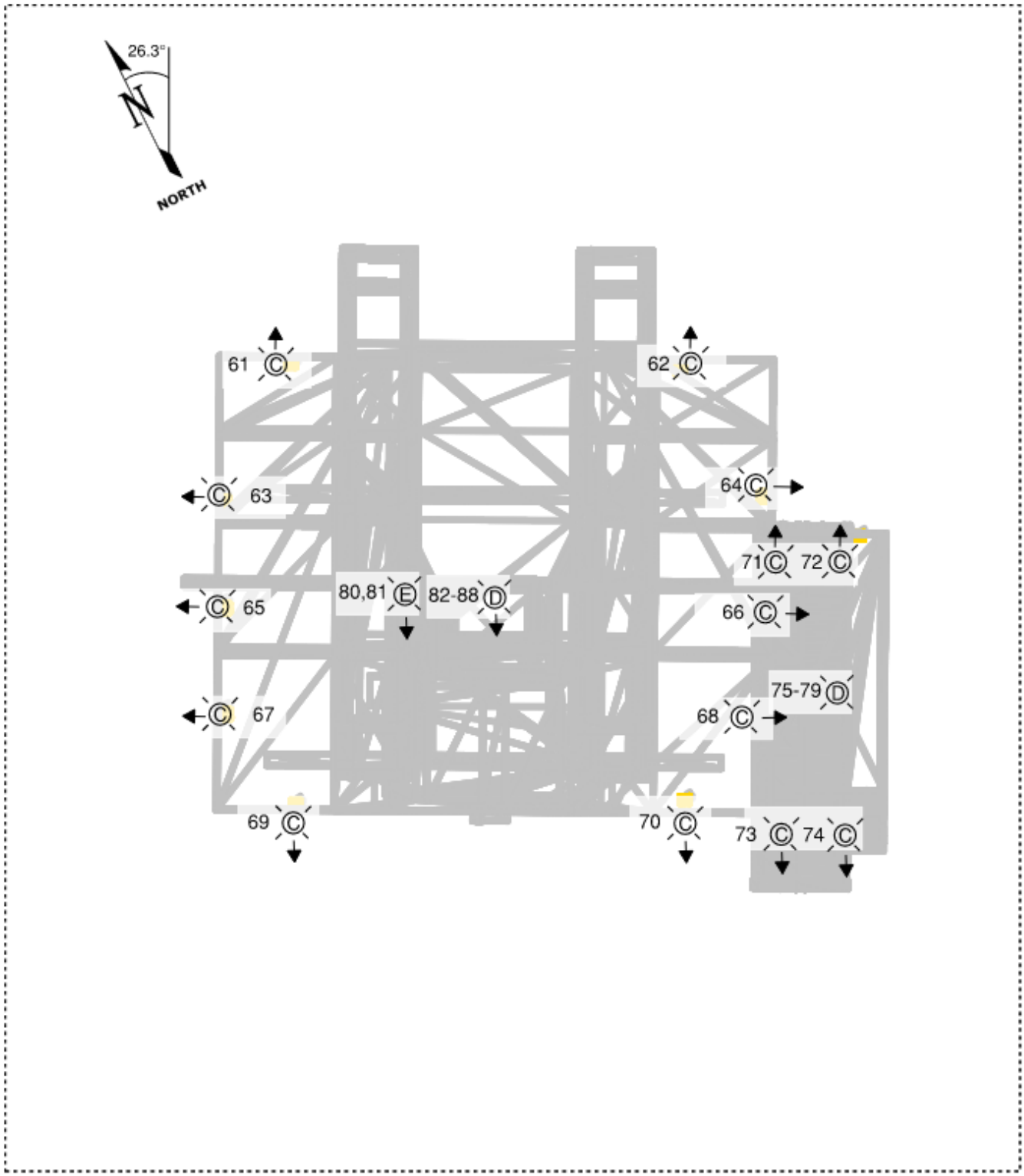
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – RIG BACKYARD
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091 lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
26	9	75	D	7,619 lm
27	9	75	D	7,619 lm
28	9	75	D	7,619 lm
29	9	75	D	7,619 lm
30	9	75	D	7,619 lm
31	9	75	D	7,619 lm
32	9	75	D	7,619 lm
33	9	75	D	7,619 lm
34	9	75	D	7,619 lm
35	9	75	D	7,619 lm
36	9	75	D	7,619 lm
37	9	75	D	7,619 lm
38	9	75	D	7,619 lm
39	9	75	D	7,619 lm
40	9	75	D	7,619 lm
41	9	75	D	7,619 lm
42	9	75	D	7,619 lm
43	9	75	D	7,619 lm
44	9	75	D	7,619 lm
45	9	75	D	7,619 lm
46	9	75	D	7,619 lm
47	9	75	D	7,619 lm
48	9	75	D	7,619 lm
49	9	75	D	7,619 lm
50	9	75	D	7,619 lm
51	9	75	D	7,619 lm
52	18	0	D	7,619 lm
53	18	0	D	7,619 lm
54	18	0	D	7,619 lm
55	18	0	D	7,619 lm
56	18	0	D	7,619 lm
57	20	75	C	24,091 lm
58	20	75	C	24,091 lm
59	20	75	C	24,091 lm
60	20	75	C	24,091 lm

Subtotal Lumens Calculation Section 5.3	
Subtotal Area Lumens:	**332,553 lm**

5.4 PRE-PRODUCTION - DRILLING –DRILL AREA - SITE LAYOUT AND LUMINAIRE SCHEDULE



LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – DRILL AREA

DRILLING OPERATIONS

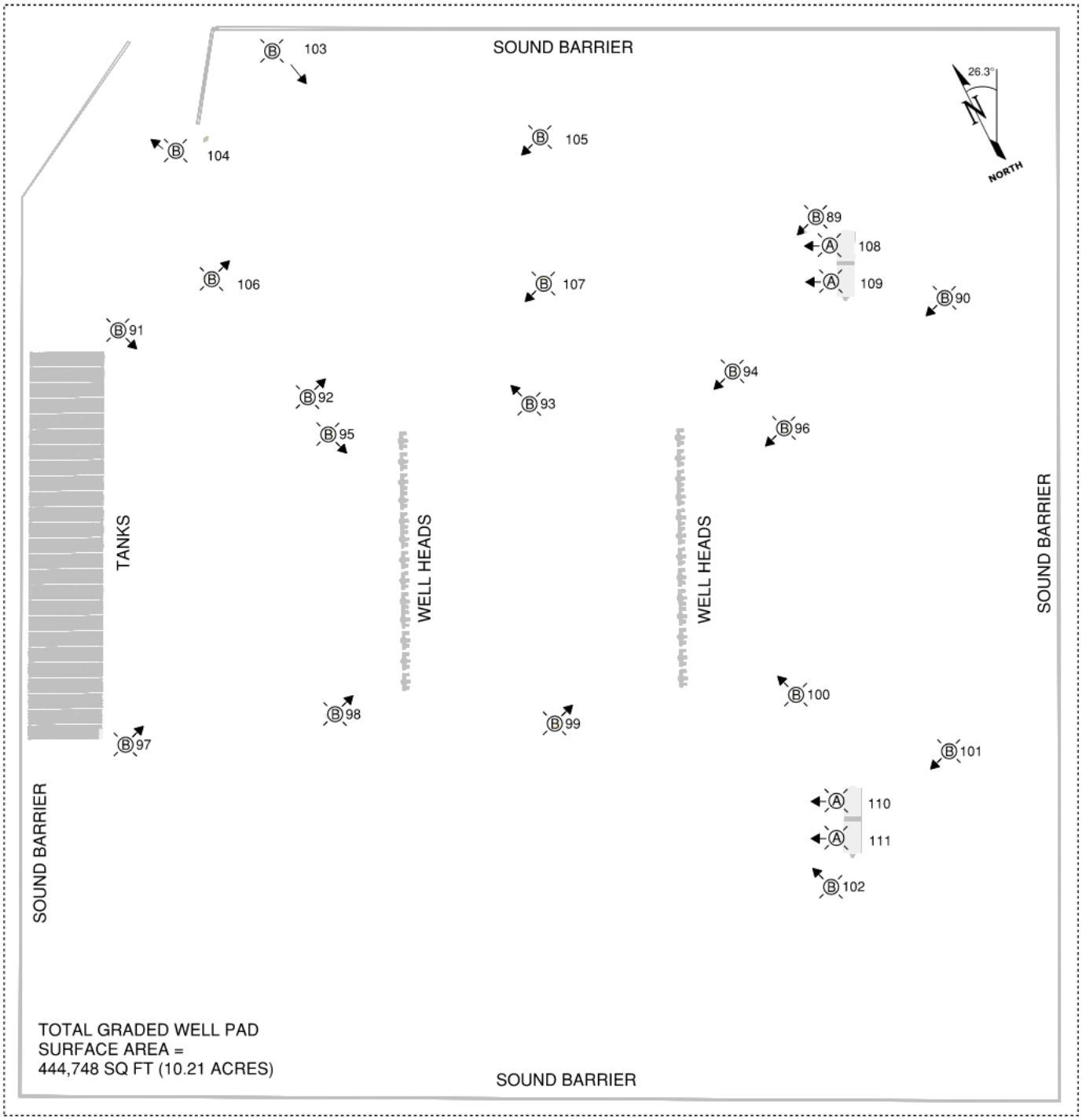
Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
C	EATON – COOPER CROUSE HINDS	DFLMYM400	HID – HAZ. AREA CLEAR CLASS	400 W	24,091lm
D	EATON – COOPER CROUSE HINDS	DLL4/UNV1S903	LED – 4FT LINEAR POLYCARBONATE	63 W	7,619 lm
E	EATON – COOPER CROUSE HINDS	DLL2/UNV1S903	LED – 2FT LINEAR POLYCARBONATE	32 W	3,958 lm

Luminaire Position and Tilt				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
61	36	75	C	24,091 lm
62	36	75	C	24,091 lm
63	36	75	C	24,091 lm
64	36	75	C	24,091 lm
65	36	75	C	24,091 lm
66	36	75	C	24,091 lm
67	36	75	C	24,091 lm
68	36	75	C	24,091 lm
69	36	75	C	24,091 lm
70	36	75	C	24,091 lm
71	20	75	C	24,091 lm
72	20	75	C	24,091 lm
73	20	75	C	24,091 lm
74	20	75	C	24,091 lm
75	18	0	D	7,619 lm
76	18	0	D	7,619 lm
77	18	0	D	7,619 lm
78	18	0	D	7,619 lm
79	18	0	D	7,619 lm

Luminaire Position and Tilt *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
80	40	90	E	3,958 lm
81	167	90	E	3,958 lm
82	52	90	D	7,619 lm
83	61	90	D	7,619 lm
84	73	90	D	7,619 lm
85	82	90	D	7,619 lm
86	92	90	D	7,619 lm
87	149	90	D	7,619 lm
88	158	90	D	7,619 lm

Subtotal Lumens Calculation Section 5.4	
Subtotal Area Lumens:	436,618 lm

5.5 PRE-PRODUCTION - COMPLETIONS - SITE LAYOUT AND LUMINAIRE SCHEDULE



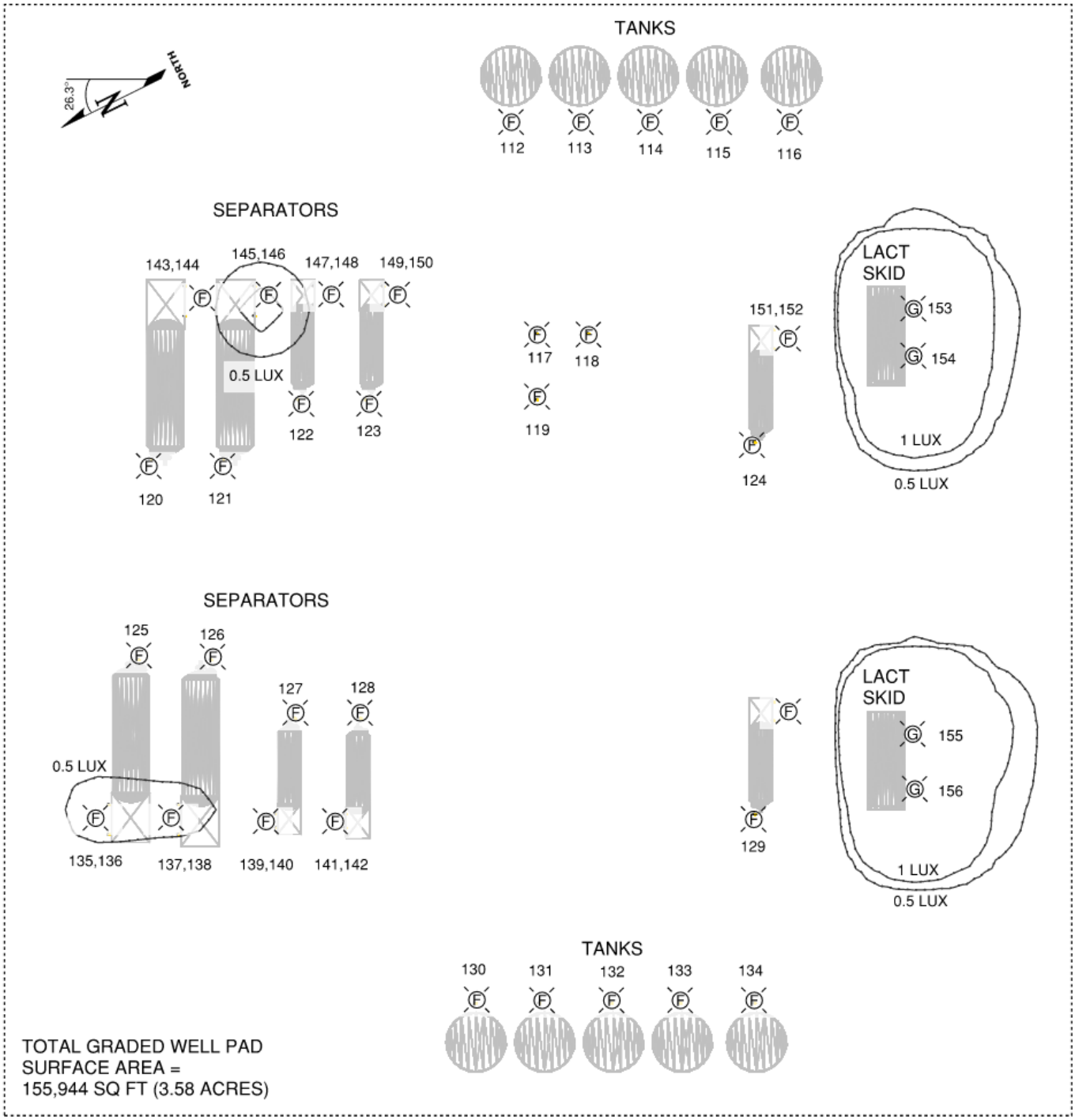
LUMINAIRE LAYOUT
MCGAVIN 6-19 HZ – COMPLETIONS AREA
COMPLETIONS OPERATIONS

Luminaire Schedule Single Crew					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
A	STANPRO	WPS	LED –WALL PACK	40 W	5,800lm
B	HPWINNER	M4	LED - TEMP. LIGHTING SYSTEM	1,696 W	213,648 lm

Luminaire Position and Tilt Single Crew				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
89	30	75	B	213,648 lm
90	30	75	B	213,648 lm
91	30	75	B	213,648 lm
92	30	75	B	213,648 lm
93	30	75	B	213,648 lm
94	30	75	B	213,648 lm
95	30	75	B	213,648 lm
96	30	75	B	213,648 lm
97	30	75	B	213,648 lm
98	30	75	B	213,648 lm
99	30	75	B	213,648 lm
100	30	75	B	213,648 lm
101	30	75	B	213,648 lm
102	30	75	B	213,648 lm
103	30	75	B	213,648 lm
104	30	75	B	213,648 lm
105	30	75	B	213,648 lm
106	30	75	B	213,648 lm
107	30	75	B	213,648 lm
108	11	90	A	5,800 lm
109	11	90	A	5,800 lm
110	11	90	A	5,800 lm
111	11	90	A	5,800 lm

Total Lumens Calculation	
Total Area Lumens:	4,082,512 lm

5.6 PRODUCTION - SITE LAYOUT, LUMINAIRE SCHEDULE, AND PHOTOMETIC



LUMINAIRE LAYOUT& PHOTOMETRIC
MCGAVIN 6-19 HZ – PRODUCTION AREA
PRODUCTION OPERATIONS

Luminaire Schedule					
Luminaire Type	**Manufacturer**	**Model Number**	**Description**	**Power (Watts)**	**Luminous Flux (Φ)**
F	RAYCHEM	E-100	LED HEAT TRACE END SEAL KIT	2 W	60 lm
G	PHOENIX	CL	LED CUBE LIGHT	13 W	1006lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
112	4.5	180	F	60 lm
113	4.5	180	F	60 lm
114	4.5	180	F	60 lm
115	4.5	180	F	60 lm
116	4.5	180	F	60 lm
117	4.5	180	F	60 lm
118	4.5	180	F	60 lm
119	4.5	180	F	60 lm
120	4.5	180	F	60 lm
121	4.5	180	F	60 lm
122	4.5	180	F	60 lm
123	4.5	180	F	60 lm
124	4.5	180	F	60 lm
125	4.5	180	F	60 lm
126	4.5	180	F	60 lm
127	4.5	180	F	60 lm
128	4.5	180	F	60 lm
129	4.5	180	F	60 lm
130	4.5	180	F	60 lm
131	4.5	180	F	60 lm
132	4.5	180	F	60 lm
133	4.5	180	F	60 lm
134	4.5	180	F	60 lm
135	4.5	180	F	60 lm
136	4.5	180	F	60 lm
137	4.5	180	F	60 lm
138	4.5	180	F	60 lm
139	4.5	180	F	60 lm
140	4.5	180	F	60 lm
141	4.5	180	F	60 lm
142	4.5	180	F	60 lm
143	4.5	180	F	60 lm
144	4.5	180	F	60 lm
145	4.5	180	F	60 lm

Luminaire Position and Tilt - *Continued*				
Luminaire No.	**Mounting Height (ft)**	**Tilt (Degrees)**	**Luminaire Type**	**Luminous Flux (Φ)**
146	4.5	180	F	60 lm
147	4.5	180	F	60 lm
148	4.5	180	F	60 lm
149	4.5	180	F	60 lm
150	4.5	180	F	60 lm
151	4.5	180	F	60 lm
152	4.5	180	F	60 lm
153	8.5	0	G	1,006 lm
154	8.5	0	G	1,006 lm
155	8.5	0	G	1,006 lm
156	8.5	0	G	1,006 lm

Total Lumens Calculation	
Total Area Lumens:	6484 lm

6.0 SITE MITIGATION NOTES AND BEST MANAGEMENT PRACTICES

The following mitigation notes and techniques apply:

1) To the extent possible, LED fixtures are used to reduce skyglow. This is based on the calculated results of the relative impact versus traditional lighting methods using DOE Skyglow comparison tool PNNL-SA-138348.

2) All lights have been positioned to point in a downward direction where vertical lighting is not required. Where it is required, lights are angled in a vertical direction to provide task lighting for safety and operations involving personnel.

3) Luminaire Type E and D used on the Derrick mast in Section 5.4 are facing horizontally to provide adequate lighting for safe operations.

4) To the extent possible, design considerations have been made regarding the type of light fixtures used, quantity, and positioning to reduce various forms of lighting pollution. Examples include:

   - Lighting is angled away from surrounding off site buildings.
   - Lighting within the Production area has been reduced to provide a minimum acceptable value for safe operations.
   - Light masts are automatically switched off/on based on lighting sensors.
   - Lights are switched off when not required.
   - Lights are directed to task areas only.
   - Low power (63W) LED lights are used for the drill rig.
   - Sound barriers are positioned to reduce lighting trespass to surrounding off-site buildings.
   - The calculated cumulative light impacts, as indicated in Section 4.1, on surrounding buildings within a one-mile radius area below 4 lux when measured 5.5 feet above grade.

5) Lighting Cut Sheet Notes for Attachment A

   1. Type A Fixtures
      - Type A fixtures are construction trailer lights. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. Lights varied significantly during site inspections. A representative model was selected based on a lumen output for a trailer.

   2. Type B fixtures
      - Type B fixtures are portable construction light towers with vertical masts. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. HP Winner M4 Model was selected for this analysis based on site inspections and current available units; however specific site units may vary based on time of construction. The model for these portable light towers consisted of a LED light source with 4 fixtures. Each of these fixtures were comprised of 4 LED modules mounted in a rectangular arrangement. The attached cut sheet for HP Winner represents 1 LED module. 16 total modules were modeled for each light mast.

- The typical light pole center of fixtures is raised approximately 30 feet from grade and pointed downward toward work area.

- The fixture mounting for portable light towers are articulated mountings which allows for both vertical and horizontal plane adjustments. For this analysis, the light mast fixtures were modeled at indicated angles.

3. Type F Fixtures
    - Type F Fixtures is an estimation of heat trace end kits. Photometric data from the manufacturer is not available. These lights are low power LED's mounted on the pipe where heat trace is installed. Mounting height, and location vary based on final design and installation.

7.0 ATTACHMENT

Attachment A – 21010 McGavin 6-19 HZ Lighting Fixture Cut Sheets Attachment

END OF REPORT

SAMUEL ENGINEERING
WE PROVIDE SOLUTIONS

8450 E. Crescent Parkway, Suite 200
Greenwood Village, Colorado 80111

Phone: 303-714-4840
Fax: 303-714-4800

ATTACHMENT A

FIXTURE CUT SHEETS TYPES A,B,C,D,E,F,G

LIGHTING MITIGATION PLAN

FOR

KERR MCGEE OIL & GAS ONSHORE LP

MCGAVIN 6-19 HZ

Project Number: 21010

Fixture Cut Sheet
Type A

STANPRO

Project: _____ Type: _____

Drawn by: _____ Catalogue #: _____ Date: _____

Series Spec Sheet

WPS GEN 4

CLASSIC WALL PACK

Selectable color temperature (3 000 K / 4 000 K / 5 000 K)[1]
Power selectable[1]
Integrated photocell[1]
Multi-Voltage (120-347 V)[1]

This wall pack series is a classic and familiar design integrated with modern LED technology to promote better energy efficiency and long life. Certain configurations come with integrated photocell, selectable power and/or selectable color temperature. It is best suited for entrances, underpasses or anywhere controlled security lighting is required, the series luminaire is a great addition to any commercial or industrial outdoor wall mount application. The tough die cast aluminum housing is moisture and dustproof. [1]



FEATURES AND SPECIFICATIONS

- **Construction**

  Housing
  - This luminaire is made of aluminum die cast and comes standard in a bronze powder coat finish.
  - The housing has four conduit entries of 1/2" on each sides and some of the configurations comes with a button type photocell that can be turned off by using the internal switch if needed.[1]

  Lens

  Prismatic tempered glass lens is standard in this product series.

- **Electrical**
  - The drivers allows an input voltage from 120-277 V or 120-347 V AC 50/60 Hz and are 0-10 V dimmable. They are coming with an onboard surge protection:
    - NS29: 2.5kV standard
    - NS40, NS60, NS80, PS40, PS100: 2kV standard
    - NS120: 4kV standard
  - This wall pack series is suitable for ambient temperature range of -40°C to +50°C. Available in color temperatures of 4 000 K, 5 000 K or 3CCT selectable (3 000/4 000/5 000 K) with a lumen per watt ratio of 140 lm/W to 152 lm/W depending on the lumen package.
  - The color temperature of the fixture is set by default at 4 000 K and can be changed on the field.

- **Compliances**
  - Wet location
  - IP65
  - Meets requirements of ICES-005 issue 5 for class B products
  - cULus
  - IK06
  - BC Hydro

OVERVIEW

Light source	LED
Watts (W)	25/30/40, 60/80/100 30, 40, 60, 80, 120
Lumens output (lm)	3 625 - 17 885
Efficiency (lm/W)	140 - 152
Color temperature (K)	3CCT (3 000/4 000/5 000) 4 000, 5 000
CRI	> 80

[1] Integrated photocell, multi-volt driver, CCT and Power selectable on some configurations. Consult Quick ship and technical specification table for more details.

5 yrs warranty

quick ship

LED fixture

power selectable [1]

3 CCT TCC [1]
3000 K / 4000 K / 5000 K

dimmable fixture

wet location

IP 65

ICES 005

IK06

DLC QPL LISTED PREMIUM

cULus

Not all products are qualified on the DLC QPL. To view our DLC qualified products, please consult the DLC Qualified Products List at www.designlights.org/search.

2233 rue de l'Aviation, Dorval, QC H9P 2X6
514.342.1199, 1.800.361.6965 • 514.807.3011 • www.standardpro.com

STANPRO

QUICK SHIP AND TECHNICAL SPECIFICATION TABLE [1]

Order code	Model number	DLC unique ID	Watts (W)	Volts (V)	Color temp. (K)[2]	Lumen output (lm)[3]	Effi-ciency (lm/W)	Photo-cell[6]	CRI	Life L70 (hrs)[5]	Tested hours LM-80 (hrs)[5]	Calculated TM21 (hrs)[5]	Finish	Dim-ming	B.U.G.	LED current (mA)	Power factor	THD (%)	Case qty (master)
Power Select, CCT Select and Integrated Photocell[6]																			
68314	WPS-PS40-Q-3C	PLW61NEJG50K	25/30/40	120-347	3000/4000/5000	3875/4500/5800[4]	141	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	850	≥0.9	≤20	1
68315	WPS-PS100-Q-3C	PLE7PYF9LCSH	60/80/100	120-347	3000/4000/5000	9300/12000/14500[4]	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	2 100	≥0.9	≤20	1
Single Power, Single CCT and Integrated Photocell[6]																			
68524	WPS-NS30-W-40K/P127		29	120-277	4 000	4 200	150	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
68525	WPS-NS30-W-50K/P127		29	120-277	5 000	4 300	148	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	230	≥0.9	≤20	1
Single Power and Single CCT																			
68490	WPS-NS40-W-40K	PLVM09BUX07G	40	120-277	4 000	6 004	142	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68491	WPS-NS40-W-50K	PL3ULW7TEV5H	40	120-277	5 000	6 034	144	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G4	354	≥0.9	≤20	1
68492	WPS-NS60-W-40K	PL6EFOUTBPWB	60	120-277	4 000	8 458	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68493	WPS-NS60-W-50K	PL01JETYSQ80	60	120-277	5 000	8 611	147	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U3G5	486	≥0.9	≤20	1
68497	WPS-NS80-W-40K	PLVXL8TOP2UF	80	120-277	4 000	11 242	146	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
68498	WPS-NS80-W-50K	PL2AZJG3L0RQ	80	120-277	5 000	11 446	148	No	>80	54 000	9 000	173 600	Bronze	Yes	B1U4G5	645	≥0.9	≤20	1
Single Power, CCT Select and Integrated Photocell[6]																			
68316	WPS-NS120-Q-3C	PLYRMZYS3AY3	120	120-277	3000/4000/5000	16 943	137	Yes	>80	54 000	9 000	173 600	Bronze	Yes	B2U4G5	2 600	≥0.9	≤20	1

[1] **QUICK SHIP:** Product availability is subject to change without notice. Please contact your Stanpro customer service representative to confirm inventory levels at time of order.
[2] Typical color temperature range: +/- 5 %.
[3] Lumen values are derived from photometric testing. Initial lumens range: +/- 10 %.
[4] Lumen values are based on 4 000 K default settings. Please refer to Quick ship Technical Specification Table for more details on other color temperatures.
[5] Life hours are derived from IESNA LM-80-08 testing report and projected per IESNA TM-21-11 extrapolations.
[6] Integrated ON/OFF photocell that can be easily disabled.

ACCESSORIES (order separately)

Order code	Description
68370	18'' Bronze metal backplate
68371	Bronze glareshield
68372	Stainless Steel wireguard





ORDERING GUIDE

WPS — ____ — ____ — ____ — ____ / ____

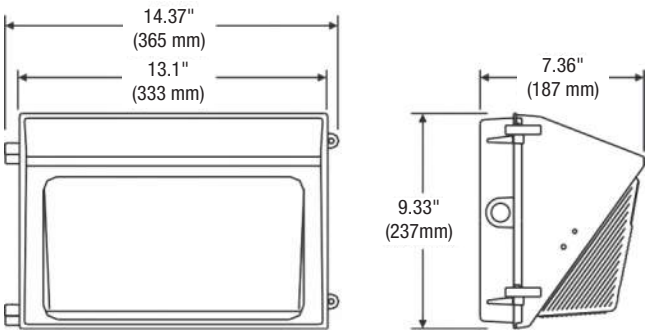
Series	Lumen package (W)	Volts (V)	Color temp. (K)	Casting color	Options
WPS	**PS40 -** 25/30/40 **PS100 -** 60/80/100 **NS120 -** 120	**Q -** 120-347	**3C -** 3 000/4 000/5 000	**BR -** Bronze (standard) **BK -** Black **WH -** White **SP-** Special color	**KV -** 10 kV surge Protection **PC -** Polycarbonate lens
	NS30 [1] **-** 29 **NS40 -** 40 **NS60 -** 60 **NS80 -** 80	**W -** 120-277	**40K -** 4 000 **50K -** 5 000		**KV -** 10 kV surge Protection **P127** [1] **-** Button type photocell 120-277 V **PC -** Polycarbonate lens

[1] Button type photocell 120-277 V comes standard with the ''NS30'' lumen package.

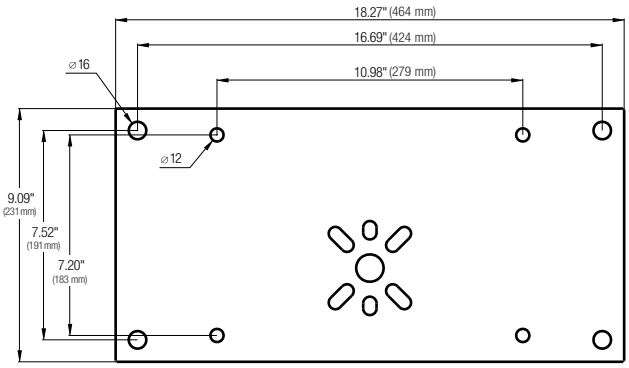
Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
All products are subject to change or may be discontinued any time without notice.

2233 rue de l'Aviation, Dorval, QC H9P 2X6
514.342.1199, 1.800.361.6965 • 514.807.3011 • www.standardpro.com

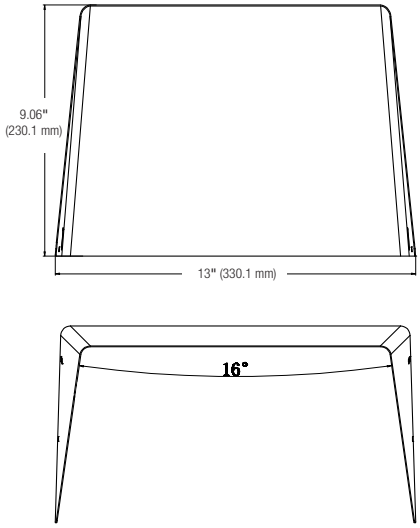
DIMENSIONS



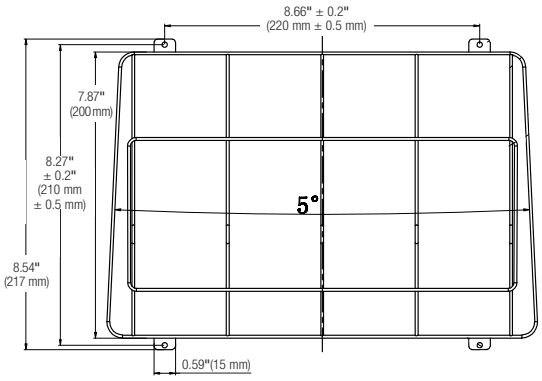
BACKPLATE



GLARESHIELD



WIREGUARD

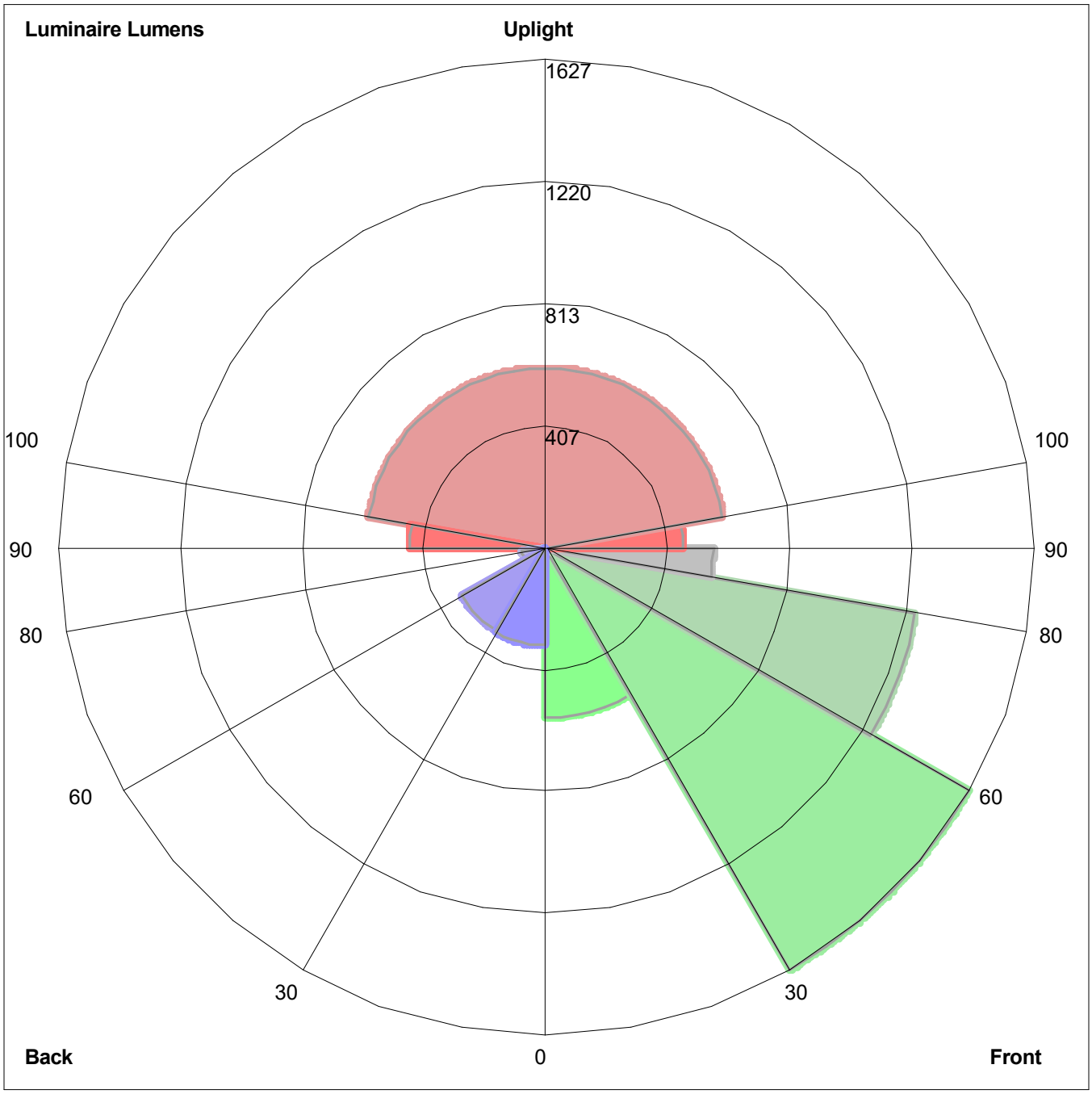


Data is based upon tests performed in a controlled environment. Actual performance can vary depending on operating conditions.
All products are subject to change or may be discontinued any time without notice.

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IES ROAD REPORT
PHOTOMETRIC FILENAME : WPS-PS40-Q-3C-40W-40K-68314.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=566.0, Medium=1626.5, High=1251.8, Very High=558.0
Back: Low=327.7, Medium=323.2, High=79.4, Very High=11.6
Uplight: Low=456.3, High=599.7

BUG Rating : B1-U4-G4

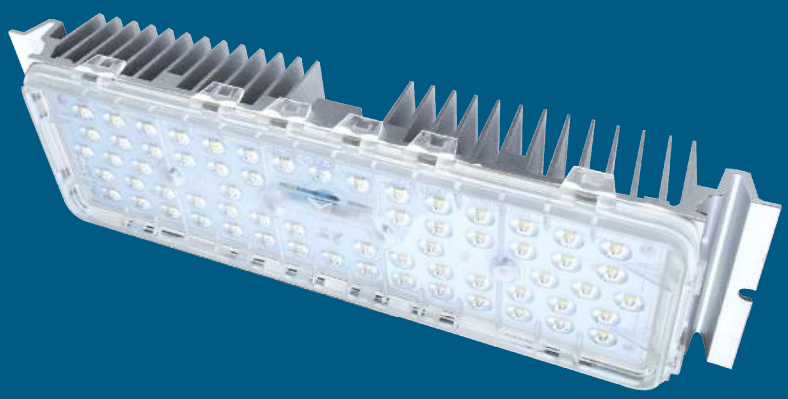
Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type B

Example Used



LED Module
M8B
Series



Specification

Working Environment: -40℃~+50℃

Storage Temperature: -40℃~+50℃

Relative humidity: 10%~90%RH

Typical value of pad temperature[1]: 70℃

IP Rating of LED Light Engine: IP68

Impact Protection Level: IK09

Color Temperature (CCT)[2]: 3000K, 4000K, 5000K, 5700K

Main Material: Aluminum 6063

Module N.W.: 0.67±0.04 kg

Note :

[1] Typical values of pad temperature is obtained based on 60W with a ambient temperature of 25℃.

[2] Efficacy of 3000K is 5% lower than other CCTs.

Features

- Lumileds Luxeon 3030;
- Super long lifetime(Lumen maintenance);
- Multiple lighting distributions available;
- Wide applicability for complex situations;
- High versatility apply for all sorts of lamps retrofit.

Application

- Street lighting retrofit and application;
- Factory lighting retrofit and application;
- Tunnel lighting retrofit and application;
- Sports lighting retrofit and application.

Ordering Information

For example: M8B-VCA-63 -1321-7040-LU

Module Model	Interface	Dimension of LEDS	Wire Material	LED Qty	Lens Model		Ra & CCT	LED Brand
M8B	**V:** V-shape Groove	**C:** 3030	**A:** CCC+VDE	**49** 49PCS	**1324** Type II Short	**1325** 25 DEG	**7030:** Ra≥70, 3000K	**LU:** Lumileds
			C: PSE	**63** 63PCS	**2322** Type II Short (V)	**2360** 60 DEG	**8040:** Ra≥80, 4000K	**SN:** Sanan
			H: UL		**5321** Type II Short	**5340** 40 DEG	...	**XX:** Others
			X: Others		**2321** Type II Short	**5390** 90 DEG		
					1321 Type III Medium	**1310** Lambert Type		
						1390 Tunnel Lighting		

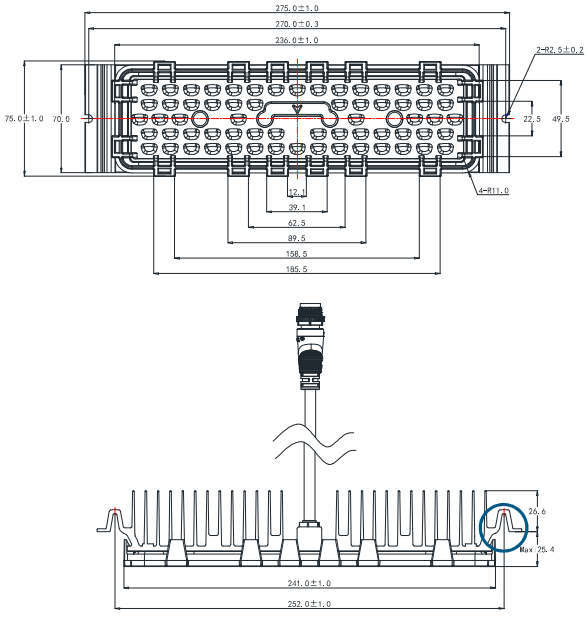
Performance

Model	Power (W)	Driving current (mA)	Input voltage (Vdc)	Efficacy (lm/W)	Lumens (lm)
M8B-VCA-63	40	700	48~61	140	5600
M8B-VCA-49	50	1050	38~48	127	6350
M8B-VCA-63	50	860	48~61	135	6750
M8B-VCA-63	60	1050	48~61	127	7620

Note : Values shown are subject to ±5%~±8% tolerance; Cable default A type;

Efficacy above is based on calculated @92% power efficiency ; Light efficacy of 3000K is 5% lower than other CCTs.

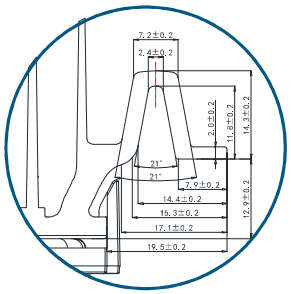
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

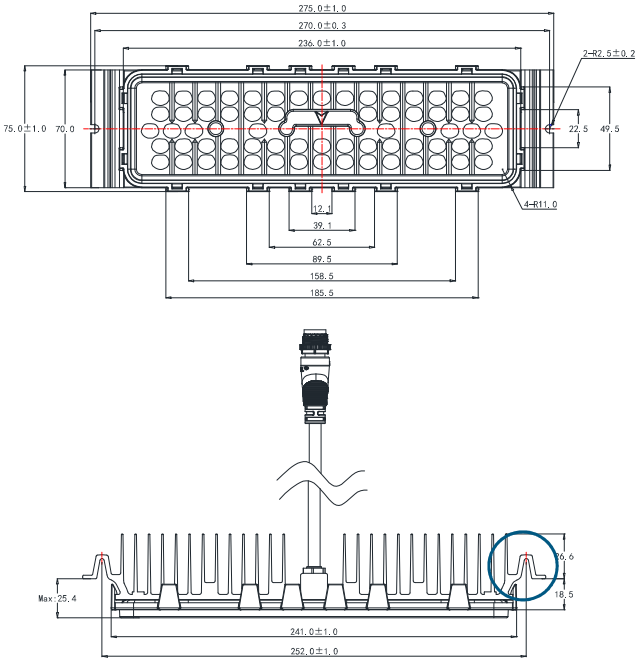
Tolerance: ±0.5mm



Available Lens Model

1321	1324	1390
1232	2322	5321

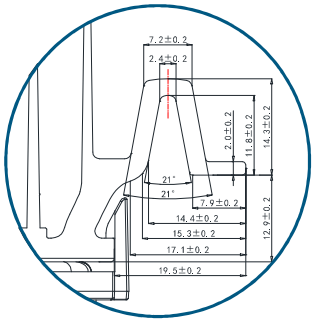
Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

Tolerance: ±0.5mm



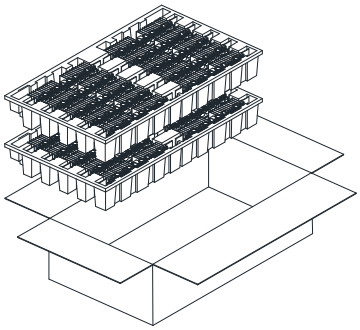
Available Lens Model

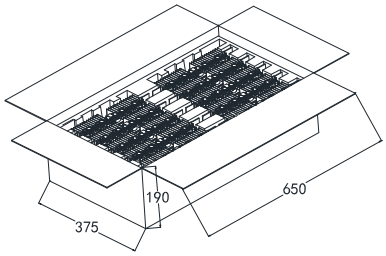
1310	1325	5340	2360
5390			

Package Information

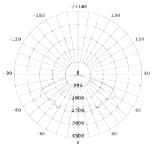
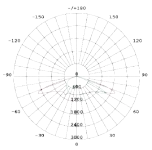
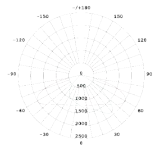
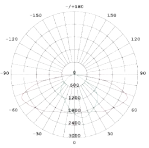
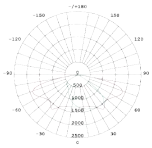
L (mm)	W (mm)	H (mm)	Module pcs/carton (PCS)	Package weight (kg)
650	375	190	20	14.9

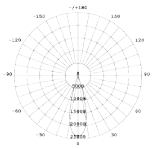
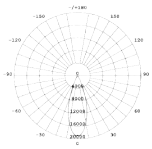
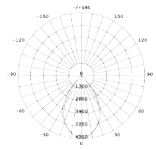
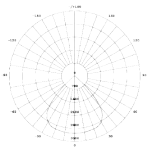
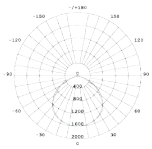
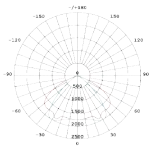
Values shown are subject to ±5% tolerance.





Lighting distributions

T2S1324	T2S(V)2322	T2S5321	T2S2321	T3M1321
				

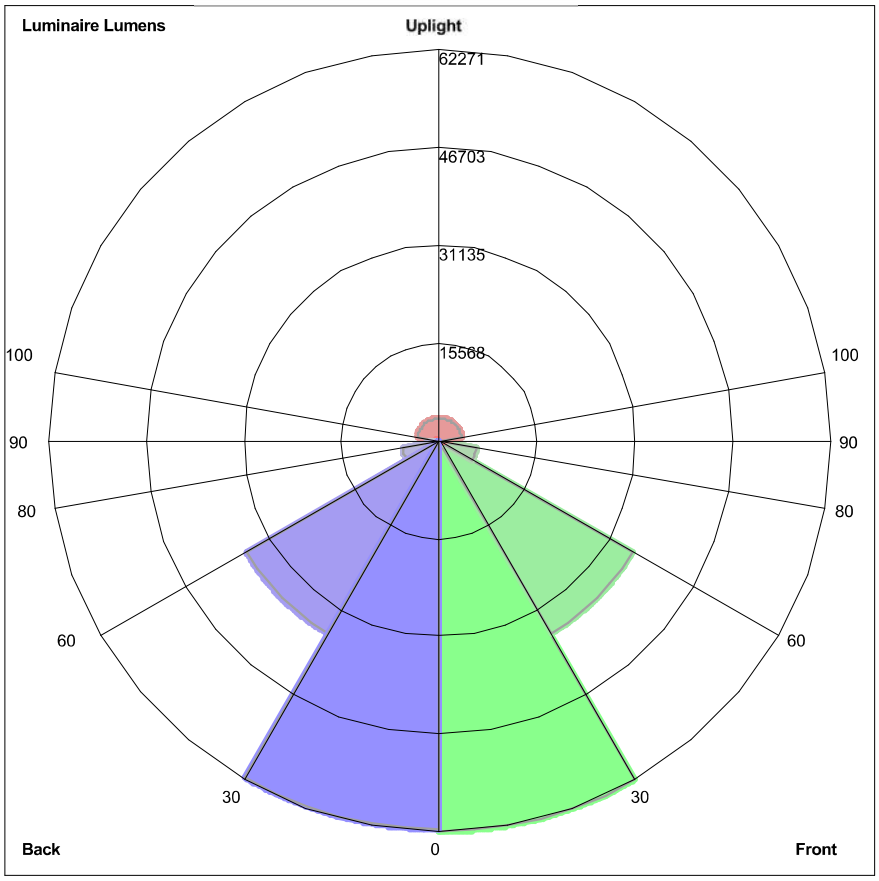
25D1325	40D5340	60D2360	90D5390	LBN1310	Tunnel lighting 1390
					

Version History

Change Date	Version	Description of Change		
		Item	From	To
20190905	Ver2.0	Data sheets release (new version)		
		Update of luminous efficacy		
		Optimized G.W of Module package	16.2kgs	14.9kgs

IES ROAD REPORT
PHOTOMETRIC FILENAME : 3560-400W 16 BANKS ESTIMATE.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=62270.6, Medium=35421.7, High=5946.3, Very High= 1328.0
Back: Low= 61920.0, Medium=35466.8, High=5958.8, Very High=1320.7
Uplight: Low=493.0, High=3564.5

BUG Rating : B5-U5-G5

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type C

Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Applications:

- Onshore drilling and exploration
- Pipeline compressor and storage
- Corrosive environments
- Façade security lighting

Features:

- 150-400W high pressure sodium or 175-400W metal halide
- AEx nR, Ex nR restricted breathing rating is standard – restricted breathing offers cooler T-numbers for increased hazardous locations suitability
- NEMA 7x6 butterfly beam floodlight pattern – wide, uniform and far reaching to provide excellent efficiency and more light where you need it
- NEMA Type 4X and IP66 heavy duty, die cast copper-free aluminum construction is designed for use indoors and outdoors in marine and wet locations with stainless steel external hardware suitable for saltwater and corrosive applications
- 40°C, 55°C and 65°C ambient suitability – addresses high ambient common at industrial facilities
- Low ambient capability to -40°C – perfect for colder climates
- Hinged door frame assembly – has captive cover screws for ease of relamping
- Yoke mount design – standard construction provides the greatest mounting flexibility; can be mounted vertically (wall), horizontally (rooftop or floor) or any angle in between
- 3-axis resonance withstand and UL844 vibration compliant – can stand up to the tough jobs
- Precision formed aluminum reflector – superior beam control, distribution and efficiency
- High light output with a low cost of operation – cost-effectiveness in a high wattage floodlight
- Slipfitter adapter for pole mounting and wall mounting bracket available

Certifications and compliances:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx nR II
- Class II, Division 1, Groups F, G (250W maximum)
- Ex nR II
- UL/cUL844 – Hazardous Locations
- UL/cUL1598 – Luminaires
- UL/cUL1598A – Supplemental Requirements for Luminaires for Installation on Marine Vessels
- 60079-15
- NEMA Type 4X
- IP66
- Marine and wet locations
- ABS



Standard materials and finishes:

- Housing and lens frame – heavy duty die cast copper-free aluminum with Corro-free epoxy powder coat finish
- Lens – heat- and impact-resistant tempered glass
- Gasket – one-piece silicone
- Mounting brackets – aluminum with Corro-free epoxy powder coat finish
- Reflector – precision formed aluminum
- Lamp holder – porcelain
- Hardware – stainless steel

Technical specifications:

- Entries – one ¾" AEx/Ex gland
- Wind rating – EPA: 2.90 at vertical
- Lamp type – high pressure sodium; probe start metal halide[A]; pulse start metal halide (lamps not provided)
- Lamp holder – mogul base
- Ballast – multi-tap 120/208/240/277V, 60 Hz (standard); 220-240V, 50 Hz (optional); tri-tap 120/277/347V (optional); 480V (optional)

Mounting option:

- Yoke mount

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

[A] Not available in the U.S.

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Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx nR II
Cl. II, Div. 1, Groups F, G (250W max.)
Ex nR II

Marine & Wet Locations
NEMA 4X
IP66

Options:

Description	Suffix
• Lamps included	L[B]
• 480V	480
Replace /MT in catalog number with /480	
• 230V	230
Replace /220 ONLY in catalog number with /230	

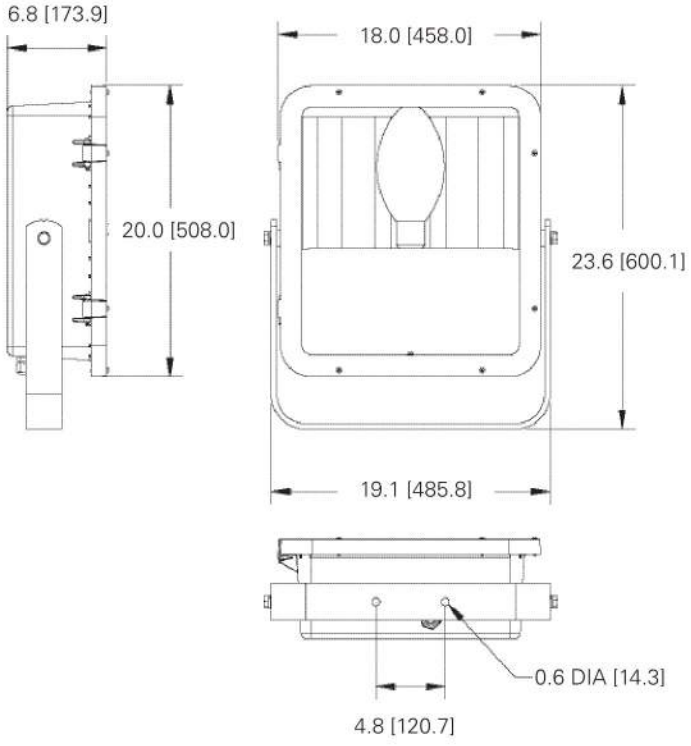
Accessories (ordered separately):

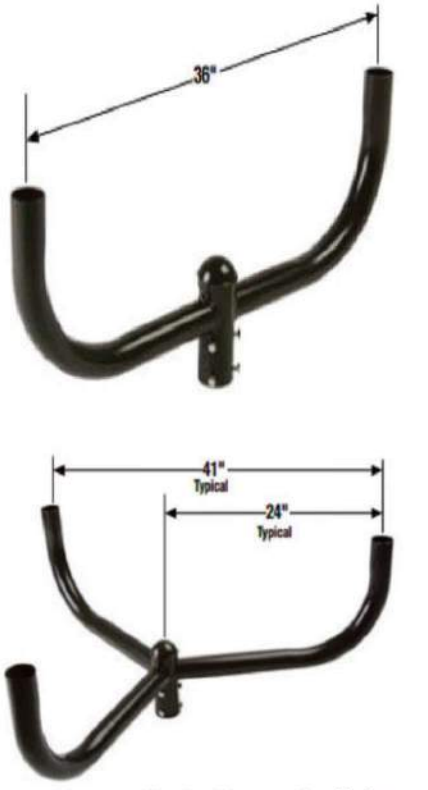
Description	Cat. #
• Pole mount slipfitter adapter	SFA6
• Wall mount bracket adapter	SWB6
• Bull horn, 2 tenon, gray	BLHN2
• Bull horn, 3 tenon, gray	BLHN3

Ordering information:

Cat. #	Lamp type	Watts	Weight (lbs.)	ANSI lamp type	Zone T-code	Division T-code	Ambient temperature °C	Supply wire °C
DFLMY250/MT 76 S828	Pulse start metal halide	250	42.0	M153	T3	T1	40/55/65	90/90/105
DFLMY400/MT 76 S828	Pulse start metal halide	400	44.0	M155	T3	T1	40/55	105/105
DFLMY320/MT 76 S828	Pulse start metal halide	320	44.0	M154	T3	T1	40/55	105/105
DFLMY250/TT 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/TT 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLMY250/220 50 76[C]	Probe start metal halide	250	42.0	M58[C]	T3	T1	40/55/65	90/90/105
DFLMY400/220 50 76[C]	Probe start metal halide	400	44.0	M59[C]	T3	T1	40/55	90/105
DFLSY250/MT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/MT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/TT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/TT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/220 50 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/220 50 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105

Dimensions (in inches):





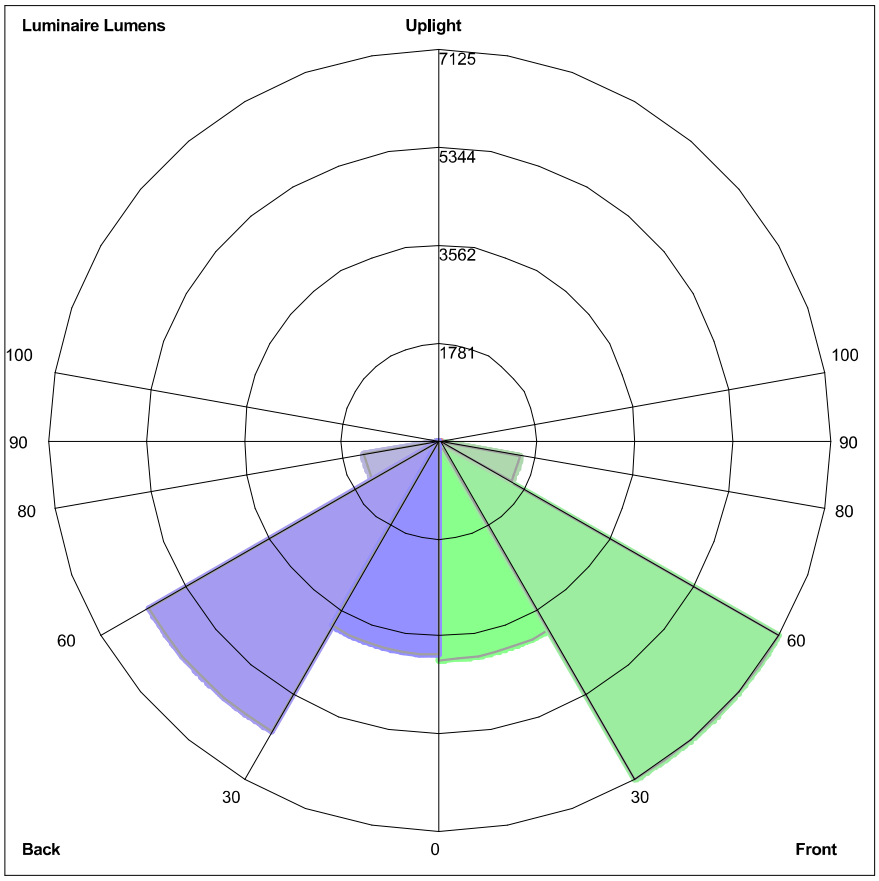
Bull horns – provided with 2 3/8" pole tenon

[B] Lamp is not included unless option 'L' is selected.
[C] Not available in the U.S.

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IES ROAD REPORT
PHOTOMETRIC FILENAME : DFLMYM400.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=3985.6, Medium= 7125.0, High=1500.3, Very High=28.6
Back: Low=3894.8, Medium=6102.1, High=1404.5, Very High=40.2
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G3

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type D

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%



Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5

Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

Ⓐ One year warranty.

Ⓑ Refer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

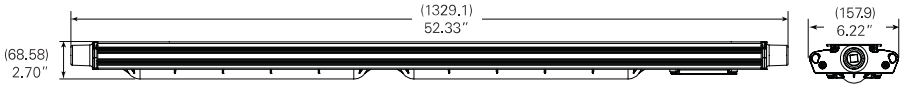
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

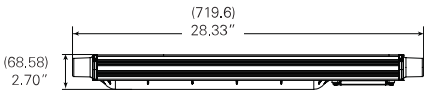
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

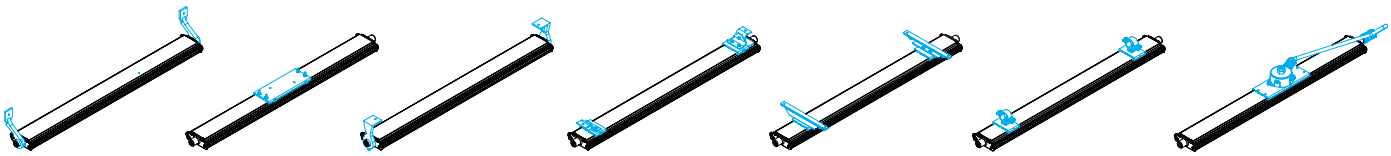
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

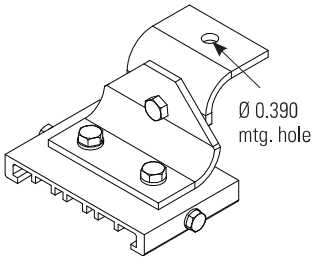
For land-based drilling

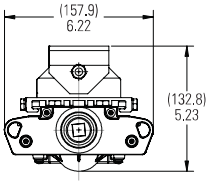
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

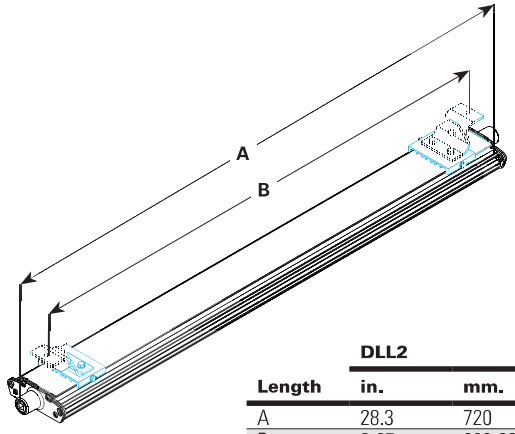
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

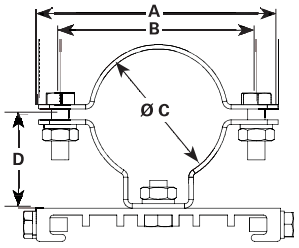




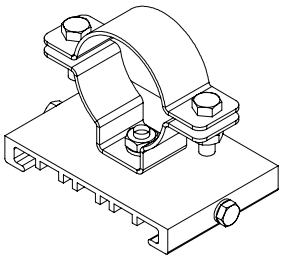


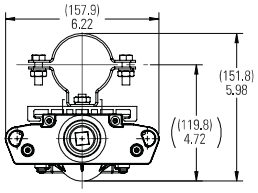
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

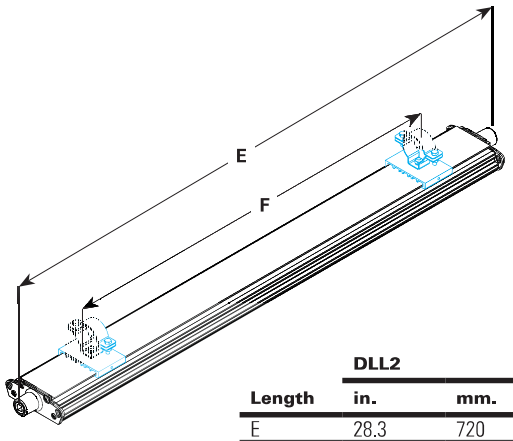
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

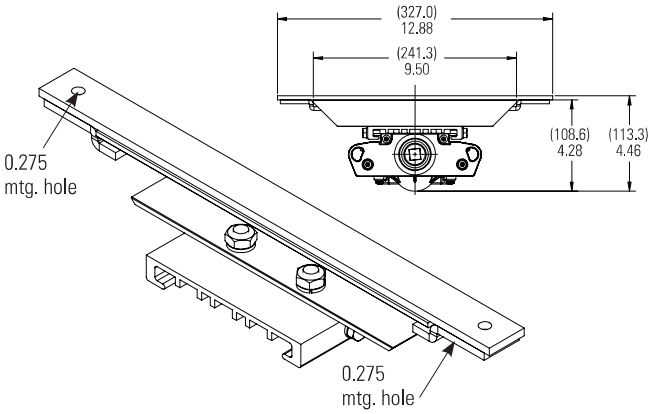


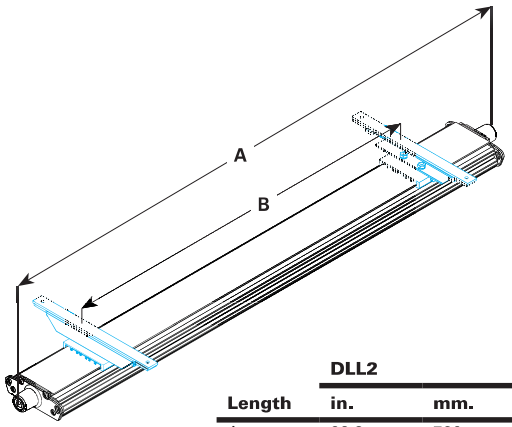




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



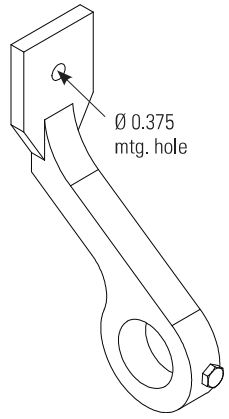


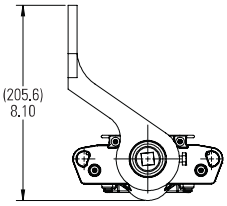
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

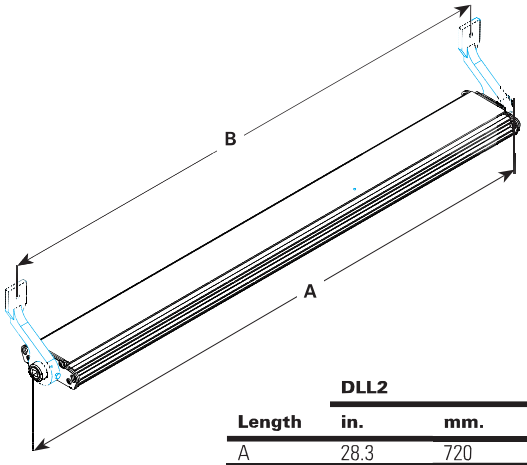
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Mounting options (continued):

Offset wall
DP1052MTK

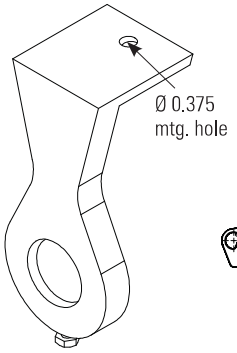


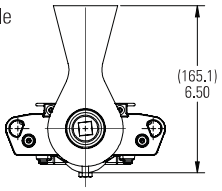


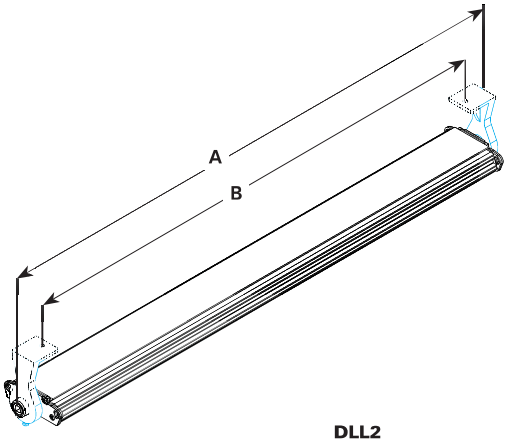


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

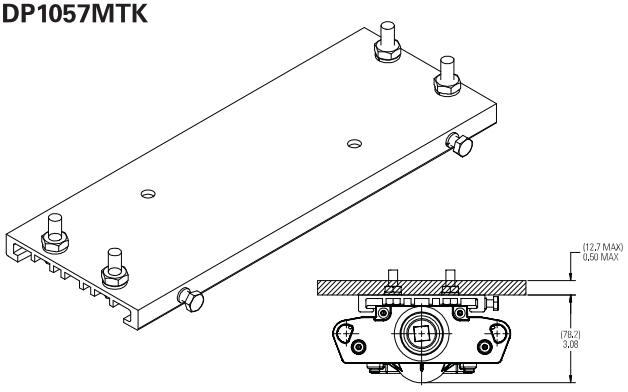


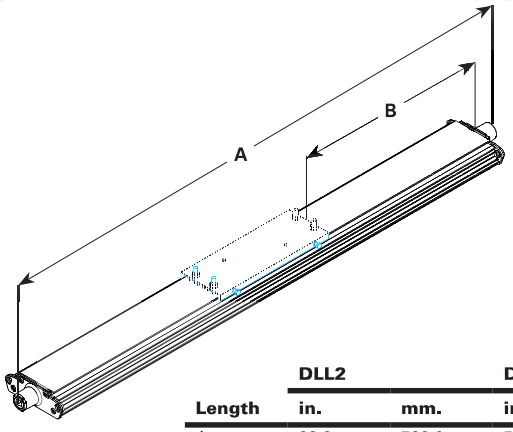




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



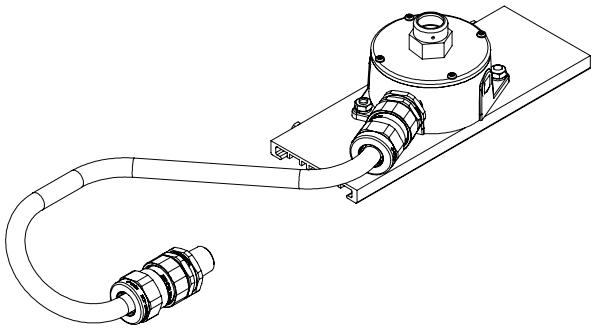


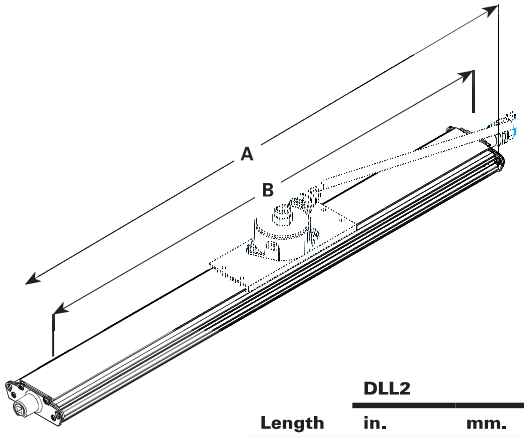
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

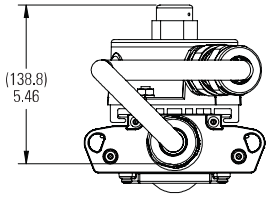
www.crouse-hinds.com US: 1-866-764-5454 CAN: 1-800-265-0502 Copyright® 2019 Eaton

Mounting options (continued):

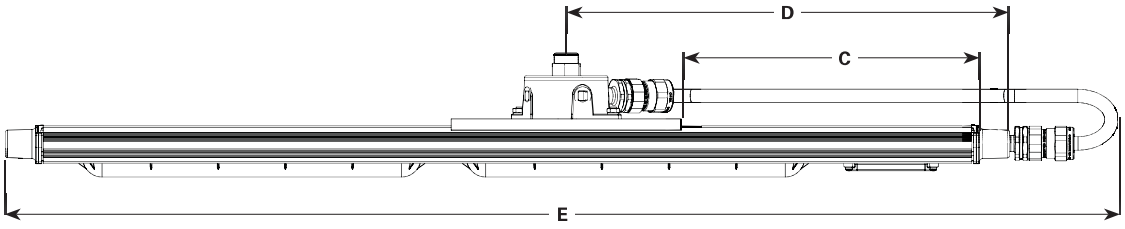
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

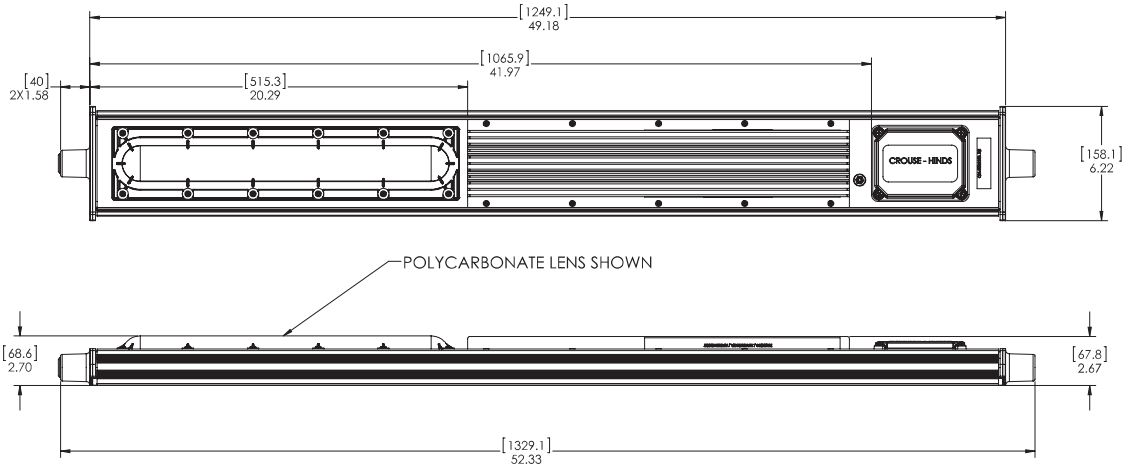
Temperature performance data:

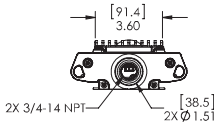
				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Dimensions:

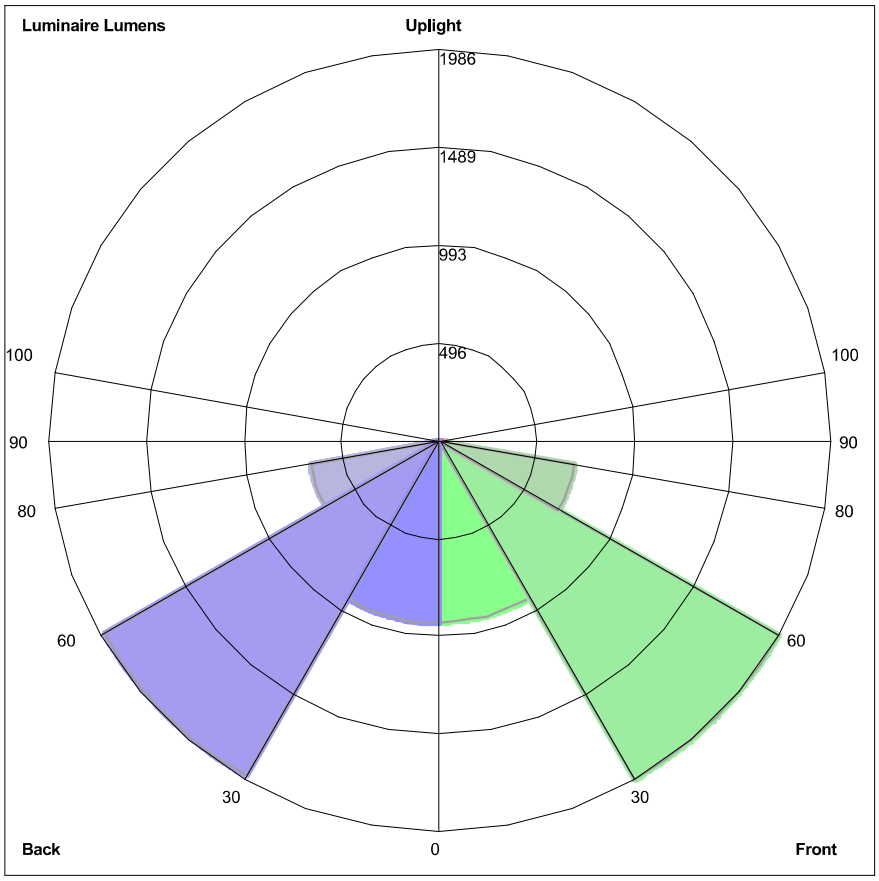




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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL4 UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=921.0, Medium=1985.6, High=698.7, Very High=29.2
Back: Low=925.1, Medium=1963.4, High=664.7, Very High=26.5
Uplight: Low=4.7, High=1.2

BUG Rating : B2-U1-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type E

Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
				T5	Up to 9%
DLL4	7,900	63	130	T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
				T8	Up to 22%
				T5	Up to 10%

Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

Features:

- High efficacy: up to 120 LPW
- -40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV)Ⓐ
- DesignLights Consortium® Qualified (some models are not DLC qualified)Ⓑ
- 5 year fixture warranty

Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

Temperature performance data:

				Simultaneous rating
Ambient temp. °C	Min. temp. supply wire °C	Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5



Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

Certifications and compliances:

NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

CSA standard:

- C22.2 No. 137

Additional certifications:

- ABS design assessed

Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

ⒶOne year warranty.

ⒷRefer to www.designlights.org Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Designed for drilling. Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



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Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Ordering information:

Part number example

DLL4N/UNV1 S903 TF P EM1

DLL 4 N /UNV1 S903 TF P EM1

Series	
DLL	Pauluhn DLL linear LED luminaire

Length / lumens	
4	4 ft. length, 7,900 lumens
2	2 ft. length, 3,958 lumens

Optics	
BLANK	Wide (120°)
N	Narrow (80°)

Voltage	
/UNV1	100-277 VAC; 108-250 VDC
/UNV34	347-480 VAC

Lens	
S903	Clear polycarbonate
S903D	Diffused polycarbonate

Options	
TF	Pull wire included in fixture

Finish	
BLANK	Natural aluminum
P	Painted (gray, epoxy)
WH	Painted (white, epoxy)

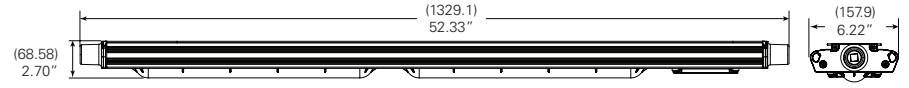
Emergency back-up	
BLANK	Standard model (no battery back-up)
EM1[C]	Integrated emergency battery back-up
EM	Remote emergency kit

Accessories (ordered separately):

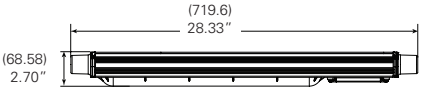
Description	Cat. #
• Flush/back mount back plate *Compatible with DuraPro*	**DP1057MTK**
• Ceiling/swivel mount *Compatible with DuraPro*	**DP1050MTK**
• Ceiling/wall mount offset *Compatible with DuraPro*	**DP1053MTK**
• Ceiling mount bracket and adapter kit *Compatible with MagnaPro*	**MP1054MTK KIT**
• Offset wall mount *Compatible with DuraPro*	**DP1052MTK**
• Pole mount kit, 1.25" conduit	**PM KIT 1.25**
• Pole mount kit, 1.50" conduit	**PM KIT 1.5**
• Pole mount kit, 2.00" conduit	**PM KIT 2.0**

Description	Cat. #
• Pendant mount kit	**PEND HAZ KIT**
• Safety chain kit	**SS KIT**
• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear	**VMVL/UNV1 80W 1A KIT**
• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear	**VMVL/UNV34 80W 1A KIT**
• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear	**VMVL/UNV1 80W 0.5A KIT**
• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear	**VMVL/UNV34 80W 0.5A KIT**

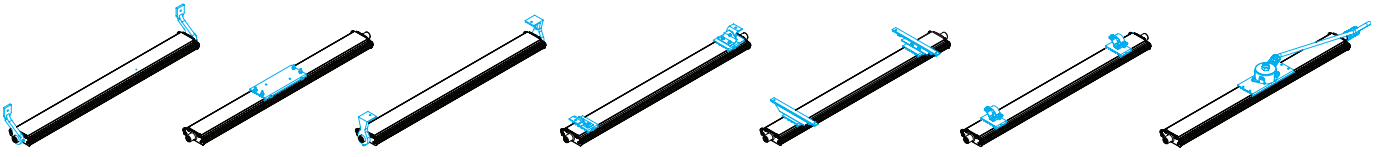
Dimensions and mounting options:



DLL4



DLL2



Offset wall
DP1052MTK

Flush ceiling
DP1057MTK

Offset ceiling
DP1053MTK

Ceiling/swivel
DP1050MTK

Ceiling and adapter
MP1054MTK KIT

Pole mount
PM KIT 1.25/1.5/2.0

Pendant mount
PEND HAZ KIT

[C] One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

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Pauluhn DLL LED luminaires

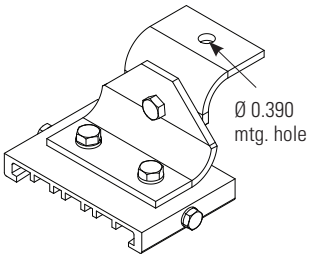
For land-based drilling

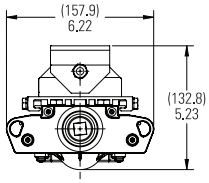
Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2
Cl. II, Div. 2, Groups F, G
Cl. III

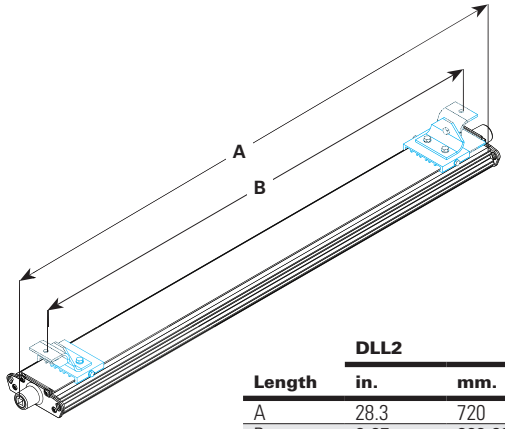
UL Listed
CSA Certified
Marine & Wet Locations
NEMA 4X; IP66

Mounting options:

Ceiling/swivel mount
DP1050MTK

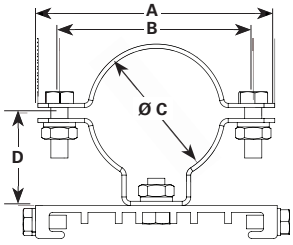




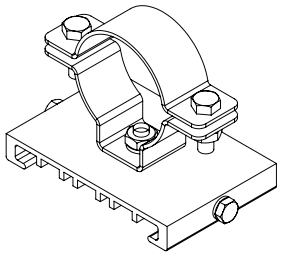


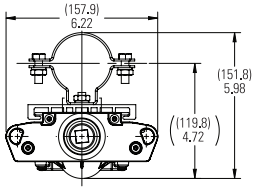
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

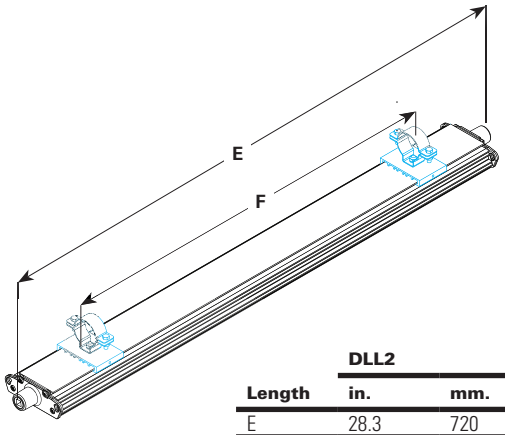
Pole mount
PM KIT 1.25/1.5/2.0



	ALL MEASUREMENTS IN INCHES			
Configuration	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378

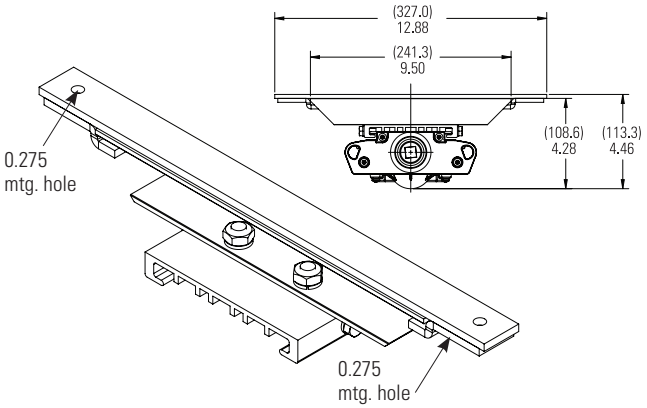


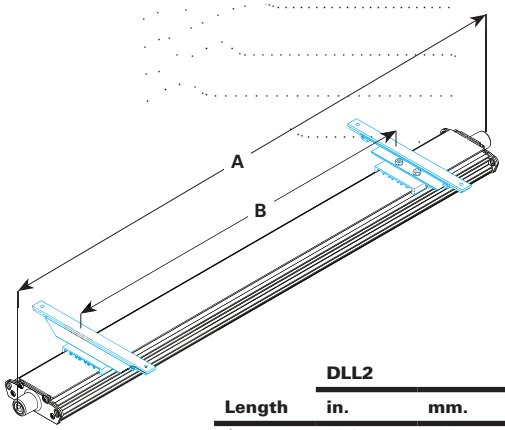




	DLL2		DLL4	
Length	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

MagnaPro mount
MP1054MTK KIT



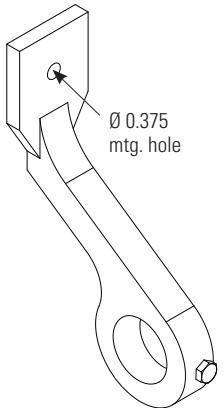


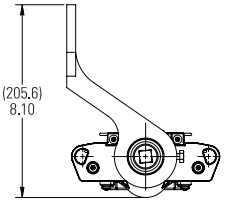
	DLL2		DLL4	
Length	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

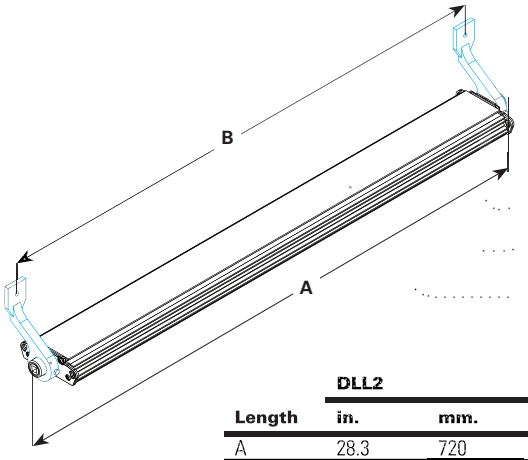
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Mounting options (continued):

Offset wall
DP1052MTK

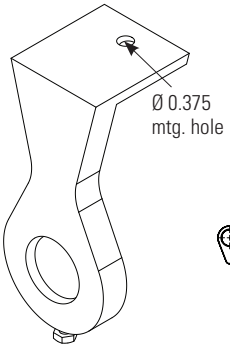


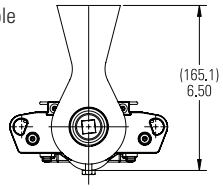


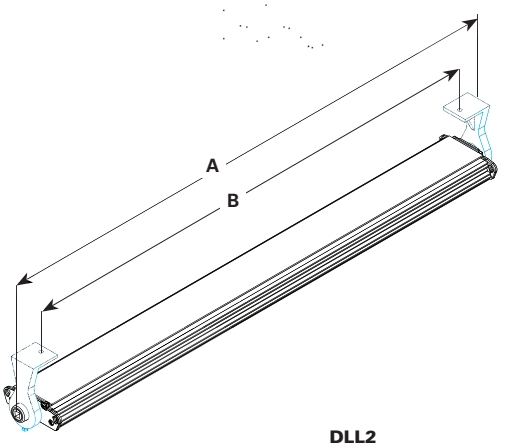


	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

Offset ceiling/wall mount
DP1053MTK

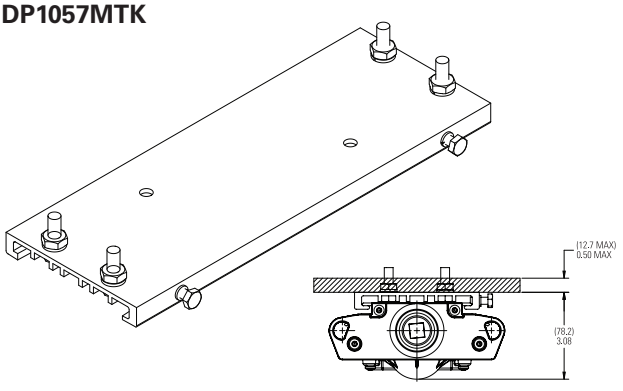


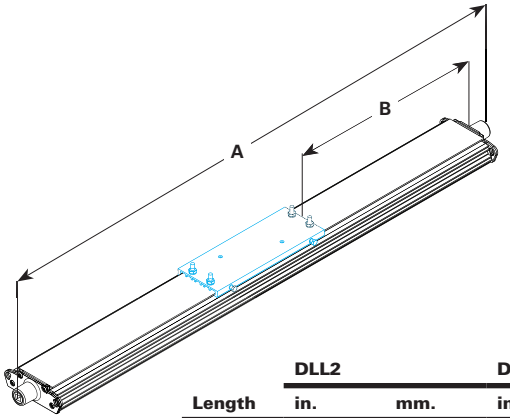




	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

Flush ceiling
DP1057MTK



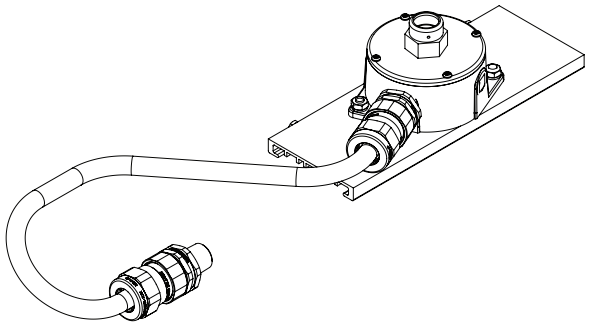


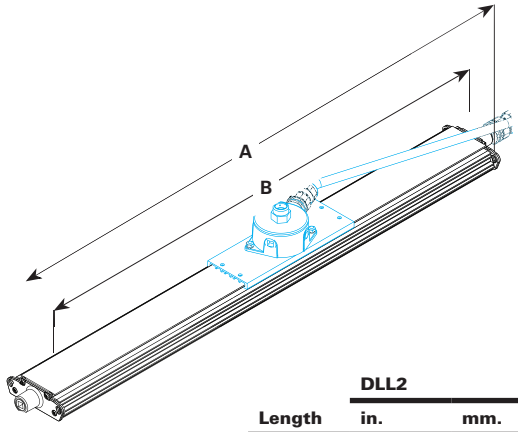
	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

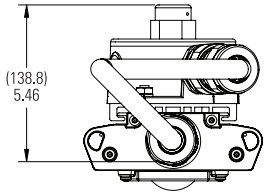
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Mounting options (continued):

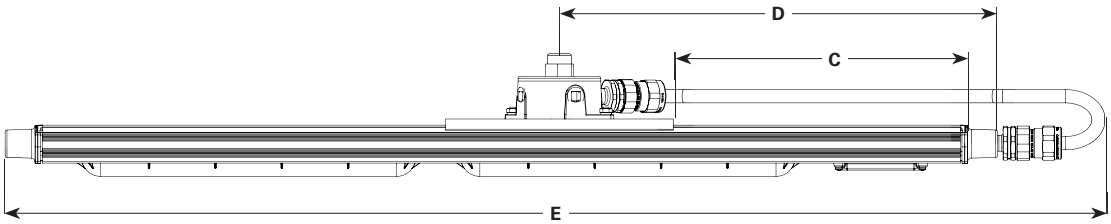
Pendant mount – Class I, Division 2 only
PEND HAZ KIT







	DLL2		DLL4	
Length	**in.**	**mm.**	**in.**	**mm.**
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



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Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D
Cl. II, Div. 2, Groups F, G

UL Listed
CSA Certified
Wet Locations
Type 4X; IP66

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.

Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)



Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

Certifications and compliances:

NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

CSA standard:

- CSA C22.2 Nos. 137, 141

Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

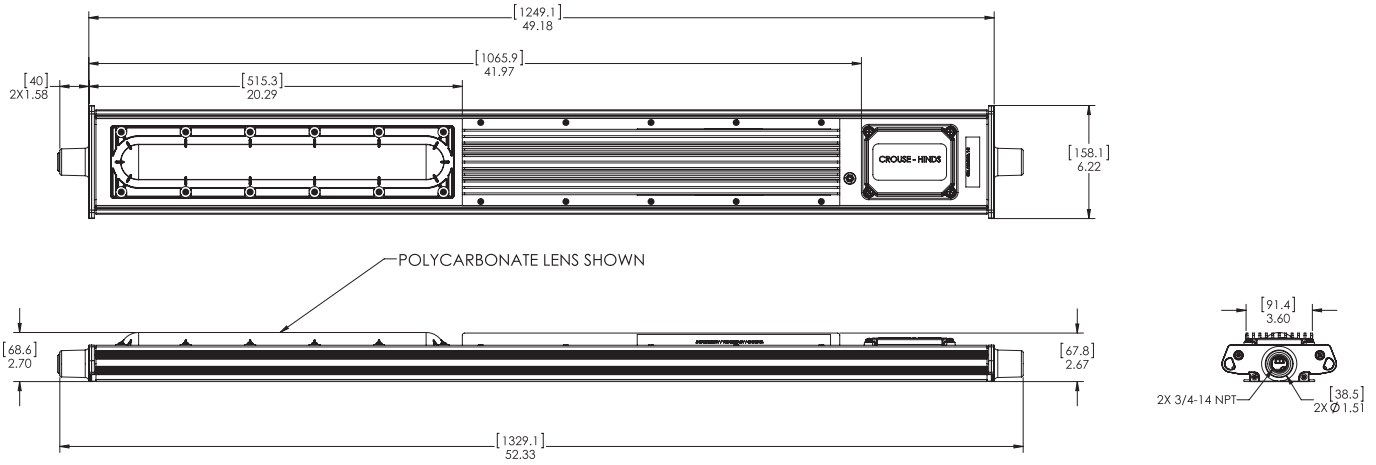
Temperature performance data:

				Simultaneous rating
Ambient temp. °C	**Min. temp. supply wire °C**	**Class I, Div. 2**	**Class II, Div. 2**	**Class I, Div. 2; Class II, Div. 2**
40	60	T5	T6	T5

Photometrics:

- Complete photometrics can be found at www.crouse-hinds.com/photometrics

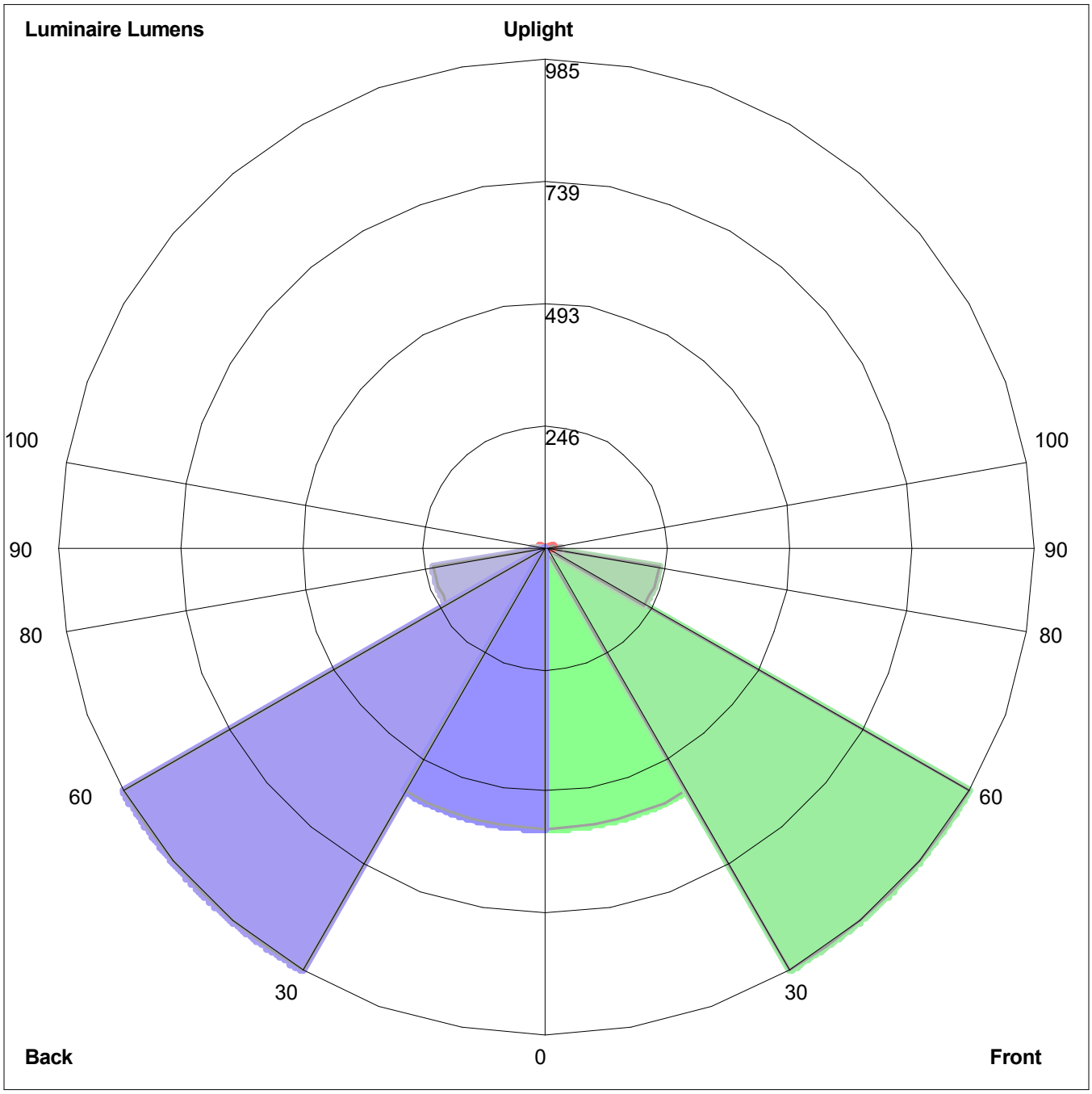
Dimensions:



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IES ROAD REPORT
PHOTOMETRIC FILENAME : DLL2-UNV1-S903.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Back: Low=568.6, Medium=985.4, High=230.6, Very High=28.4
Uplight: Low=12.8, High=0.3

BUG Rating : B2-U2-G1

Photometric Toolbox® Copyright 2002-2019 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type F



Mounting: Vertical Green LED Heat Trace End Seal Kit

Mounting Height: Piping Height Varies.

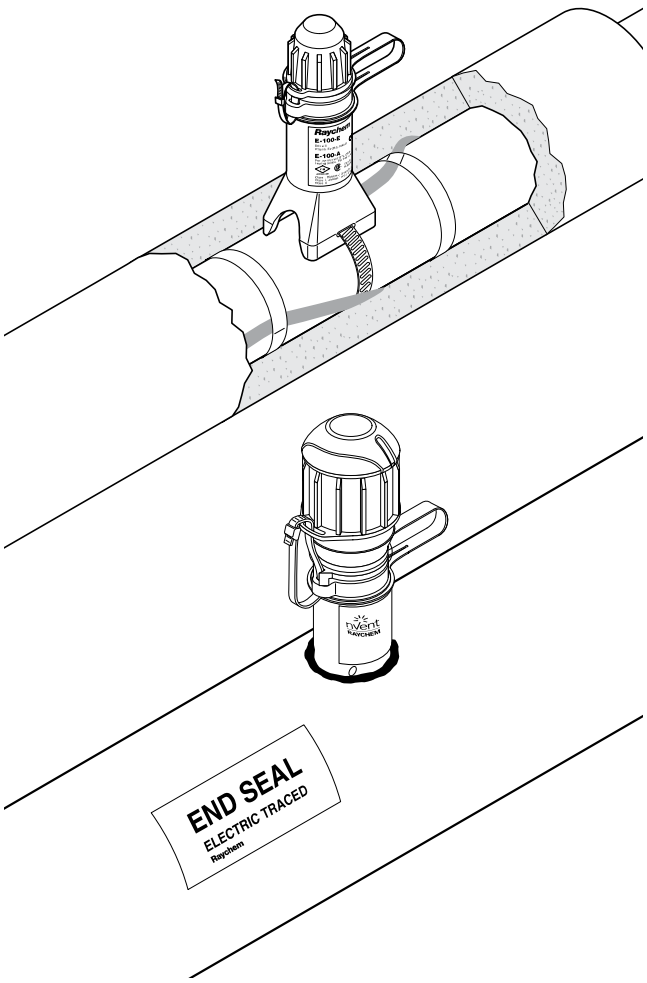
Part Number: E-100-L-A

Manufacturer: Raychem

Wattage: 2 watts at 60 Lumens/watt LED. 120 Lumens per end seal

E-100-E AND E-100-L-E

END SEAL AND LIGHTED END SEAL



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTV, KTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

KIT CONTENTS

	E-100-E	E-100-L-E
	1 end seal 1 cable tie 1 polywater sachet 1 installation instruction	1 end seal with indicator light 1 cable tie 1 polywater sachet 2 insulated parallel crimps 1 core sealer 1 installation instruction

APPROVAL DATA

Area of use	Hazardous or ordinary (indoors and outdoors)

APPROVALS

E-100-E	E-100-L-E
PTB 09 ATEX 1060 U Ⓔx II 2G Ex e II II 2D Ex tD A21 IP66 IECEx PTB 09.0038U Ex e II Ex tD A21 IP66 SP Ex e II T*	Sira 14ATEX3015X Ⓔx II 2GD Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C IECEx SIR 14.0007X Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C FM CLI, ZN1, AEx e mb IIC T* Gb (1) ZN21 AEx tb IIIC T* SP Ex e mb IIC T* Gb Ex tb IIIC T***°C Db

DNV Certificate No. E-11564 and E-11565
*For T-rating, see heating cable or design documentation
(1) Except VPL

EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"
EAC Ex	TC RU C-BE.МЮ62.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 ООО "ТехИмпорт"

PRODUCT SPECIFICATIONS

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	480 V*	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	−50°C to +56°C*	−40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the summary the certificate or installation instructions for full details.	
Min. installation temperature	−50°C	−40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

LIGHT SOURCE

Type	Green LEDs
Voltage rating range	110-277 Vac, 50/60 Hz
Power consumption	< 2 W
Electromagnetic immunity/emissions	Complies with IEC61000-6 and IEC61000-4

INSTALLATION DATA

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers

ORDERING DETAILS

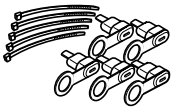
End seal		
Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied) PTB, DNV and EAC approved product

ACCESSORIES

Small pipe adaptor	JBS- SPA, required for pipes ≤ 1" (DN 25), E 90515-000 (bag of 5 adaptors)

SPARE PART

Boot pack for E-100-E



Part description	E-100-BOOT-5-PACK
PN (Weight)	281053-000 (140 g)
Pack size	5 sealant filled boots and 5 cable ties

Replacement indicator light for E-100-L

Part description:	E-100-LR-E
PN	P000001586

North America
Tel +1.800.545.6258
Fax +1.800.527.5703
thermal.info@nVent.com

Europe, Middle East, Africa
Tel +32.16.213.502
Fax +32.16.213.604
thermal.info@nVent.com

Asia Pacific
Tel +86.21.2412.1688
Fax +86.21.5426.3167
cn.thermal.info@nVent.com

Latin America
Tel +1.713.868.4800
Fax +1.713.868.2333
thermal.info@nVent.com

nVent

nVent.com

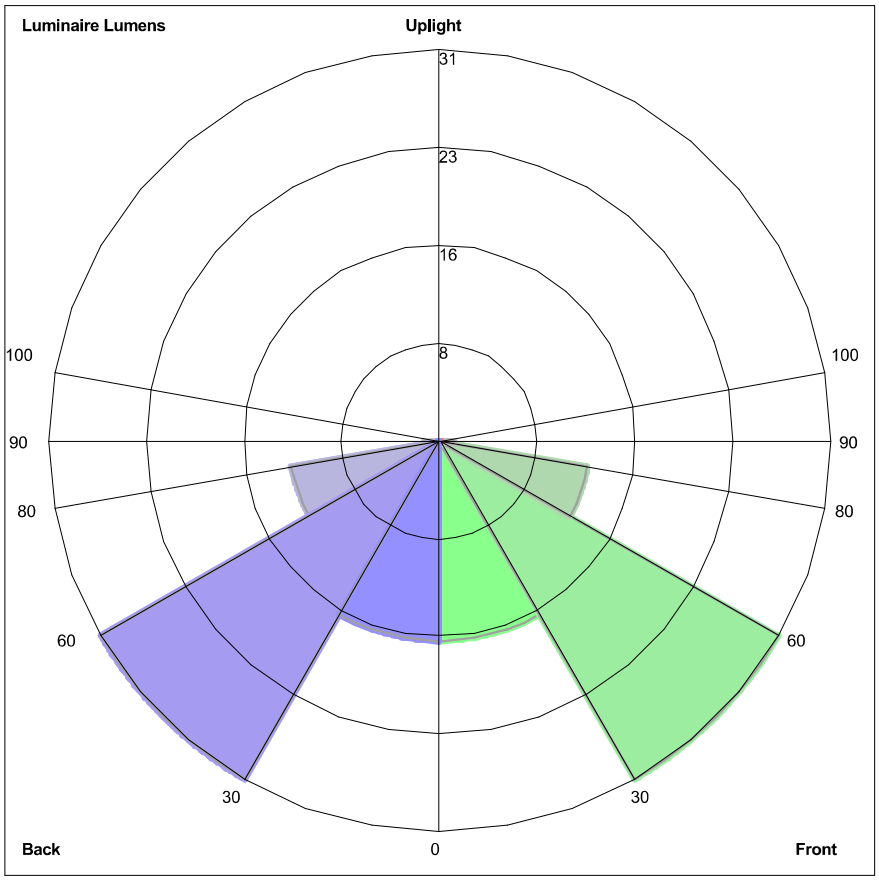
Our powerful portfolio of brands:
CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER

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nVent reserves the right to change specifications without notice.

RAYCHEM-DS-EU1421-E100EE100LE-EN-1911

IES ROAD REPORT
PHOTOMETRIC FILENAME : APPROXIMATION RAYCHEM END KITS.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH

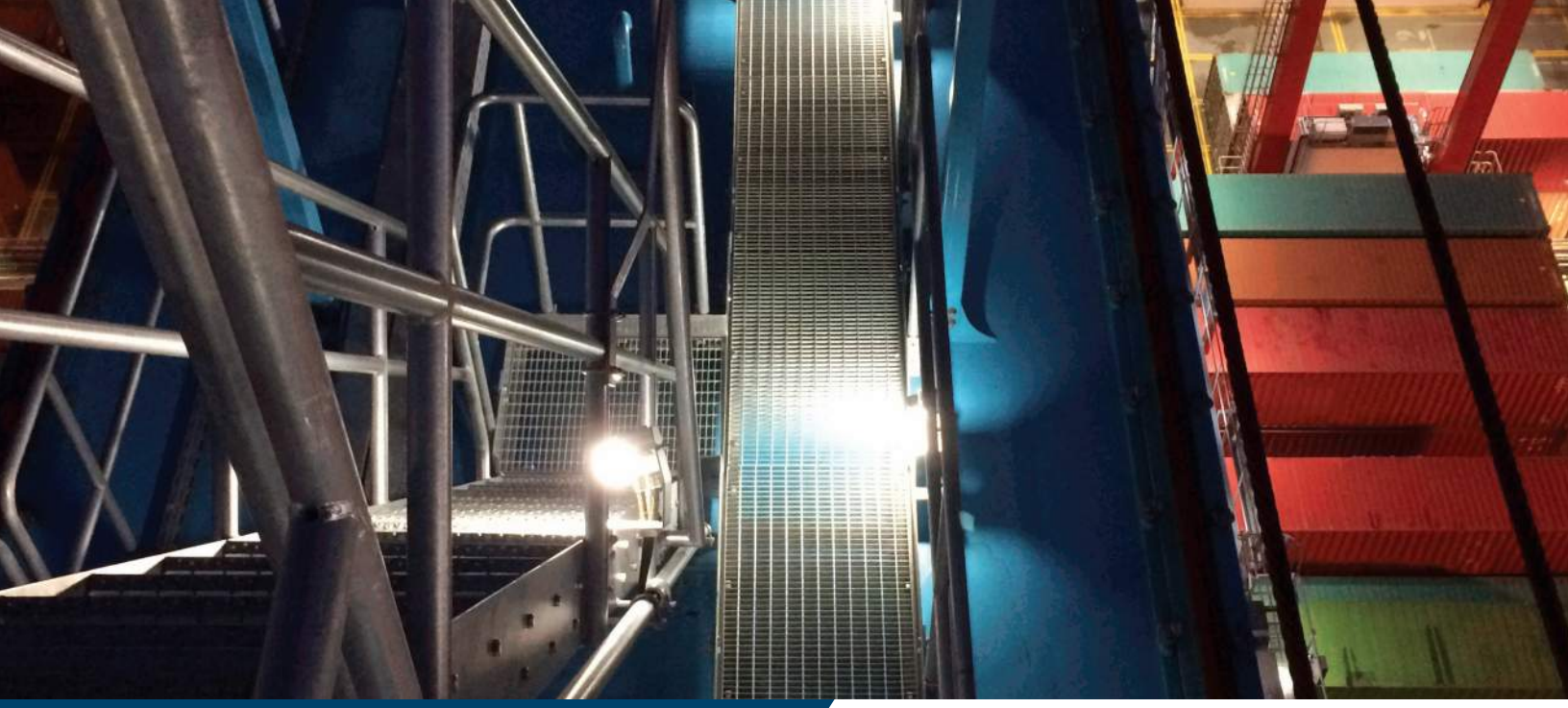


Luminaire Lumens:
Front: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Back: Low=16.0, Medium=31.2, High=12.0, Very High=1.2
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Fixture Cut Sheet
Type G



PHOENIX®
DURABILITY X DESIGN™

Cube-Light

Compact LED Area Light



Australian Design No. 359170
US Patent No. D762,321 S

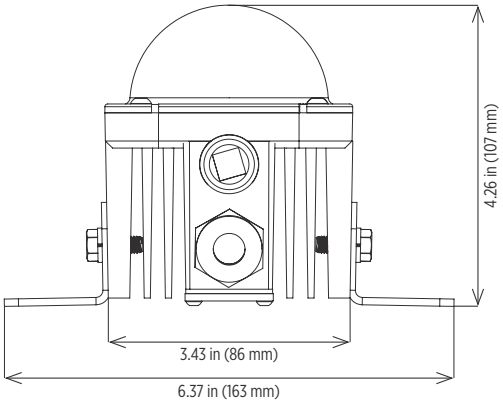
Delivers up to 1000 lumens to doorways, walkways, cabins or other small areas

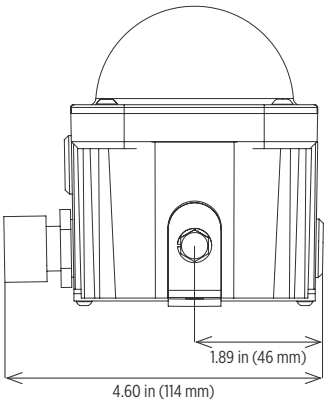
Competitive pricing with short lead times

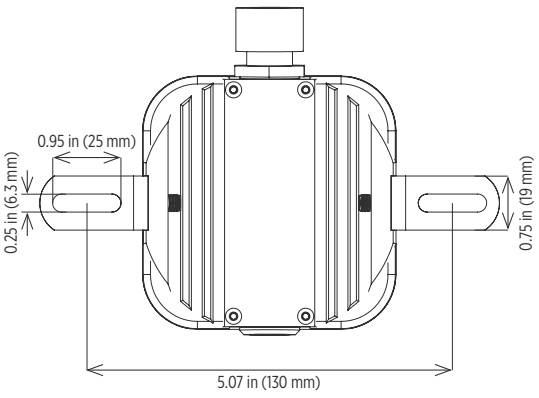
Various mounting options for maximum versatility

LED technology increases efficiency, eliminates maintenance and supports green initiatives

Dimensions







Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Cube-Light

Compact LED Area Light

Specifications

Construction	Cast aluminum housing
Finish	White thermoset powder coat
Hardware	Marine grade (316) stainless steel
Lens	Impact-resistant, diffuse polycarbonate Diffuse red, green, blue and amber lens accessories available (AMB-CL, BLU-CL, GRN-CL, RED-CL)
Light source	13W, up to 1000 lumens Conformal coated CRI ≥ 70 CCT 5000K 50,000 hour rated life
Power source	120-240V, 50/60Hz 240V, 50/60Hz 13-27V DC
Wiring	Stranded wires Cord not included - standard 72.00 inch (1829 mm) cord with pigtail option (CD) NEMA 5-15 plug (120V only) sold separately (PLG-515)
Through wiring	Continuous row mounting option (TW)
Ambient operating temperature	-30°C to +50°C
Mounting	Flush mount brackets - standard Harp mount available Rail mount available - 2.00 inch overall diameter Fixture can be mounted in any orientation
Weight	2.0 lb (0.9 kg)
Warranty	3 years

For IES files, see website or contact factory

Compliances

ETL/cETL Listed to:

- UL 1598 Suitable for Wet Locations
- UL 1598A Marine Outside Type (Saltwater)
- CSA C22.2 No. 250.0

CE
ABS
IP66 rated
LM79 and LM80 reports available



The Cube-Light on an STS crane

Phoenix Products LLC 8711 West Port Avenue Milwaukee, WI 53224 USA
Phone: +1 414.973.3300 Toll Free: 800.438.1214 Fax: +1 414.973.3210 **www.phoenixlighting.com**

Ordering Information

Example: CL-13LED-120-240

Fixture	Wattage/Type	Voltage	Options
CL	13LED	120-240 [1,2]	CD
		240 [2]	TW
		DC [3]	

Wattage/Type

13LED	13W, up to 1000 lumens

Voltage

120-240 [1,2]	120-240V, 50/60Hz
240 [2]	240V, 50/60Hz
DC [3]	13-27V DC

Options

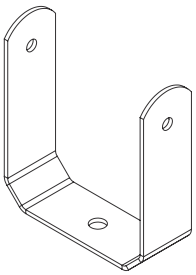
CD	72.00 inch (1829 mm) cord with pigtail option
TW	Continuous row mounting

Notes

1	ETL/cETL listed
2	CE
3	No certifications

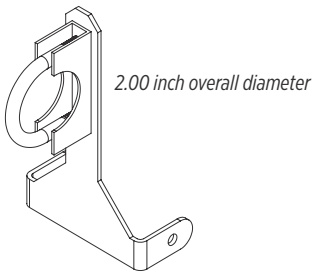
Special Projects: We may be able to accommodate your special projects, so please don't hesitate to ask about additional options. Minimum order quantities and/or extended lead times will apply. Contact your Phoenix representative with specific inquiries.

Mounting (order separately)



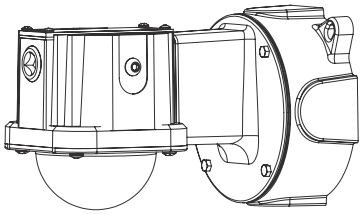
Harp Mount

HRP-CL



Rail Mount

RLMT-CL
Contact factory

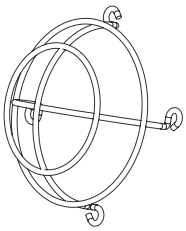


Wall Mount

Complete fixture sold separately
Refer to Cube-Light Wall Mount spec sheet

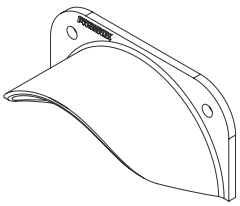
Flush mount comes standard with fixture

Accessories (order separately)



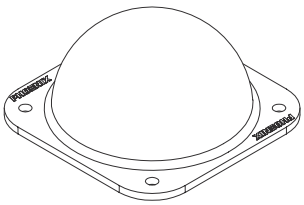
Wire Guard Kit

WG-CL



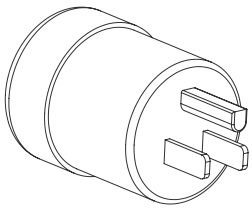
Visor Kit

VSR-CL



Color Lens Kits

AMB-CL	amber lens kit
BLU-CL	blue lens kit
GRN-CL	green lens kit
RED-CL	red lens kit

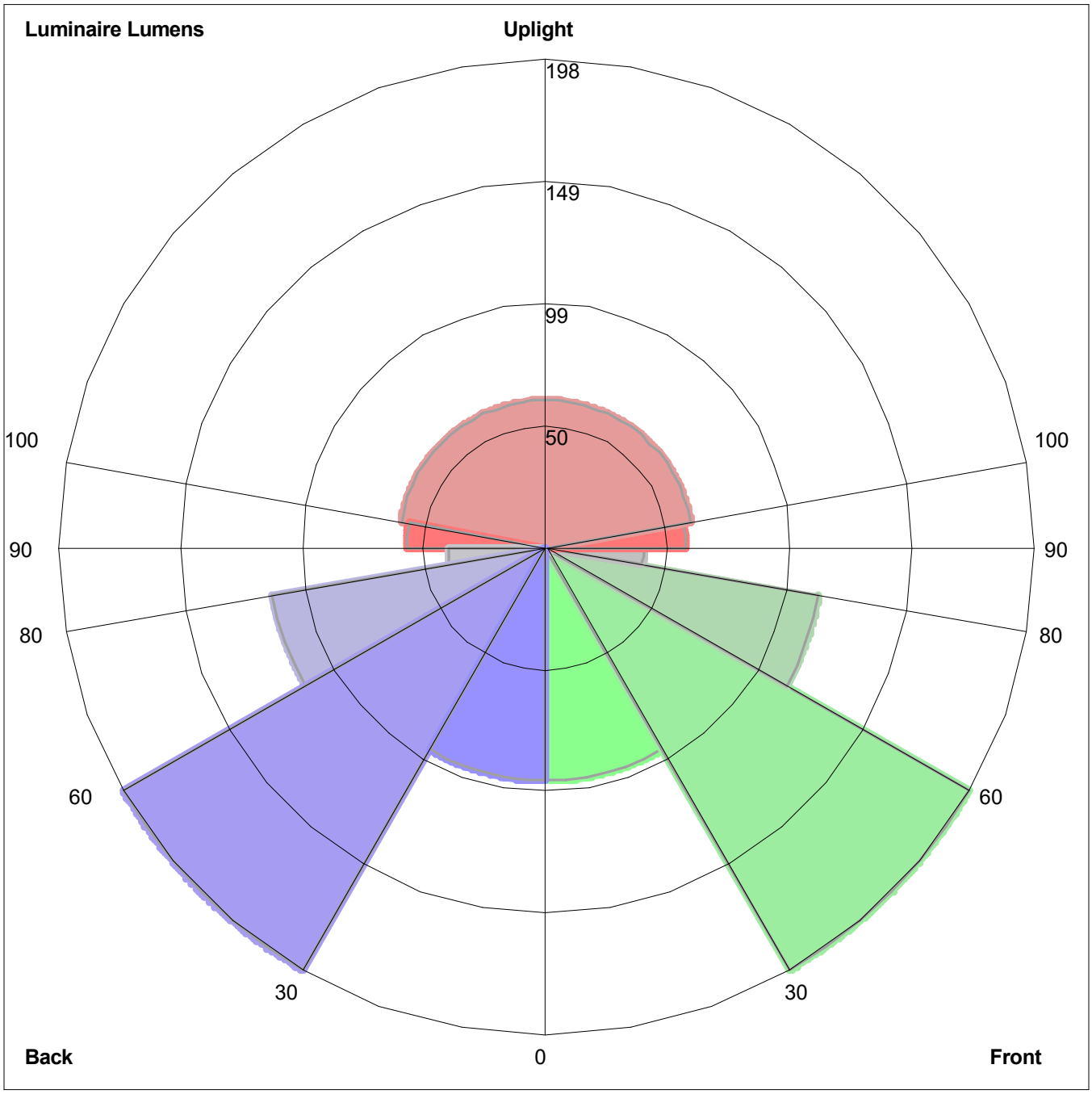


NEMA 5-15 plug (120V only)

PLG-515

IES ROAD REPORT
PHOTOMETRIC FILENAME : CL-13LED (CUBE 120V ITL TESTED).IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Back: Low=94.7, Medium=198.1, High=112.5, Very High=39.7
Uplight: Low=56.4, High=59.7

BUG Rating : B1-U3-G1

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Section 12

Noise Mitigation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

McGavin 6-19HZ Pad - Noise Mitigation and Monitoring Plan

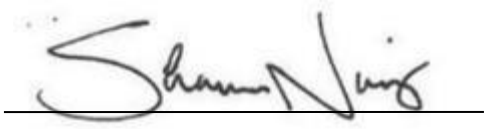
June 28, 2021

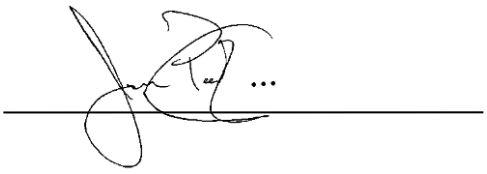
Prepared for:

Kerr-McGee Oil & Gas Onshore, LP
1099 18th Street
Denver, CO 80202

Prepared by:

Behrens and Associates, Inc.
9536 E. I-25 Frontage Rd.
Longmont, CO 80504





Shaun Norris
Staff Acoustical Engineer

Jason Peetz
Engineering Manager

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1. Executive Summary

The following Noise Mitigation and Monitoring Plan (NMP) was prepared by Behrens and Associates Environmental Noise Control (BAENC) for the planned operations associated with the proposed McGavin 6-19HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG). Predictive noise models representing the planned operations for the site were developed and assessed against the maximum permissible noise levels described in Rule 423 of the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The following tasks were completed during development of the NMP:

- Completion of a 4-location, 72-hour ambient sound level survey at the site
- Development of a site-specific drilling noise model representing the Precision 461 rig
- Development of a site-specific completions noise model representing a Haliburton Quiet Fleet crew
- Development of a site-specific production noise model

The ambient sound level survey was conducted to document the existing ambient sound levels at the site and determine if an increase in maximum permissible sound levels was appropriate per Rule 423.d.(2).

The site-specific noise models were developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the COGCC and CDA maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, buildings, barriers, and ground cover. Both A-weighted (dBA) and C-weighted (dBC) noise levels were measured during the ambient survey and considered during the noise modeling assessment.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

Additionally, the area surrounding the site was evaluated to establish noise points of compliance per Rule 423.a.(5). The need for continuous noise monitoring was also evaluated per Rule 423.c.(1) and the CDA. Table 1-1 below summarizes the analysis and mitigation findings in the noise mitigation and monitoring plan and presents them in the form of best management practices.

Table 1-1 Site Mitigation and Best Management Practices

Task	Result of Analysis/Recommended Action
Ambient Survey	• Ambient survey conducted to document noise levels in area around the site (April 2021) • Max permissible noise levels adjusted

Drilling Noise Model	• Developed noise model representing drilling to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, east, south, and west sides of the pad
Completions Noise Model	• Developed noise model representing completions to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Recommended perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, east, south, and west sides of the pad
Production Noise Model	• Developed noise model representing production to assess operational noise levels against COGCC allowable dBA and dBC noise levels • Noise mitigation not recommended
Land Use Evaluation	• Residential building units located within 2,000 ft • Planned Unit Development zoning (Firestone)
Continuous Monitoring Evaluation	• Noise points of compliance proposed (where applicable) • Continuous monitoring proposed at 4 locations

Based on the noise modeling analysis, with the implementation of the best management practices outlined in Table 1-1, the drilling, completions, and production operations are predicted to comply with the COGCC dBA and dBC noise limits and associated requirements of the Firestone CDA.

2. Introduction

The following report provides a noise modeling assessment of the proposed activities at the McGavin 6-19HZ pad operated by Kerr-McGee Oil & Gas Onshore, LP (KMOG) in relation to the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Cooperative Development Agreement (CDA) with the Town of Firestone. The assessment includes a modeling analysis of the Precision 461 production rig, Halliburton Quiet Fleet completion crew and McGavin 6-19HZ production facility. The McGavin 6-19HZ pad (40.129063, -104.937746) is located approximately 0.2 miles southeast of the intersection of County Road 20 and County Road 13, Colorado as shown in Figure 2-1. The Weld County GIS portal indicates that the parcel in question, parcel # 131119200045, has been assigned a zoning designation of Planned Unit Development (PUD) by Firestone, and an image depicting the parcel as defined by Weld County is shown in Figure 2-2 below.

To assess the operational noise levels of the proposed McGavin 6-19HZ pad, file noise level data previously measured and typical of the Precision 461 production rig, and Halliburton Quiet Fleet completion crew and production facility equipment were utilized in the noise modeling. The noise models were developed using SoundPLAN 8.1 software.

PD 461 drilling operations are scheduled to occur for 75 days, Haliburton completions operations are scheduled to occur for 45 days, flowback operations are scheduled to occur for 48 days and production operations are scheduled to occur for 360 months.

The following is provided in this report:

- Documentation of ambient sound level survey results
- A review of applicable COGCC noise standards and the CDA with the Town of Firestone
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to the COGCC noise limits
- Proposed continuous noise monitoring procedure



Figure 2-1 McGavin 6-19HZ Pad Location

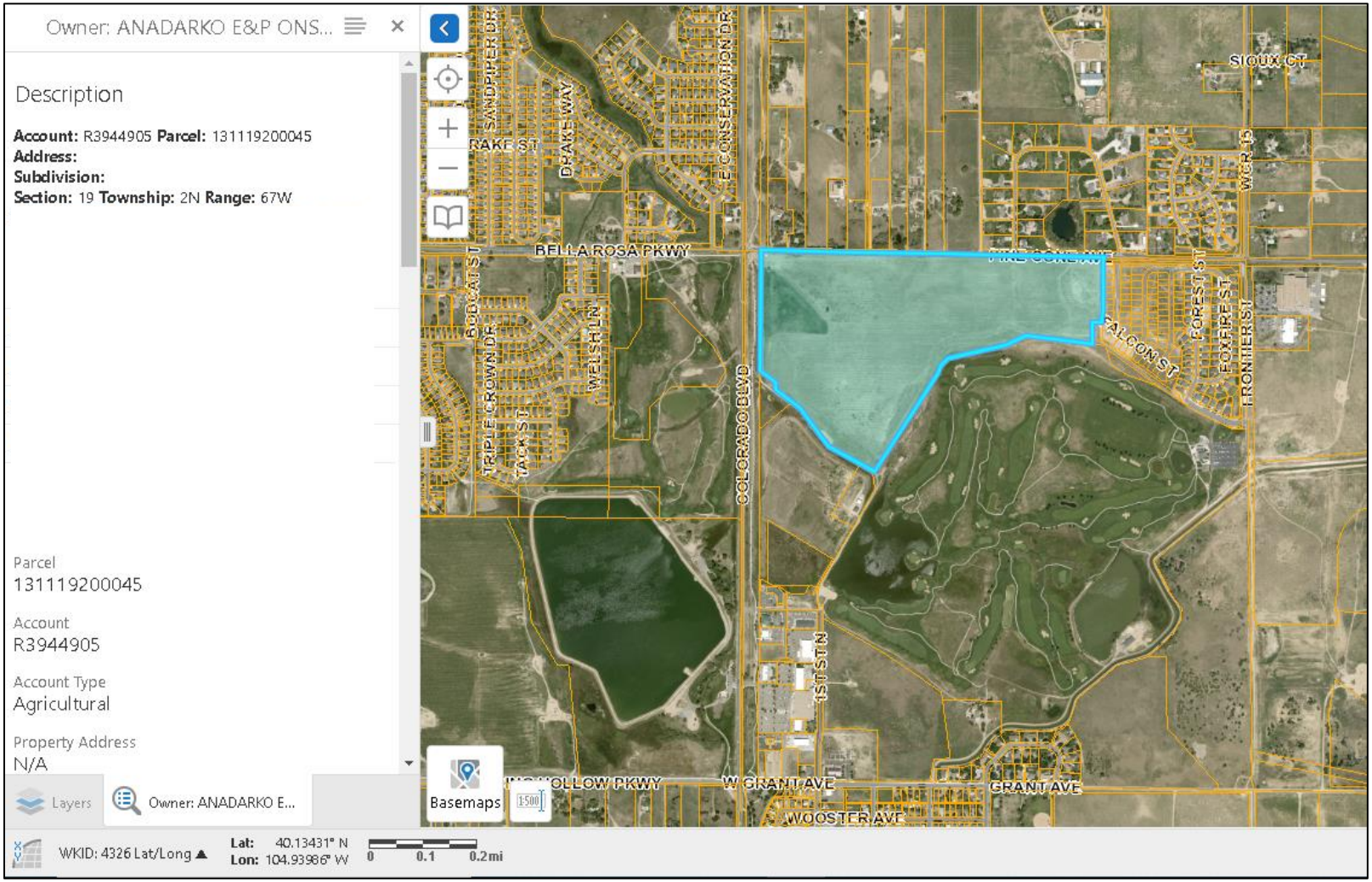


Figure 2-2 Weld County Geographic Information Systems (GIS) Parcel # 131119200045

3. Noise Fundamentals

Sound is most commonly experienced by people as pressure waves passing through air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. The rate at which sound pressure changes occur is called the frequency. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear range from approximately 20 Hz to 20,000 Hz. Toward the lower end of this range are low-pitched sounds, including those that might be described as a “rumble” or “boom”. At the higher end of the range are high-pitched sounds that might be described as a “screech” or “hiss”.

Environmental noise generally derives, in part, from a combination of distant noise sources. Such sources may include common experiences such as distant traffic, wind in trees, and distant industrial or farming activities. These distant sources create a low-level "background noise" in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment but varies slowly from hour to hour as natural forces change or as human activity follows its daily cycle.

Superimposed on this low-level, slowly varying background noise is a succession of identifiable noisy events of relatively brief duration. These events may include the passing of single-vehicles, aircraft flyovers, screeching of brakes, and other short-term events. The presence of these short-term events causes the noise level to fluctuate. Typical indoor and outdoor A-weighted sound levels are shown in Figure 3-1.

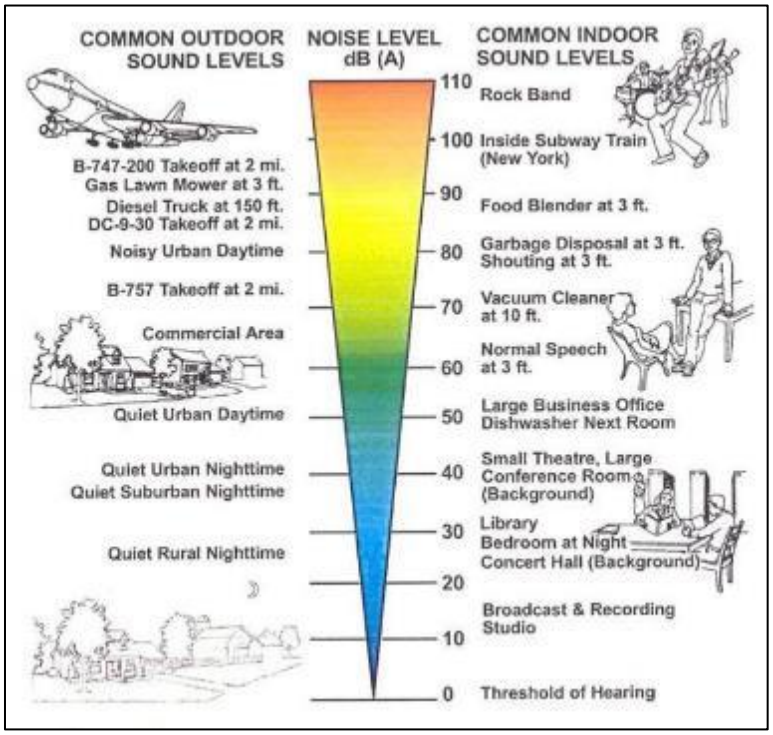


Figure 3-1 Typical Indoor and Outdoor A-Weighted Sound Levels

4. Noise Standards

The pad is located in Firestone in the state of Colorado and is subject to the regulations of the Colorado Oil and Gas Conservation Commission (COGCC) and the Cooperative Development Agreement with the Town of Firestone. The COGCC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423.

4.1 Colorado Oil and Gas Conservation Commission (COGCC)

The COGCC Code lists noise limits for oil and gas operations. "All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423." The noise limits are provided in Table 4-1.

Table 4-1 COGCC Table 423-1 – Maximum Permissible Noise Levels

Zone	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential / Rural / State Parks & State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2):

(2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:

A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 db(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(A) in the hours between 7:00 a.m. to 7:00 p.m.; and

B. In all zones maximum permissible noise levels will be 65 db(C) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(C) in the hours between 7:00 a.m. to 7:00 p.m.

To demonstrate compliance with the sound level limits, Rule 423.c.(2).A states:

A. In response to a complaint or at the Director's request, Operators will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dbC) indicated issues. For high frequency (dbA) measurement will be at the nearest point of compliance. For equipment installed at Oil and Gas Locations subject to a Form 2A approved prior to January 15, 2021, after the Commencement of Production Operations, no single piece of equipment will exceed the maximum permissible noise levels listed in Table 423-1 as measured at a point 350 feet from the equipment generating the noise in the direction from which the complaint was received.

Defining noise points of compliance, Rule 423.a.(5) states:

(5) For proposed Oil and Gas Locations with a Working Pad Surface within 2,000 feet of one or more Residential Building Units, at least one, and no more than six noise points of compliance where monitors will be located. Operators will identify noise points of compliance using the following criteria:

A. Provide one noise point of compliance in each direction in which a Residential Building Unit is located within 2,000 feet of the proposed Working Pad Surface.

B. Noise points of compliance will be located at least 350 feet from the Working Pad Surface, and no less than 25 feet from the exterior wall of the Residential Building Unit that is closest to the Working Pad Surface. If a Surface Owner or tenant refuses to provide the Operator with access to install a noise monitor, then the noise point of compliance will be located at either the next-closest Residential Building Unit or an alternative location approximately the same distance and direction from the Working Pad Surface.

With regards to adjusting maximum permissible noise levels based on measured ambient sound levels, Rule 423.d. states:

d. Cumulative Noise. All noise measurements will be cumulative.

(1) Noise measurements taken at noise points of compliance designated pursuant to Rule 423.a.(5) will take into account ambient noise, rather than solely the incremental increase of noise from the facility targeted for measurement.

(2) At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m. This Rule 423.d.(2) does not allow Operators to increase noise above the maximum cumulative noise thresholds specified in Table 423-2 after the Commencement of Production Operations.

(3) After the Commencement of Production Operations, if ambient noise levels already exceed the maximum permissible noise thresholds identified in Table 423-1, under no circumstances will new

Oil and Gas Operations or a significant modification to an existing Oil and Gas Operations raise cumulative ambient noise above:

Table 423-2 – Maximum Cumulative Noise Levels

LAND USE	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential /Rural/State Parks/State Wildlife Areas	65 db(A)	60 db(A)
Commercial/Agricultural	70 db(A)	65 db(A)
Light Industrial	80 db(A)	75 db(A)
Industrial	90 db(A)	85 db(A)
All Zones	75 db(C)	70 db(C)

4.2 Cooperative Development Agreement (CDA)

Kerr-McGee Oil & Gas Onshore, LP (KMOG) and the Town of Firestone have entered into a Cooperative Development Agreement (CDA) to develop and implement a Noise Mitigation and Monitoring Plan. The Operational Standards identified in the CDA state:

(2) **Noise Mitigation**. To reduce the noise effects of the Town and its residents during drilling, and provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at last 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

4.3 Summary of COGCC Maximum Permissible Noise Levels

Notwithstanding any influence or adjustments due to ambient noise or maximum cumulative noise levels of Rule 423 – Table 423-2, based on COGCC Rule 423, the allowable noise level limits applicable to the site are as follows:

Table 4-2 Unadjusted Maximum Permissible Noise Levels

Operation	Applicable Zoning	Noise Limits (dBA)	Noise Limits (dBC)
Drilling	Agricultural/Commercial	65 day / 60 night	65 day and night
Completions	Agricultural/Commercial	65 day / 60 night	65 day and night
Production	Agricultural/Commercial	60 day / 55 night	60 day and night

5. Ambient Sound Level Survey

5.1 Ambient Sound Level Survey Procedure

Four Type 1 SVANTEK SVAN 971 sound level meters were utilized to conduct an ambient sound level survey adjacent to the McGavin 6-19HZ pad. The sound level meters conform to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meters were calibrated prior to deployment. The sound level monitoring period began on Thursday, April 22, 2021 with the meters programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, April 26, 2021. The locations of the sound level meters and weather station used to conduct the ambient sound level survey can be seen in Figure 5-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

Per COGCC Rule 423.c.(2), the measurements were conducted at an approximate height of 5 feet. When calculating the ambient average sound levels shown in Table 5-1 and Table 5-2, the weather data collected during the survey was used to exclude periods from the calculation when winds exceeded 5 mph. The graphed ambient survey results show the measurement data before periods of wind above 5 mph were removed.

5.2 Ambient Sound Level Survey Results

The measured A-weighted and C-weighted hourly average Leq for each monitoring location can be seen in Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5, respectively. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1 and 2 are shown in Table 5-1 below. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 3 and 4 are shown in Table 5-2 below.

Table 5-1 Ambient Sound Level Survey Results for Monitoring Locations 1 & 2

Day	Location 1				Location 2			
	Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels		Daytime L_{eq} Ambient Noise Levels		Nighttime L_{eq} Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	57	72	54	63	63	75	57	64
2	56	75	52	70	62	70	55	63
3	57	74	52	68	61	70	54	62
4	56	75	55	66	59	69	56	64
5	60	72	-	-	64	70	-	-
Overall Leq	57	75	54	68	61	70	56	63

Note: Day 1 Daytime is an L_{eq} from 4pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 11am.

Table 5-2 Ambient Sound Level Survey Results for Monitoring Locations 3 & 4

Day	Location 3				Location 4			
	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	48	69	44	57	51	68	51	61
2	48	64	42	59	59	75	51	67
3	62	67	44	63	61	71	50	69
4	47	65	45	59	62	73	54	64
5	55	68	-	-	52	67	-	-
Overall Leq	58	66	44	60	61	73	51	66

Note: Day 1 Daytime is an L_{eq} from 4pm until 7pm, and Day 5 Daytime is an L_{eq} from 7am until 11am.

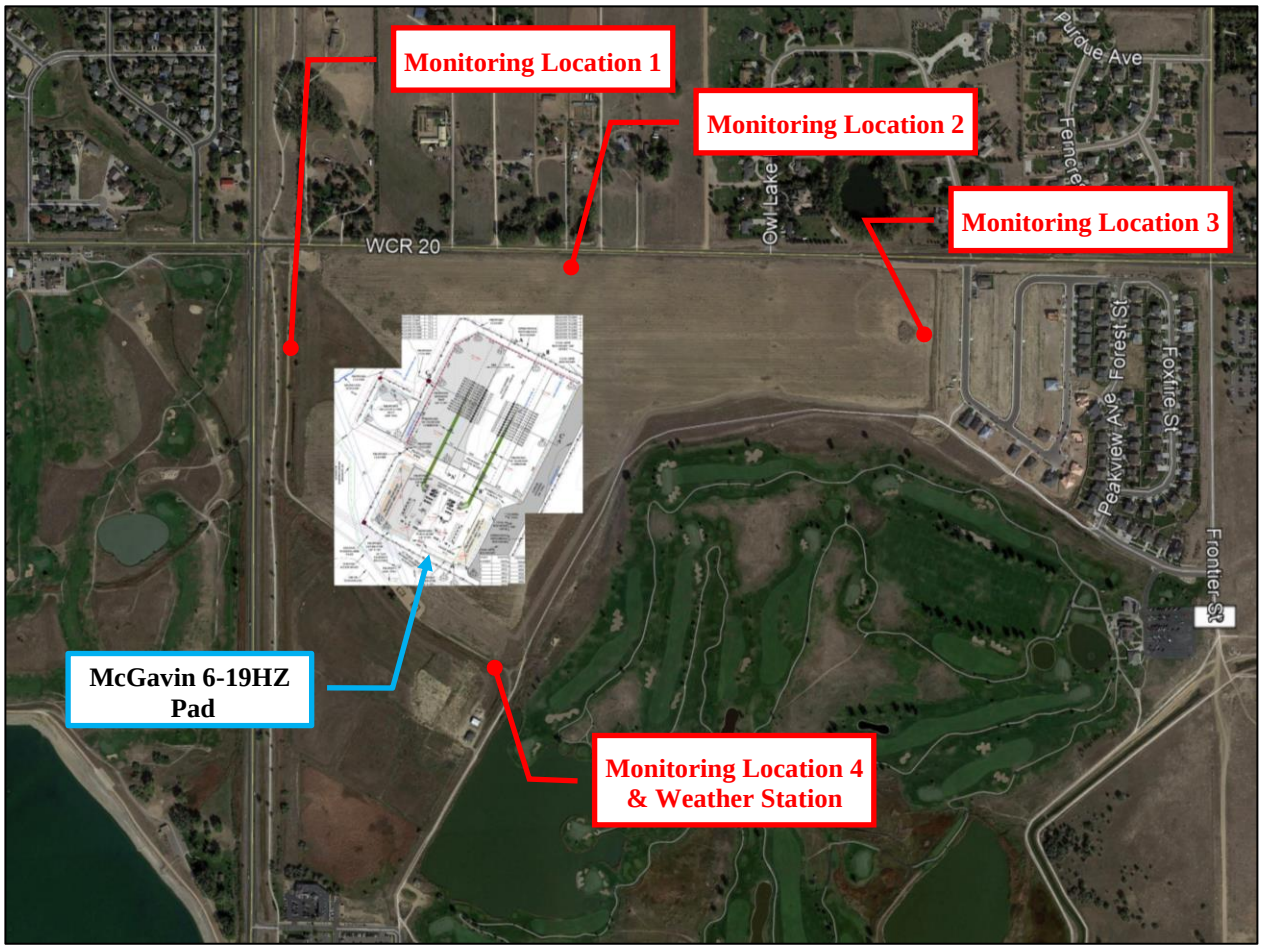


Figure 5-1 Ambient Monitoring Locations

5.3 Maximum Adjusted Noise Levels

The measured ambient sound levels already exceed the maximum permissible noise thresholds identified in COGCC Table 423-1 at multiple locations. Based on COGCC Rule 423.d.(2), for drilling and completions operations, the operational noise levels at the site will be limited to the measured ambient noise level plus 5 dBC during nighttime and 7 dBC during daytime. The following table presents the adjusted allowable noise levels for the site.

Table 5-3 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Drilling and Completions (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	75/68 dBC	82/73 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	73/66 dBC	80/71 dBC

Table 5-4 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBA)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	61/56 dBA	68/61 dBA

Table 5-5 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production (dBC)

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
Location 1 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	75/68 dBC	75/70 dBC
Location 2 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	70/63 dBC	75/68 dBC
Location 4 (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 4)	73/66 dBC	75/70 dBC

Note: Maximum adjusted production cumulative noise levels capped at 75/70 day/night dBC

The drilling, completions, and production operations are planned to occur 24 hours a day, as such, the stricter nighttime allowable level will be utilized in the noise modeling analysis.

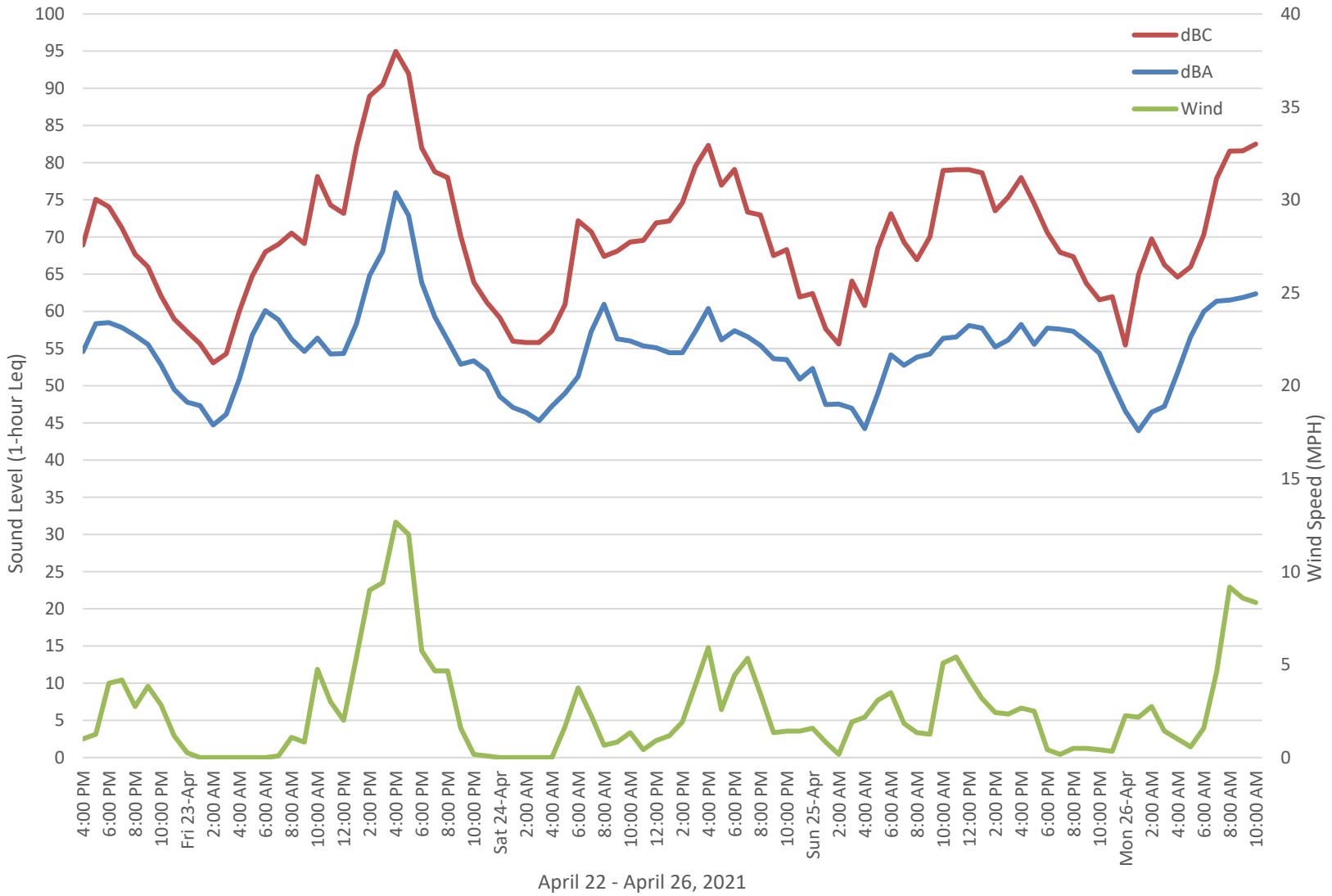


Figure 5-2 Ambient Sound Level Data for Measurement Location 1

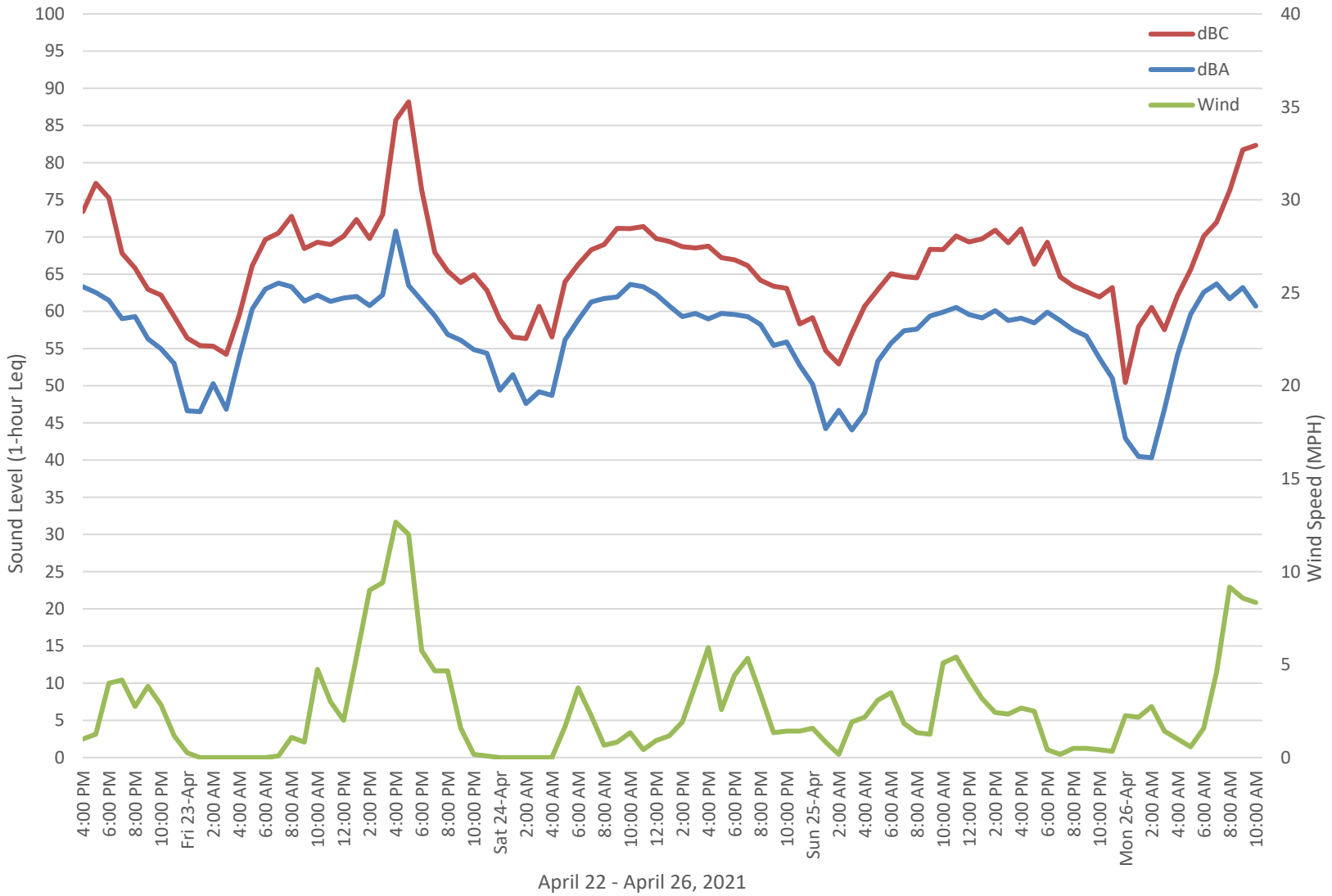


Figure 5-3 Ambient Sound Level Data for Measurement Location 2

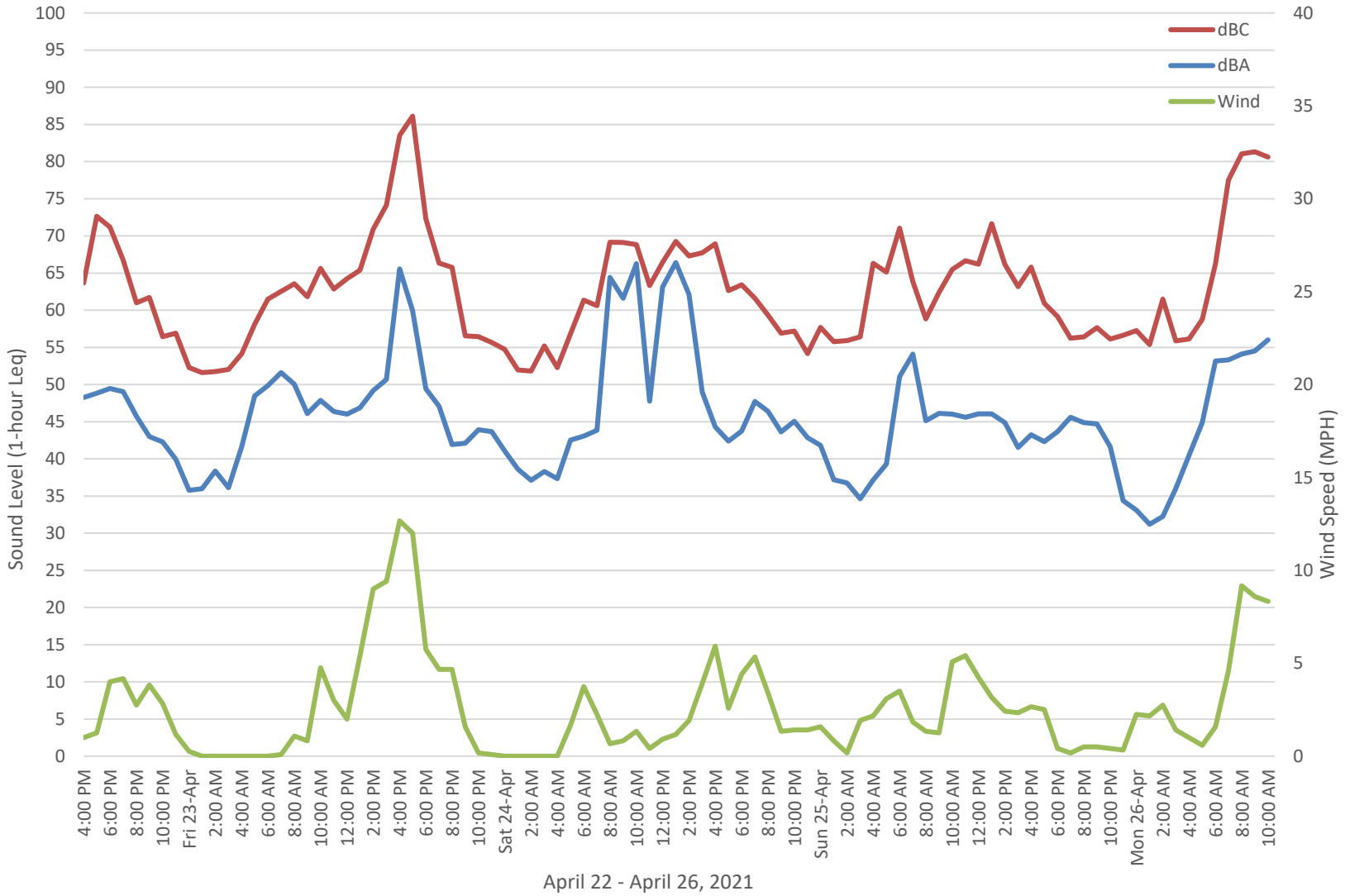


Figure 5-4 Ambient Sound Level Data for Measurement Location 3

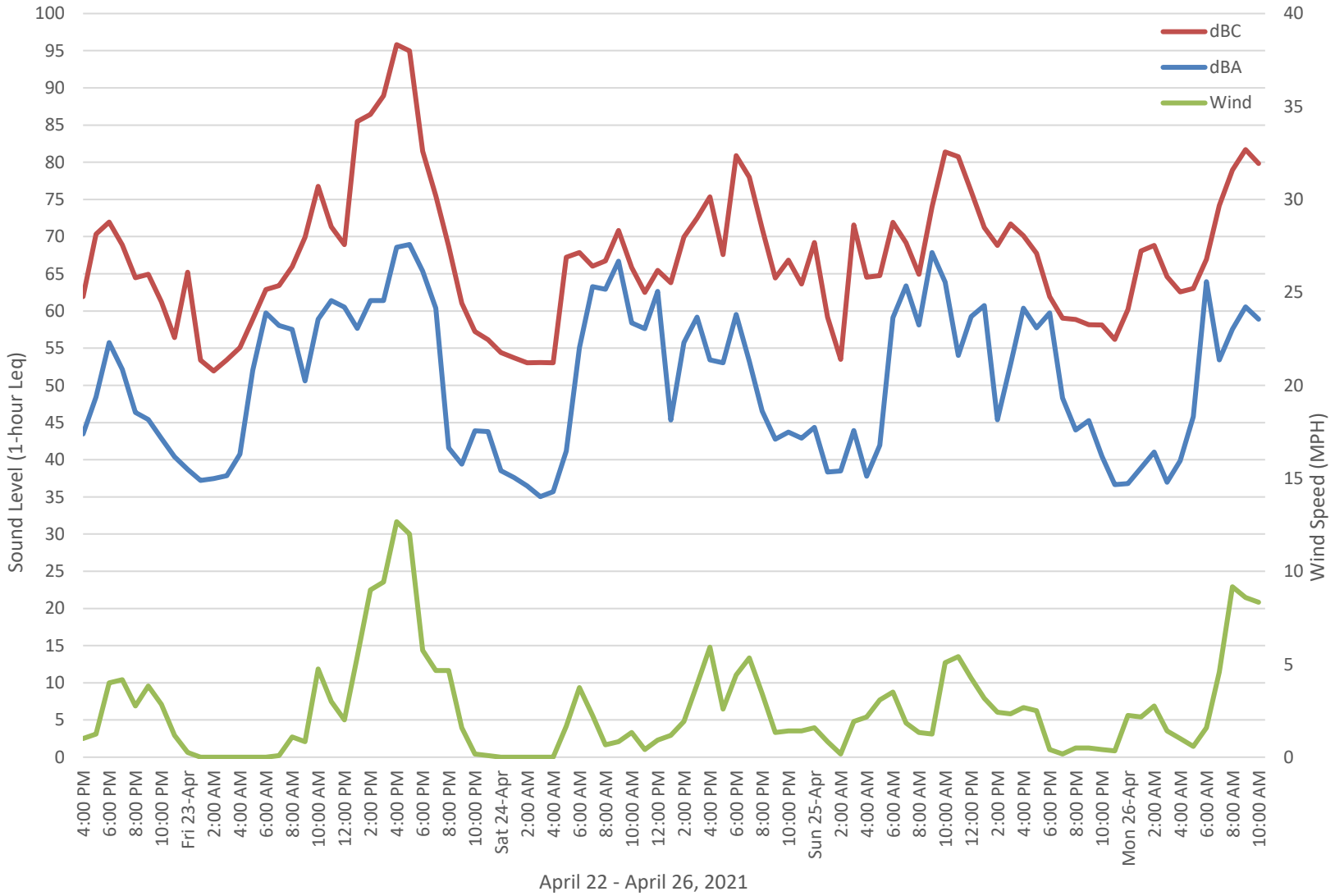


Figure 5-5 Ambient Sound Level Data for Measurement Location 4

6. McGavin 6-19HZ Pad Noise Modeling

6.1 Noise Modeling Methodology

The noise modeling was completed with use of three-dimensional computer noise modeling software. All models in this report were developed with SoundPLAN 8.1 software using the ISO 9613-2 standard. Noise levels are predicted based on the locations, noise levels and frequency spectra of the noise sources, and the geometry and reflective properties of the local terrain, buildings and barriers. To ensure a conservative assessment and compliance with ISO 9613-2 standards, light to moderate winds are assumed to be blowing from the source to receptor. The predicted noise levels represent only the contribution of the drilling, completions and production facility equipment operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Sound level data utilized in the surface drilling model was based on file data of the Precision 461 rig collected by BAENC. The V door faces south with the backyard equipment positioned to the north. Rig placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

Sound level data utilized in the completions model was based on file data of the Halliburton Quiet Fleet completions crew collected by BAENC. The model consists of 12 completions trucks positioned north of the well heads. Completions equipment placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

6.2 Noise Sensitive Receptors

The noise sensitive receptors utilized in the drilling and completions modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the drill pad surface. Receptor points used in the modeling can represent multiple closely located RBU's. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 6-1 shows the dBA and dBC noise sensitive receptor locations.

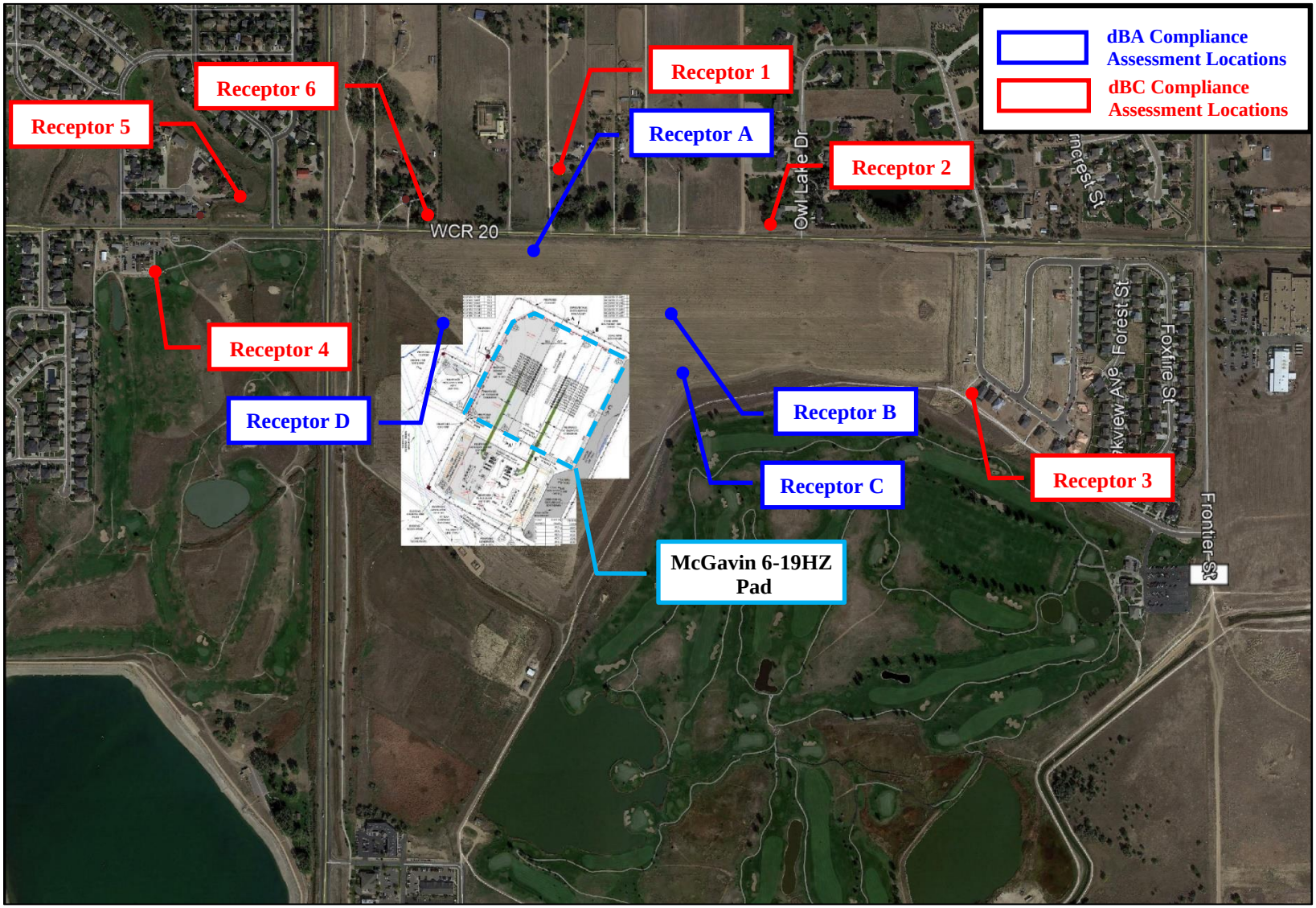


Figure 6-1 Noise Sensitive Receptor Locations

6.3 Unmitigated Drilling and Completions Noise Modeling Results

The unmitigated modeling is based off of current drilling and completions plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated drilling noise modeling are presented in Table 6-1 and Table 6-2. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-2 and Figure 6-3 shows the Unmitigated PD 461 Noise Contour Map in dBA and dBC respectively. Figure 6-4 and Figure 6-5 shows the Unmitigated Halliburton Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

Table 6-1 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location A	350 Feet North	57	58
Location B	350 Feet Northeast	54	61
Location C	350 Feet East	54	62
Location D	350 Feet Northwest	55	59
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**	**65 Day / 60 Night**

Table 6-2 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461	Halliburton Quiet Fleet
Location 1	6261 County Road 20	67	67
Location 2	9010 Owl Lake Drive	62	65
Location 3	8865 Falcon Street	57	61
Location 4*	5830 Bella Rosa Parkway	59	61
Location 5*	5709 Capistrano Way	60	63
Location 6*	6099 County Road 20	64	67
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted noise level limits. However, the results of the unmitigated noise modeling indicate that drilling operations will exceed the COGCC C-weighted noise level limits. The results of the unmitigated noise modeling indicate that completions operations will exceed the COGCC A-weighted and C-weighted noise level limits. Therefore, mitigation will be recommended for drilling and completions.

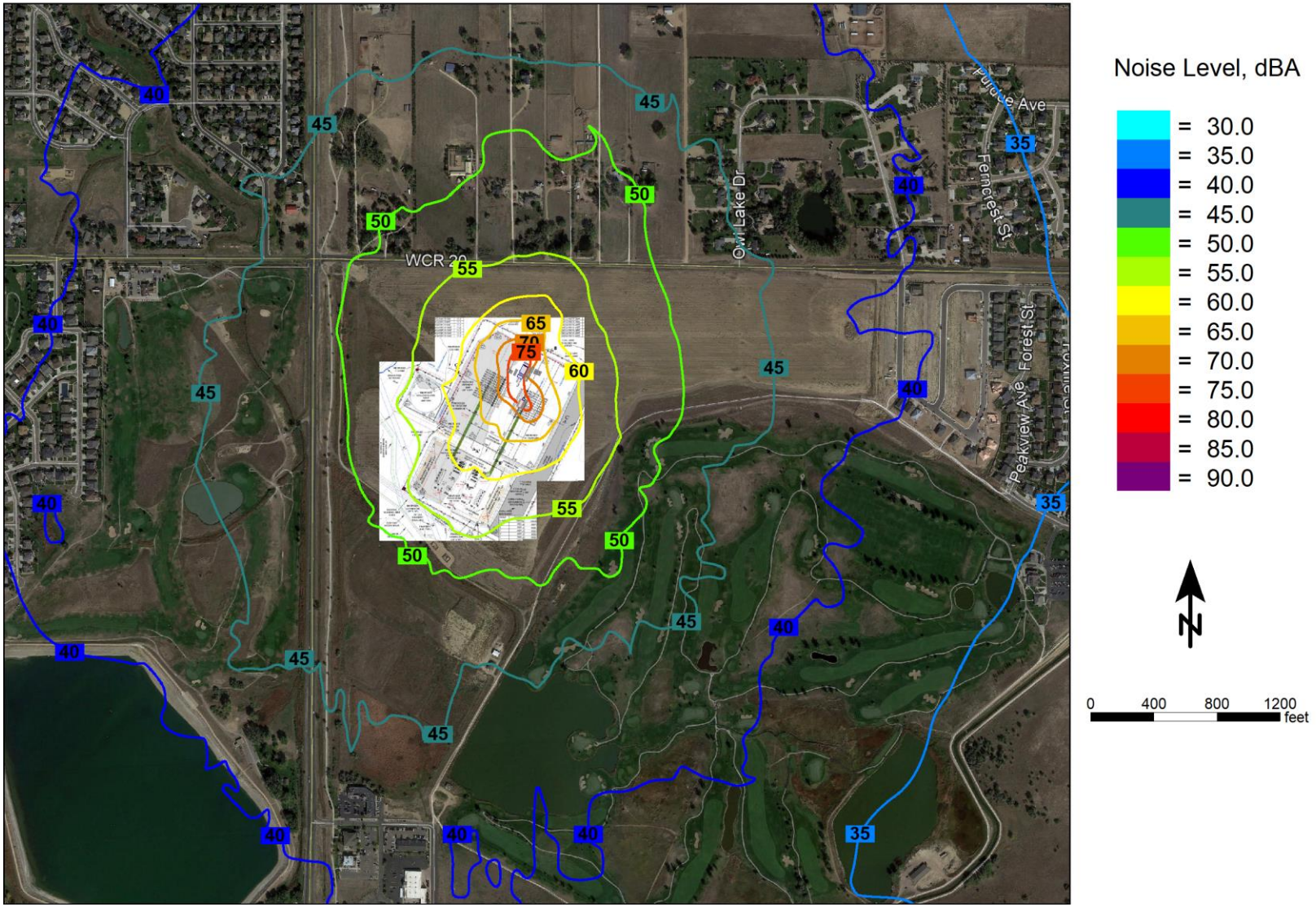


Figure 6-2 PD 461 Unmitigated Noise Contour Map (dBA)

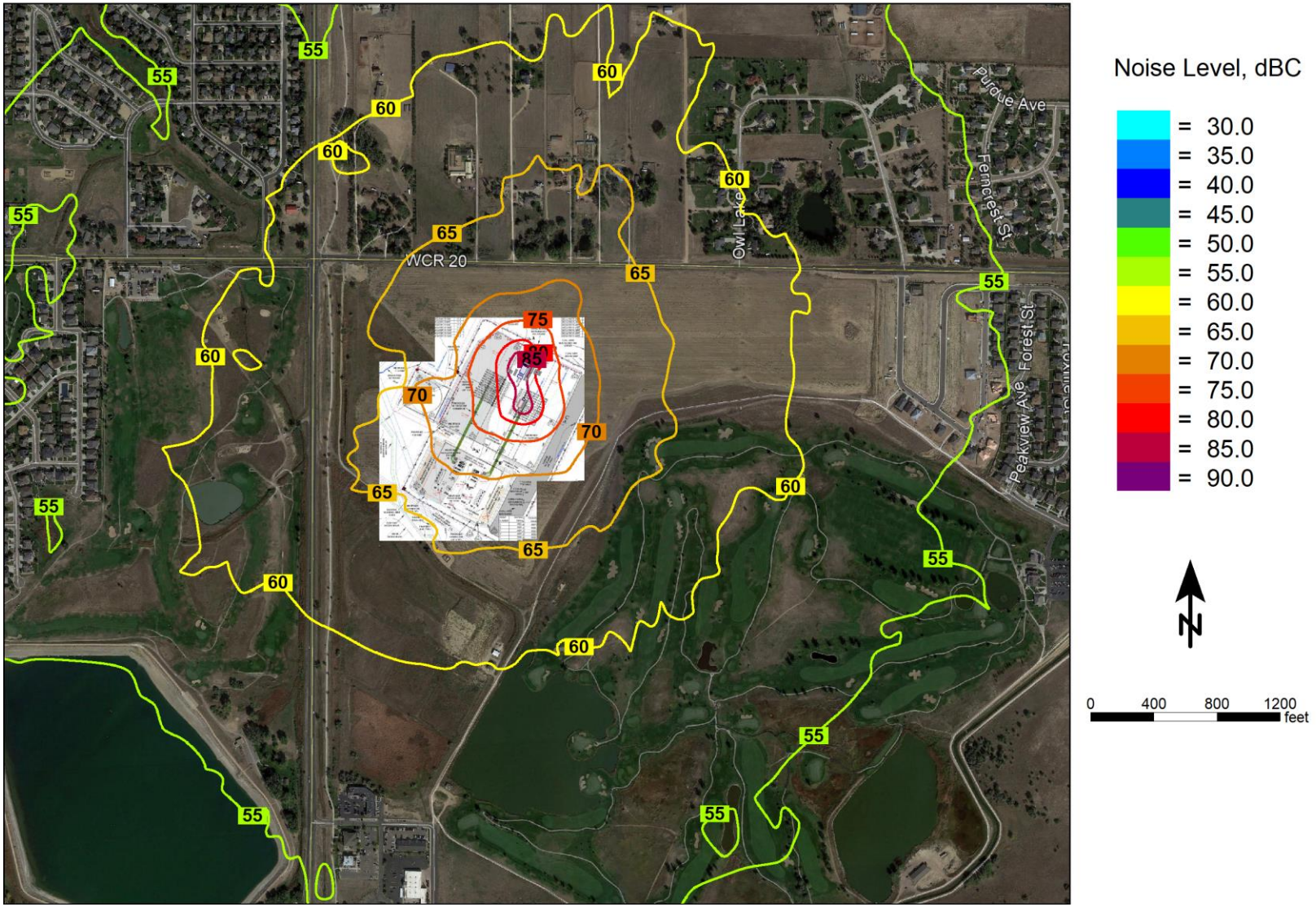


Figure 6-3 PD 461 Unmitigated Noise Contour Map (dBC)

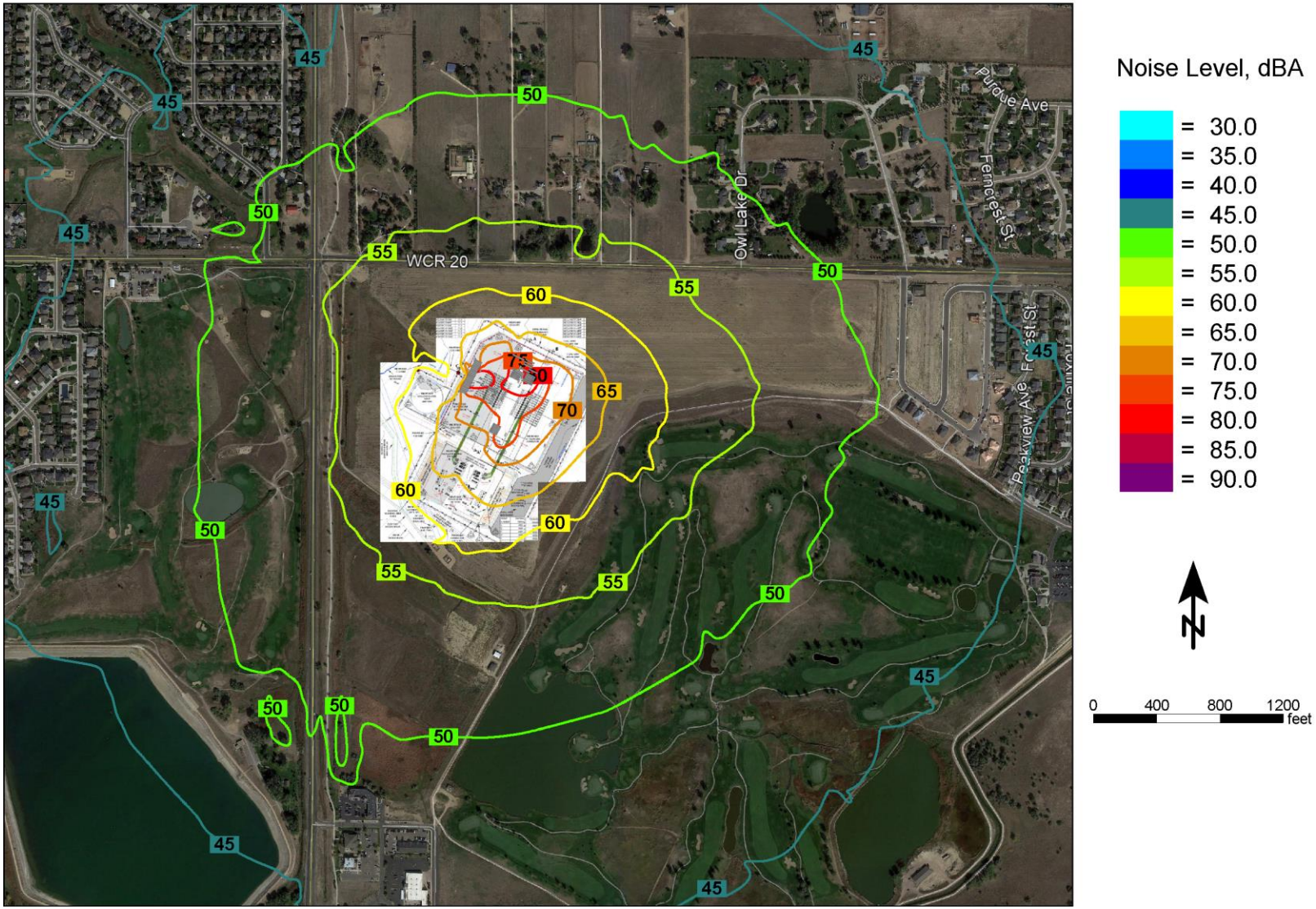


Figure 6-4 Halliburton Unmitigated Noise Contour Map (dBA)

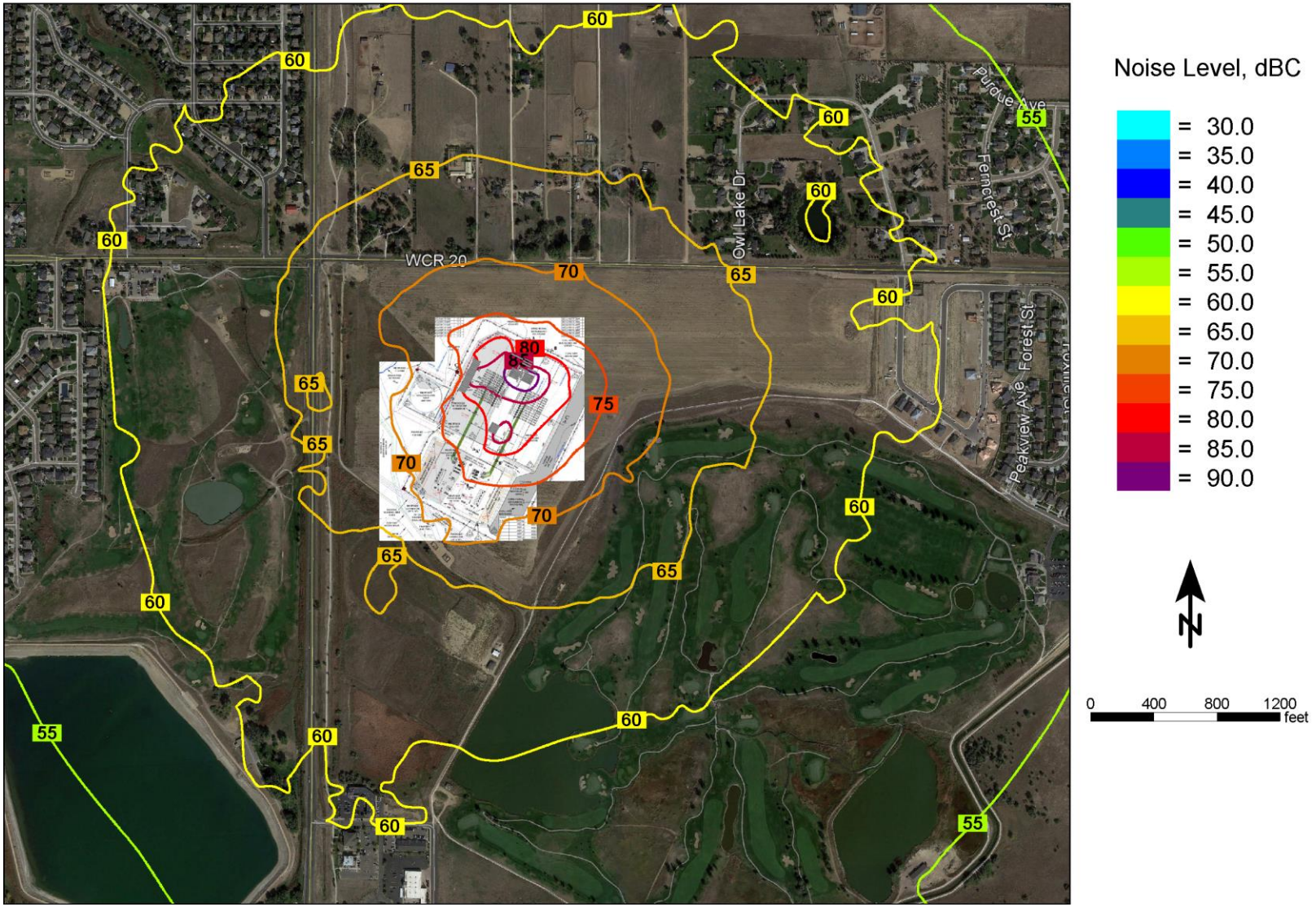


Figure 6-5 Halliburton Unmitigated Noise Contour Map (dBC)

6.4 Drilling Mitigated Modeling Results

Noise mitigation for drilling operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 2,600 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-6.

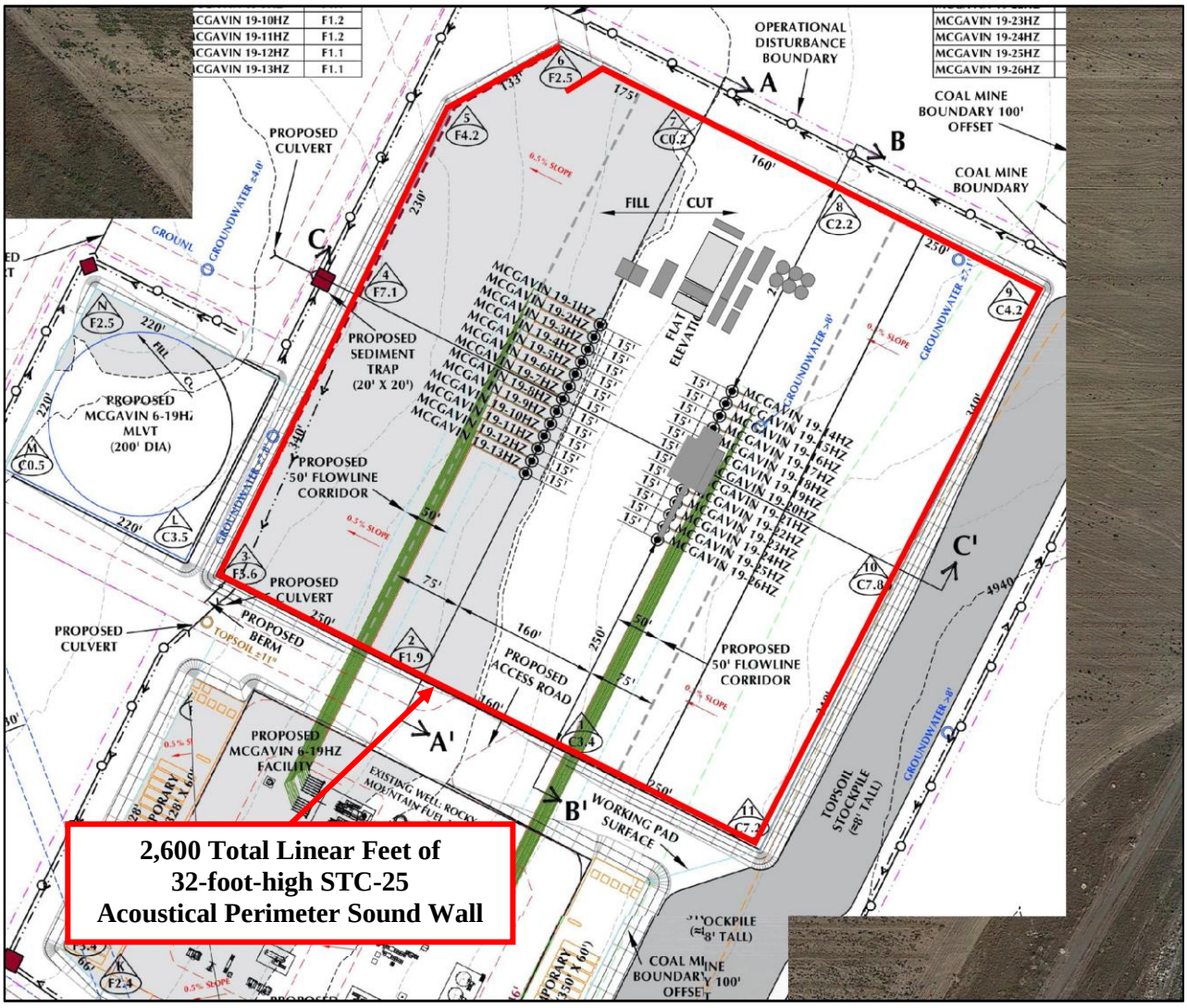


Figure 6-6 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-6. The results of the mitigated noise modeling are presented in Table 6-3 and Table 6-4. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the drilling operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-3 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Precision 461
Location A	350 Feet North	49
Location B	350 Feet Northeast	48
Location C	350 Feet East	49
Location D	350 Feet Northwest	47
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-4 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Precision 461
Location 1	6261 County Road 20	61
Location 2	9010 Owl Lake Drive	60
Location 3	8865 Falcon Street	56
Location 4*	5830 Bella Rosa Parkway	55
Location 5*	5709 Capistrano Way	56
Location 6*	6099 County Road 20	60
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed drilling operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-7 shows the Mitigated PD 461 Noise Contour Map in the A-weighted scale and Figure 6-8 shows the Mitigated PD461 Noise Contour Map in the C-weighted scale.

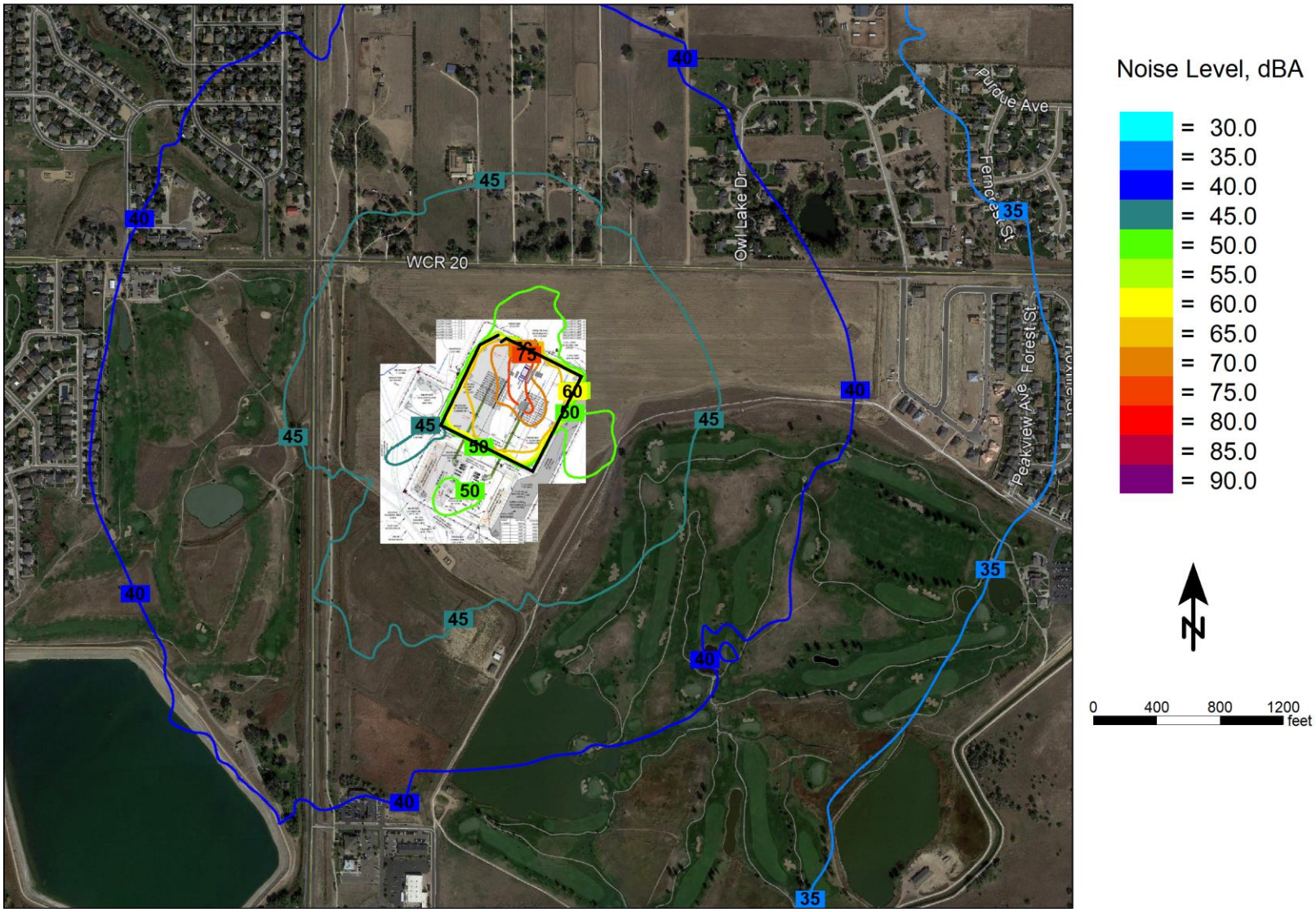


Figure 6-7 Mitigated PD 461 Noise Contour Map (dBA)

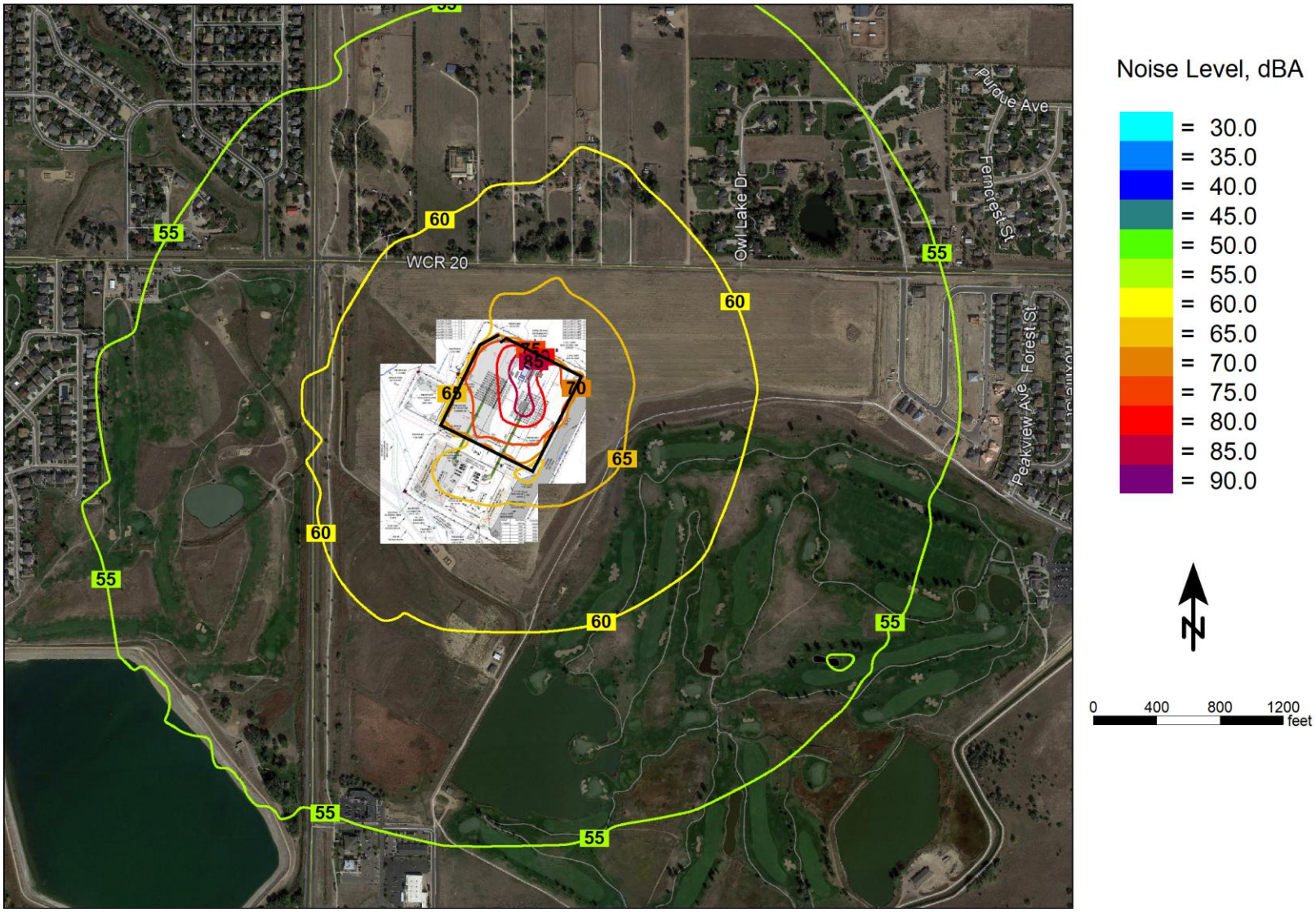


Figure 6-8 Mitigated PD 461 Noise Contour Map (dBC)

6.5 Completions Mitigated Modeling Results

Noise mitigation for completions operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 2,600 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the modeled mitigation scenario is shown in Figure 6-9.

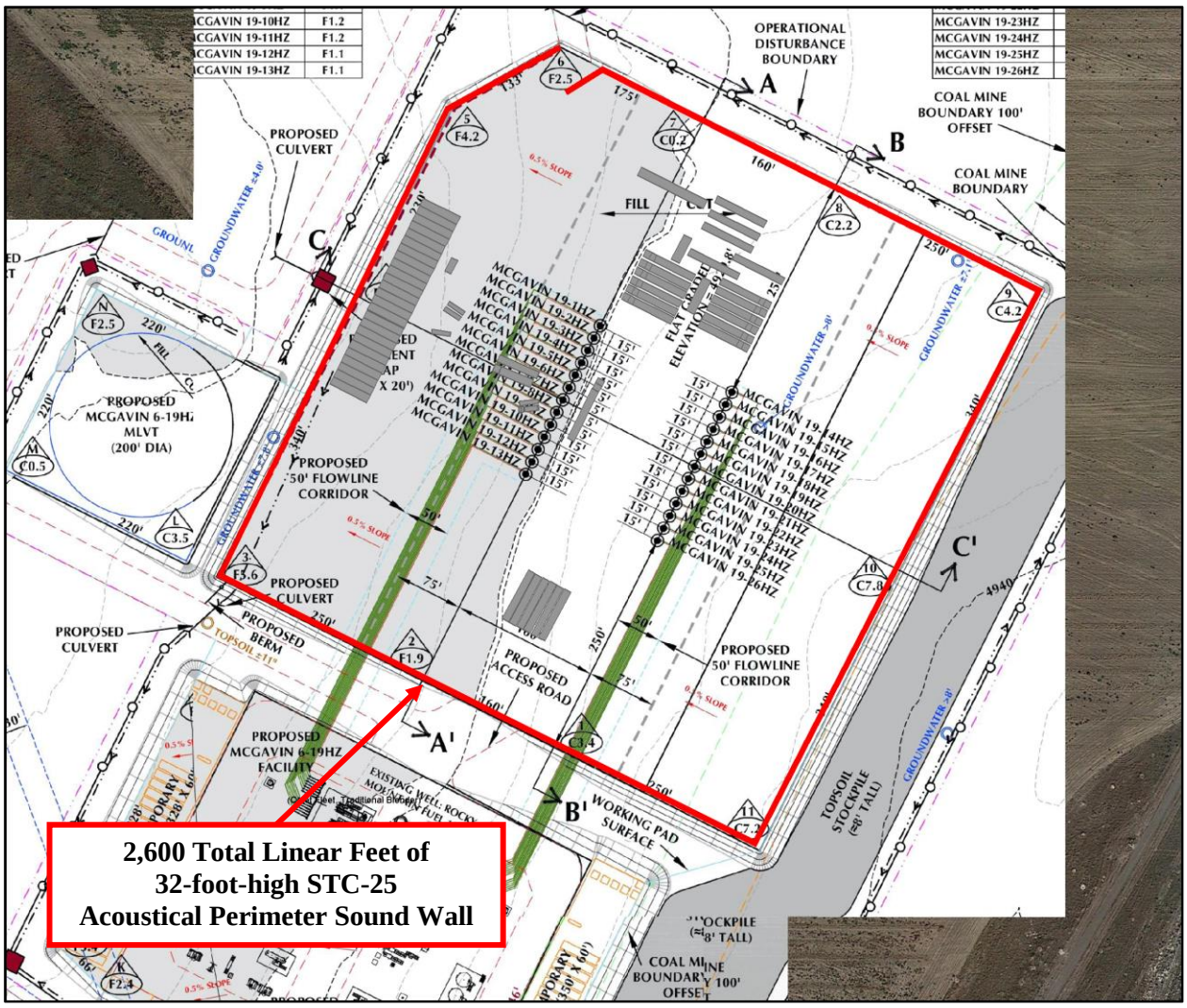


Figure 6-9 Recommended Mitigation Layout

The mitigated modeling includes the acoustical mitigation recommendations shown in Figure 6-9. The results of the mitigated noise modeling are presented in Table 6-5 and Table 6-6. The locations in the tables correspond to the locations identified in Figure 6-1. The predicted noise levels represent only the contribution of the completions operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Table 6-5 Mitigated Noise Modeling Results (dBA)

Receptor	Location Description	Halliburton Quiet Fleet
Location A	350 Feet North	54
Location B	350 Feet Northeast	55
Location C	350 Feet East	57
Location D	350 Feet Northwest	53
COGCC Noise Limit	**350 ft. from the working pad surface**	**65 Day / 60 Night**

Table 6-6 Mitigated Noise Modeling Results (dBC)

Receptor	Location Description	Halliburton Quiet Fleet
Location 1	6261 County Road 20	64
Location 2	9010 Owl Lake Drive	63
Location 3	8865 Falcon Street	60
Location 4*	5830 Bella Rosa Parkway	59
Location 5*	5709 Capistrano Way	60
Location 6*	6099 County Road 20	63
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**65**

*Location 4,5, and 6 are subject to adjusted allowable limits of 82 day/ 73 night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the recommended mitigation the proposed completions operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits at all modeled receptors and associated requirements of the Firestone CDA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 6-10 shows the Mitigated Halliburton Noise Contour Map in the A-weighted scale Figure 6-11 shows the Mitigated Halliburton Noise Contour Map in the C-weighted scale.

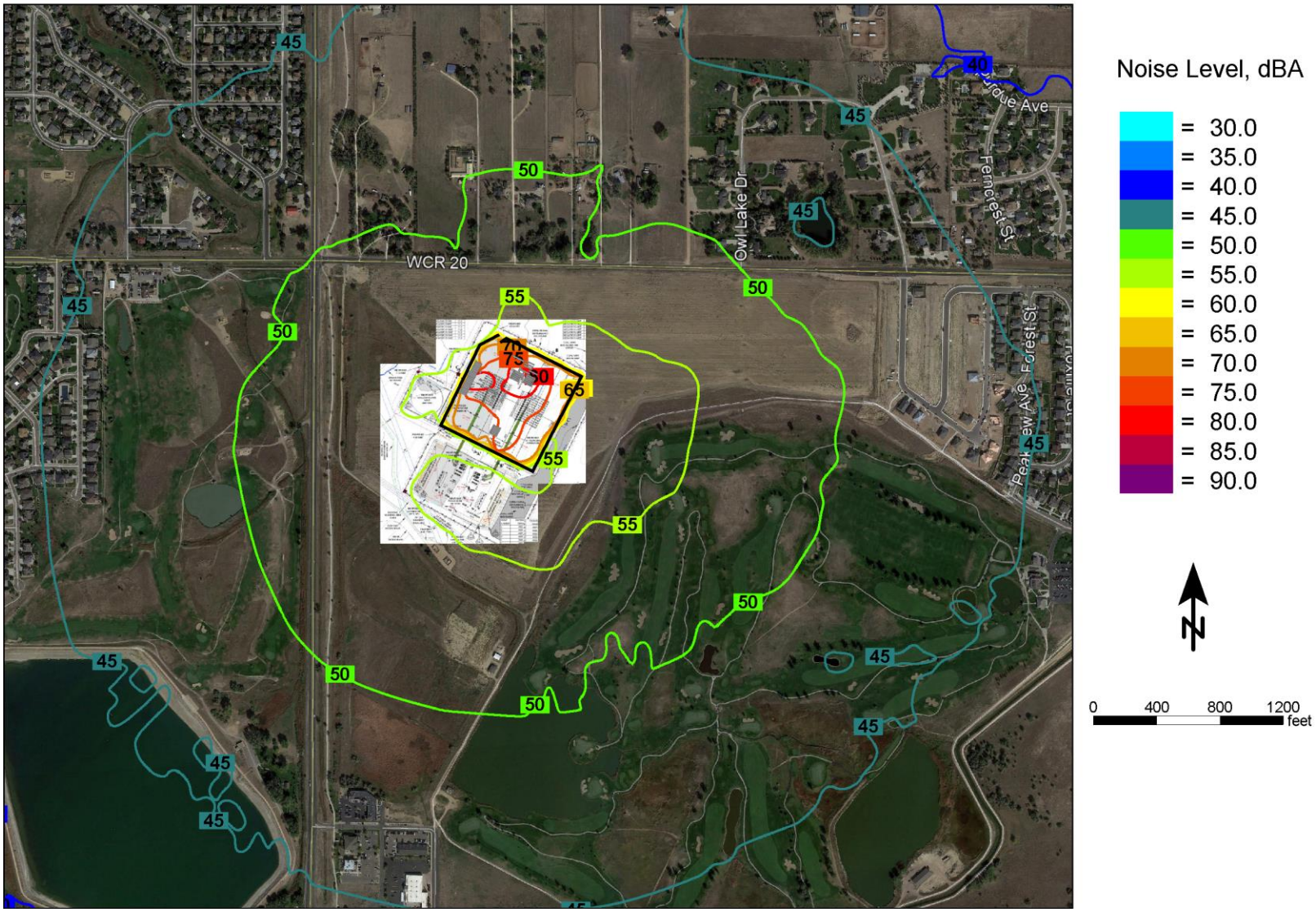


Figure 6-10 Mitigated Halliburton Noise Contour Map (dBA)

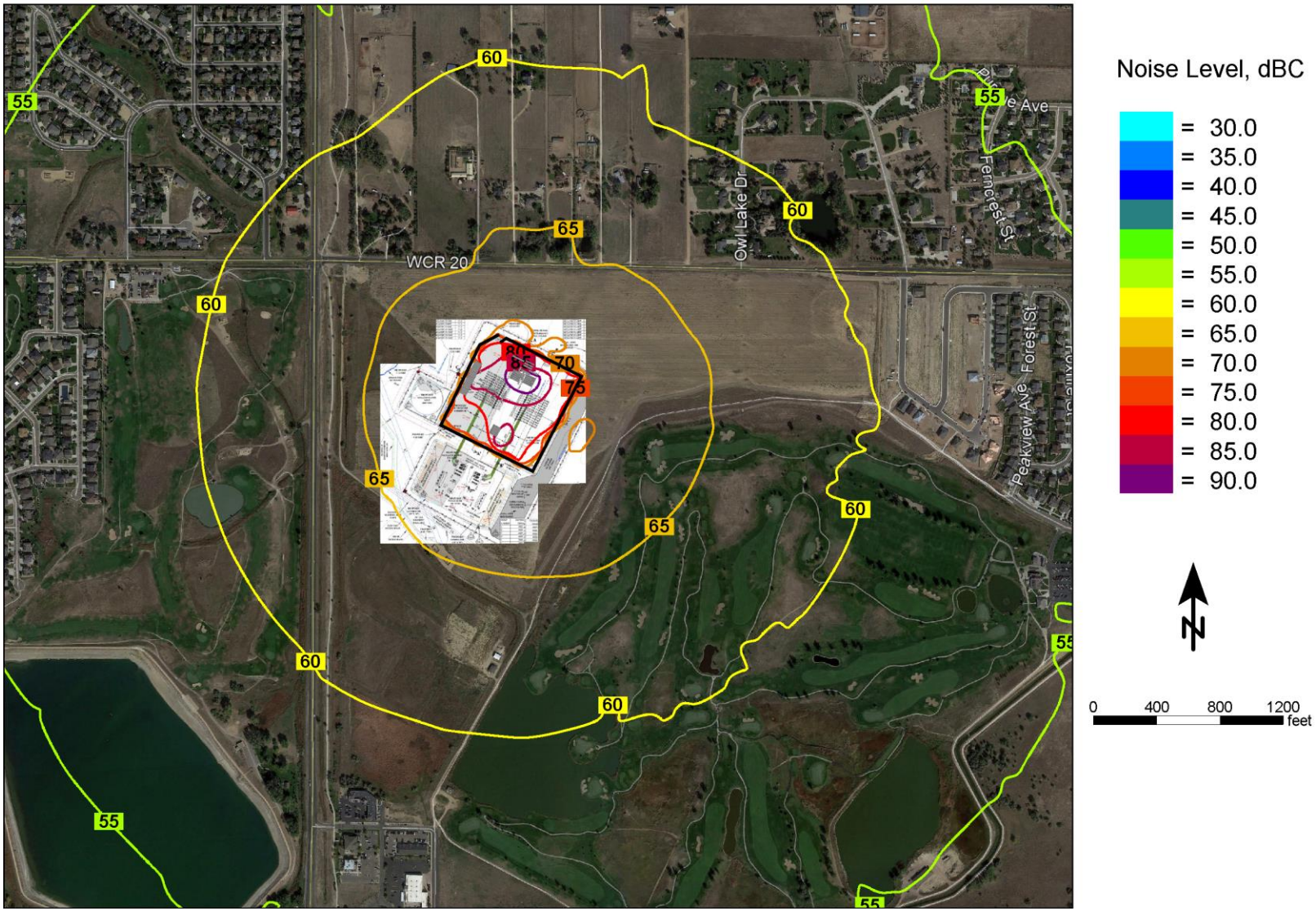


Figure 6-11 Mitigated Halliburton Noise Contour Map (dBC)

7. McGavin 6-19HZ Pad Production Facility Noise Modeling

7.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off of current production site plans and does not include sound walls or other third-party acoustical mitigation measures. The production facility operational noise model was created to predict the constant, steady-state noise levels at the McGavin 6-19HZ pad and adjacent surroundings. The production facility was modeled assuming all listed equipment was operating simultaneously to represent the loudest operating scenario. Sound level data utilized in the production model was based on file data previously collected by BAENC at a KMOG production facility with similar equipment. The production facility equipment list and equipment orientation were supplied by KMOG and can be seen Figure 7-1. The predicted modeling results are dependent on equipment and orientation as indicated.

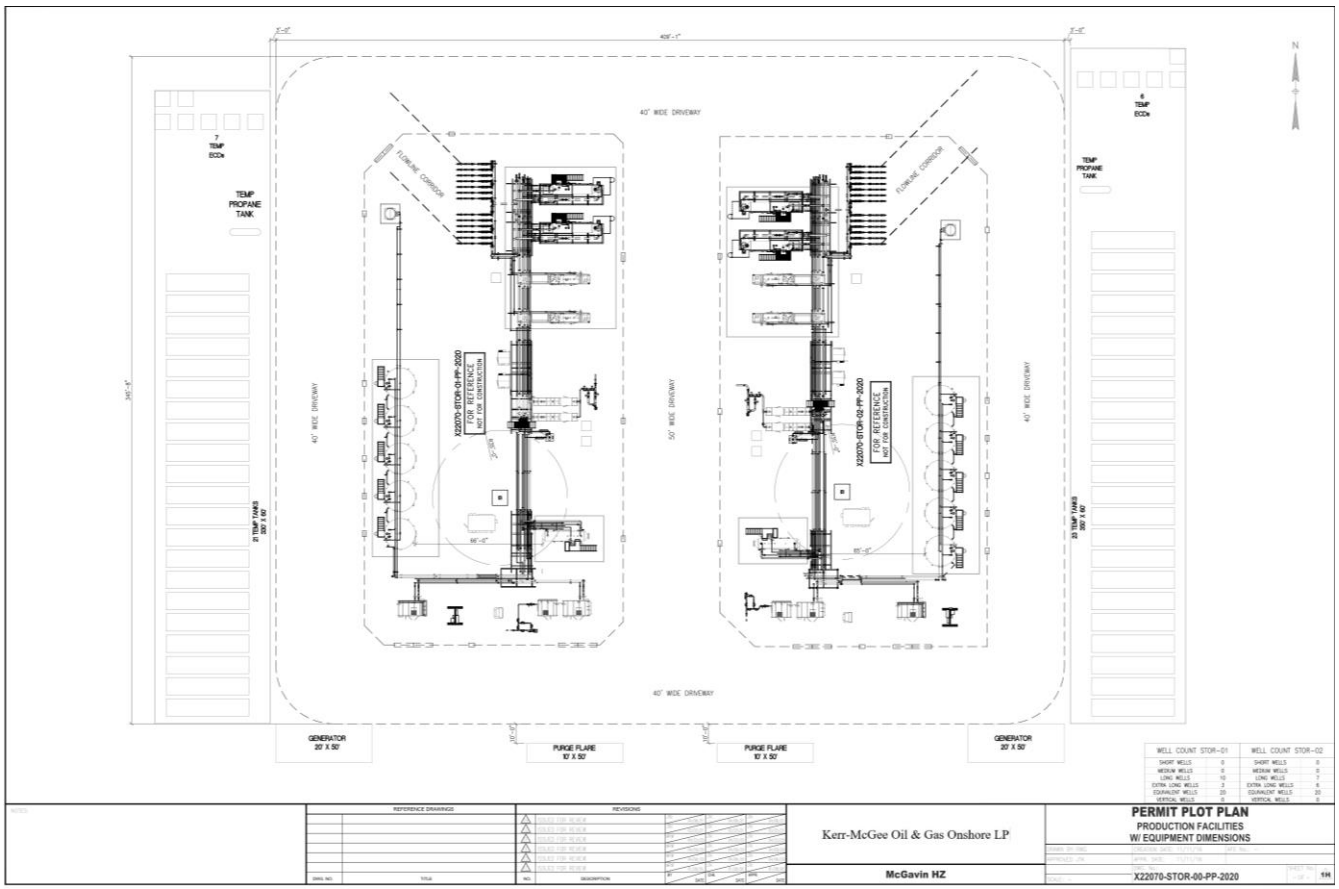


Figure 7-1 Modeled McGavin 6-19HZ Production Facility Layout
(DWG # X22070-STOR-00-PP-2020, 11/11/2016)

The equipment list and layout were scrutinized to determine the major noise emitting sources planned for the site. These major noise sources, listed in Table 7-1, were included in the production modeling. Other auxiliary/temporary equipment or smaller equipment not anticipated to generate significant noise was not included in the production model.

The noise sensitive receptors utilized in the production modeling were positioned to be consistent with the requirements of the COGCC noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the production pad surface. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 7-2 shows the dBA and dBC noise sensitive receptor locations.

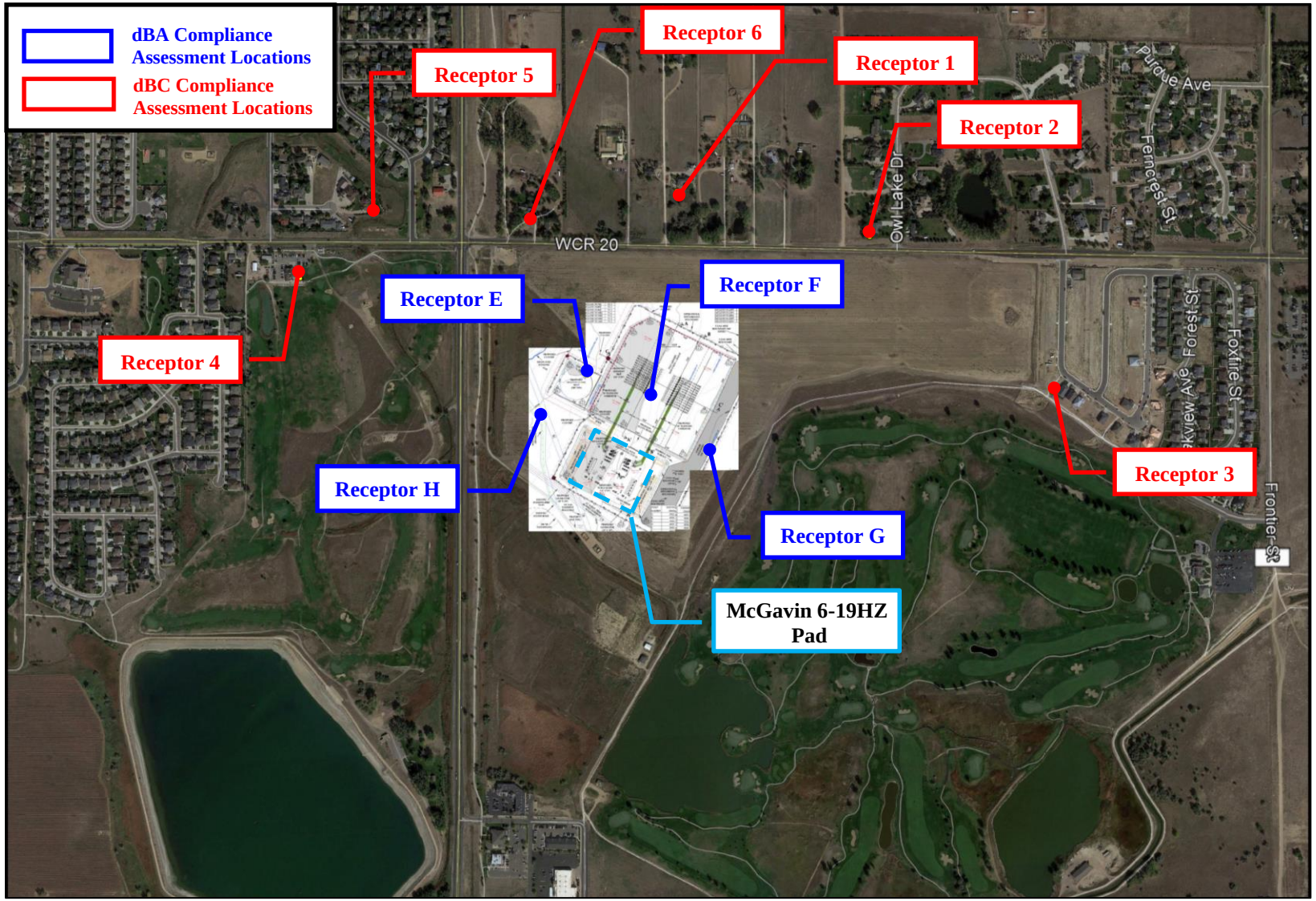


Figure 7-2 Noise Sensitive Receptor Location

The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 7-1.

Table 7-1 Production Facility Major Noise Emitting Equipment Included in Model

Equipment	Quantity
Air Compressor	4
Electrical Panel/Box	4
LACT Building	4
Fisher 4-inch ET Series Whisper I Trim Globe Control Valve	2
Separator	8
Bulk Separator	2
Three Phase Separator Burner	10
VOC Combustor	2

The results of the unmitigated production facility noise modeling are presented in Table 7-2 and Table 7-3. The locations in the tables correspond to the locations identified in Figure 7-2. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 7-3 and Figure 7-4 shows the Unmitigated Production Facility Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

The results of the unmitigated noise modeling indicate that the production operations will comply with the COGCC A-weighted and C-weighted noise level limits.

Table 7-2 Unmitigated Noise Modeling Results (dBA)

Receptor	Location Description	Production Facility
Location E	350 Feet North	50
Location F	350 Feet Northeast	53
Location G	350 Feet East	50
Location H	350 Feet Northwest	49
COGCC Noise Limit	**350 ft. from the working pad surface**	**60 Day / 55 Night**

*Location F is subject to adjusted allowable limits of 68 day / 61 night dBA for production

Table 7-3 Unmitigated Noise Modeling Results (dBC)

Receptor	Location Description	Production Facility
Location 1*	16757 County Road 25	50
Location 2	16127 County Road 85	50
Location 3	16135 County Road 25	43
Location 4**	16134 County Road 23	45
Location 5**	16716 County Road 23	45
Location 6**	11660 County Road 36	47
COGCC Noise Limit	**25 ft. from the exterior wall of a residence or occupied structure towards the noise source**	**60**

*Location 1 is subject to adjusted allowable limits of 75 day/ 68 night dBC for production
**Location 4, 5, & 6 is subject to adjusted allowable limits of 75 day/ 70 night dBC for production

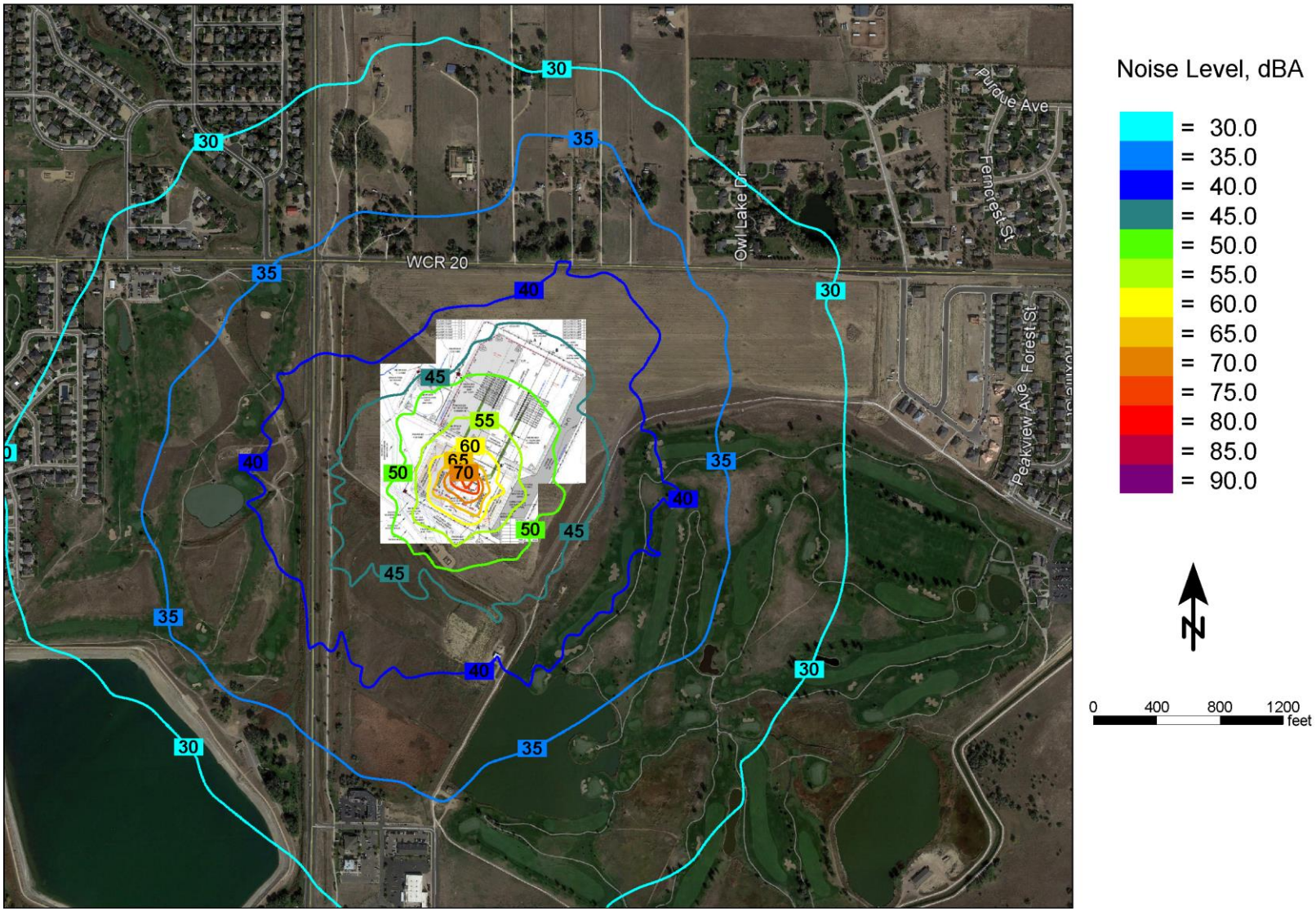


Figure 7-3 Production Facility Unmitigated Noise Contour Map (dBA)

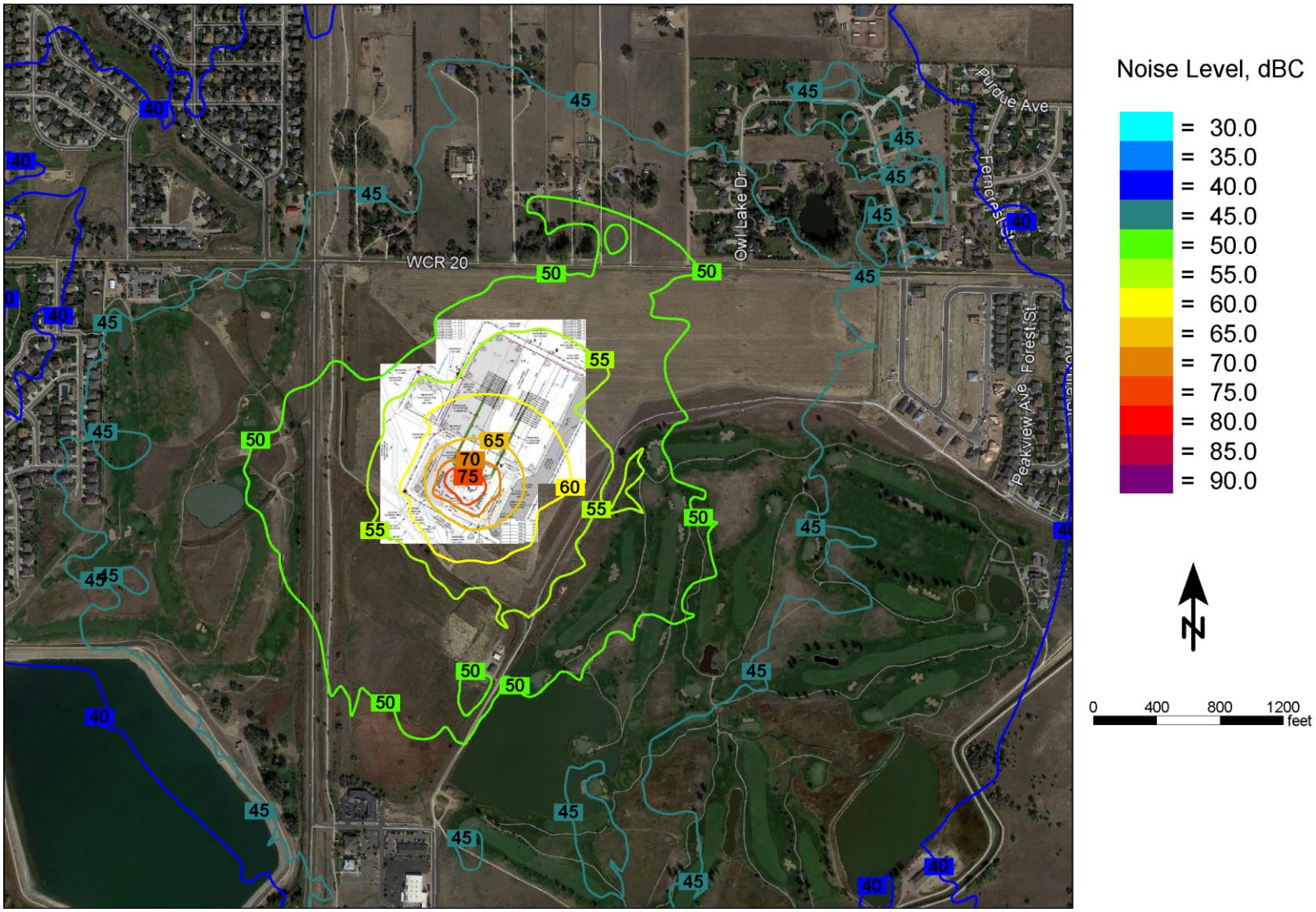


Figure 7-4 Production Facility Unmitigated Noise Contour Map (dBC)

8. Noise Points of Compliance and Continuous Noise Monitoring

8.1 Continuous Monitoring Procedure

The following continuous monitoring procedures are proposed to ensure compliance with the monitoring procedures outlined in COGCC Rule 423.c.(2) and the CDA with the Town of Firestone. To demonstrate compliance with COGCC and CDA noise regulations, pre-production activities and ongoing operations lasting longer than 24 consecutive hours will require continuous monitoring measurements from each noise point of compliance designated. According to Section 423. Noise (c), to demonstrate compliance with Tables 423-1 and 423-2 Operators will measure sound levels according to the following standards:

> (1) During pre-production activities and ongoing operations lasting longer than 24 consecutive hours such as drilling, completion, recompletion, Stimulation, and Well maintenance, in areas zoned residential or within 2,000 feet of a Building Unit, Operators will take continuous sound measurements from each noise point of compliance designated pursuant to Rule 423.a.(5).

Figure 8-1 shows an aerial view of the proposed pad with an approximate 2,000 ft. radius from the working pad surface. There are numerous Residential Building Units (RBU) with in the 2,000 ft. radius. Proposed noise points of compliance are detailed in Table 8-1. The noise points of compliance were selected to represent RBU's in multiple directions from the pad.

Residential Building Units (RBU) may be exempt to continuous monitoring due to rule 423.b.(5) if an agreement is made between the surface owner and operator and subsequently accepted by the COGCC.

Table 8-1 Proposed Continuous Monitoring Locations

Location	Description	Notes
Noise Point of Compliance 1	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 2	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 3	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted
Noise Point of Compliance 4	25 feet from exterior of RBU	• Located on private land, measurement location can be adjusted if access is not granted

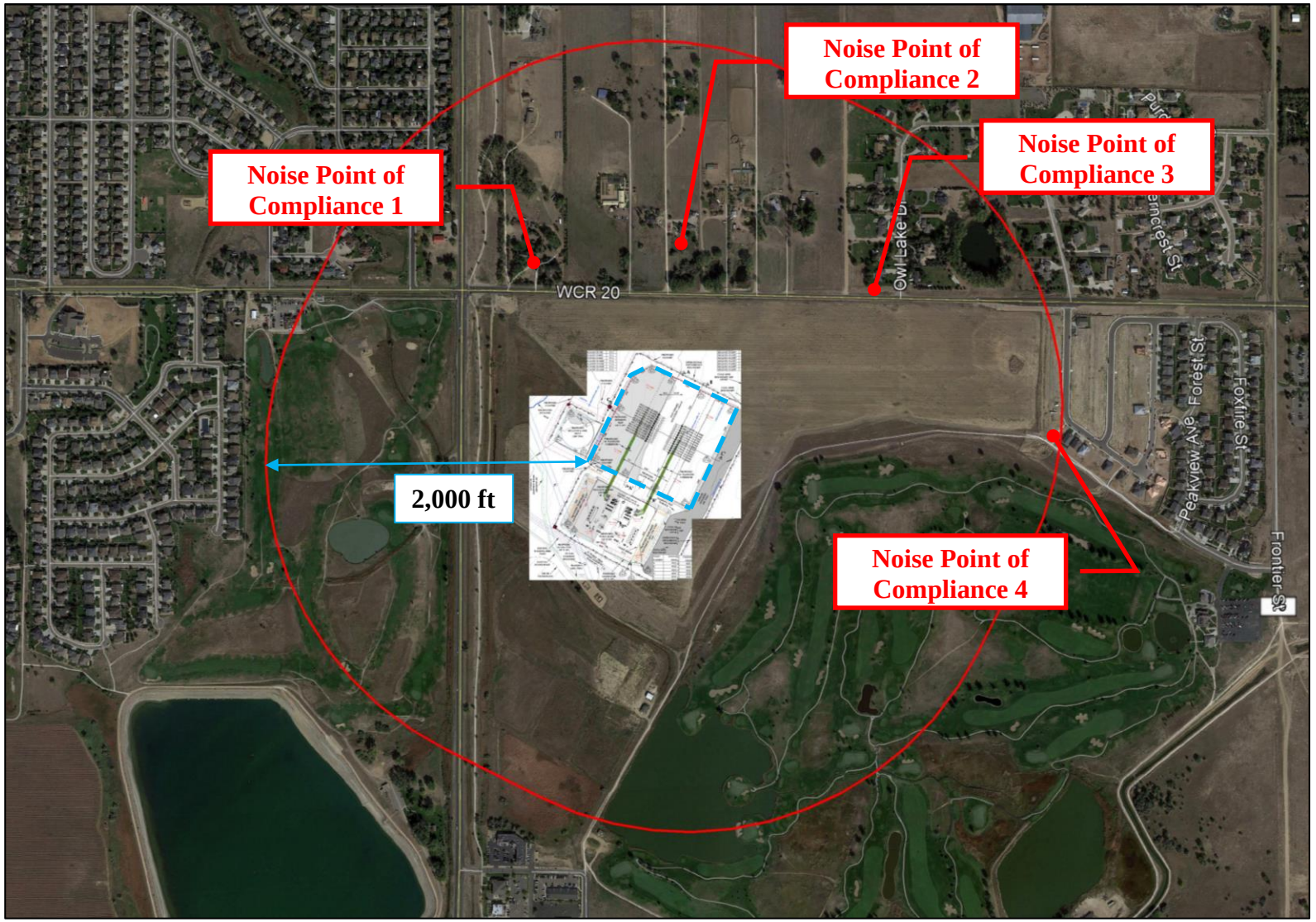


Figure 8-1 Proposed Continuous Monitoring Locations

Appendix A - Ambient Data

Table A-8-2 Recorded Hourly Average Ambient Sound Levels Location 1 (1-hr dBA L_{eq})

Location 1 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	55	69	2:00 PM	54	75
5:00 PM	58	75	3:00 PM	57	80
6:00 PM	59	74	4:00 PM	60	82
7:00 PM	58	71	5:00 PM	56	77
8:00 PM	57	68	6:00 PM	57	79
9:00 PM	56	66	7:00 PM	57	73
10:00 PM	53	62	8:00 PM	55	73
11:00 PM	50	59	9:00 PM	54	68
Fri 23-Apr	48	57	10:00 PM	54	68
1:00 AM	47	56	11:00 PM	51	62
2:00 AM	45	53	Sun 25-Apr	52	62
3:00 AM	46	54	1:00 AM	47	58
4:00 AM	51	60	2:00 AM	48	56
5:00 AM	57	65	3:00 AM	47	64
6:00 AM	60	68	4:00 AM	44	61
7:00 AM	59	69	5:00 AM	49	68
8:00 AM	56	71	6:00 AM	54	73
9:00 AM	55	69	7:00 AM	53	69
10:00 AM	56	78	8:00 AM	54	67
11:00 AM	54	74	9:00 AM	54	70
12:00 PM	54	73	10:00 AM	56	79
1:00 PM	58	82	11:00 AM	57	79
2:00 PM	65	89	12:00 PM	58	79
3:00 PM	68	91	1:00 PM	58	79
4:00 PM	76	95	2:00 PM	55	74
5:00 PM	73	92	3:00 PM	56	75
6:00 PM	64	82	4:00 PM	58	78
7:00 PM	59	79	5:00 PM	56	74
8:00 PM	56	78	6:00 PM	58	71
9:00 PM	53	70	7:00 PM	58	68
10:00 PM	53	64	8:00 PM	57	67
11:00 PM	52	61	9:00 PM	56	64
Sat 24-Apr	49	59	10:00 PM	54	62
1:00 AM	47	56	11:00 PM	50	62
2:00 AM	46	56	Mon 26-Apr	47	55
3:00 AM	45	56	1:00 AM	44	65
4:00 AM	47	57	2:00 AM	46	70
5:00 AM	49	61	3:00 AM	47	66
6:00 AM	51	72	4:00 AM	52	65
7:00 AM	57	71	5:00 AM	57	66
8:00 AM	61	67	6:00 AM	60	70
9:00 AM	56	68	7:00 AM	61	78
10:00 AM	56	69	8:00 AM	62	82
11:00 AM	55	70	9:00 AM	62	82
12:00 PM	55	72	10:00 AM	62	83
1:00 PM	54	72			

Table A-8-3 Recorded Hourly Average Ambient Sound Levels Location 2 (1-hr dBA L_{eq})

Location 2 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	63	73	2:00 PM	59	69
5:00 PM	63	77	3:00 PM	60	69
6:00 PM	62	75	4:00 PM	59	69
7:00 PM	59	68	5:00 PM	60	67
8:00 PM	59	66	6:00 PM	60	67
9:00 PM	56	63	7:00 PM	59	66
10:00 PM	55	62	8:00 PM	58	64
11:00 PM	53	59	9:00 PM	55	63
Fri 23-Apr	47	56	10:00 PM	56	63
1:00 AM	47	55	11:00 PM	53	58
2:00 AM	50	55	Sun 25-Apr	50	59
3:00 AM	47	54	1:00 AM	44	55
4:00 AM	54	60	2:00 AM	47	53
5:00 AM	60	66	3:00 AM	44	57
6:00 AM	63	70	4:00 AM	46	61
7:00 AM	64	71	5:00 AM	53	63
8:00 AM	63	73	6:00 AM	56	65
9:00 AM	61	68	7:00 AM	57	65
10:00 AM	62	69	8:00 AM	58	65
11:00 AM	61	69	9:00 AM	59	68
12:00 PM	62	70	10:00 AM	60	68
1:00 PM	62	72	11:00 AM	61	70
2:00 PM	61	70	12:00 PM	60	69
3:00 PM	62	73	1:00 PM	59	70
4:00 PM	71	86	2:00 PM	60	71
5:00 PM	64	88	3:00 PM	59	69
6:00 PM	61	76	4:00 PM	59	71
7:00 PM	59	68	5:00 PM	58	66
8:00 PM	57	65	6:00 PM	60	69
9:00 PM	56	64	7:00 PM	59	65
10:00 PM	55	65	8:00 PM	58	63
11:00 PM	54	63	9:00 PM	57	63
Sat 24-Apr	49	59	10:00 PM	54	62
1:00 AM	51	57	11:00 PM	51	63
2:00 AM	48	56	Mon 26-Apr	43	50
3:00 AM	49	61	1:00 AM	40	58
4:00 AM	49	57	2:00 AM	40	61
5:00 AM	56	64	3:00 AM	47	58
6:00 AM	59	66	4:00 AM	54	62
7:00 AM	61	68	5:00 AM	60	66
8:00 AM	62	69	6:00 AM	63	70
9:00 AM	62	71	7:00 AM	64	72
10:00 AM	64	71	8:00 AM	62	76
11:00 AM	63	71	9:00 AM	63	82
12:00 PM	62	70	10:00 AM	61	82
1:00 PM	61	69			

Table A-8-4 Recorded Hourly Average Ambient Sound Levels Location 3 (1-hr dBA L_{eq})

Location 3 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	48	64	2:00 PM	62	67
5:00 PM	49	73	3:00 PM	49	68
6:00 PM	49	71	4:00 PM	44	69
7:00 PM	49	67	5:00 PM	42	63
8:00 PM	46	61	6:00 PM	44	63
9:00 PM	43	62	7:00 PM	48	62
10:00 PM	42	56	8:00 PM	46	59
11:00 PM	40	57	9:00 PM	44	57
Fri 23-Apr	36	52	10:00 PM	45	57
1:00 AM	36	52	11:00 PM	43	54
2:00 AM	38	52	Sun 25-Apr	42	58
3:00 AM	36	52	1:00 AM	37	56
4:00 AM	42	54	2:00 AM	37	56
5:00 AM	48	58	3:00 AM	35	56
6:00 AM	50	61	4:00 AM	37	66
7:00 AM	52	63	5:00 AM	39	65
8:00 AM	50	64	6:00 AM	51	71
9:00 AM	46	62	7:00 AM	54	64
10:00 AM	48	66	8:00 AM	45	59
11:00 AM	46	63	9:00 AM	46	62
12:00 PM	46	64	10:00 AM	46	65
1:00 PM	47	65	11:00 AM	46	67
2:00 PM	49	71	12:00 PM	46	66
3:00 PM	51	74	1:00 PM	46	72
4:00 PM	66	84	2:00 PM	45	66
5:00 PM	60	86	3:00 PM	42	63
6:00 PM	49	72	4:00 PM	43	66
7:00 PM	47	66	5:00 PM	42	61
8:00 PM	42	66	6:00 PM	44	59
9:00 PM	42	57	7:00 PM	46	56
10:00 PM	44	56	8:00 PM	45	56
11:00 PM	44	56	9:00 PM	45	58
Sat 24-Apr	41	55	10:00 PM	42	56
1:00 AM	39	52	11:00 PM	34	57
2:00 AM	37	52	Mon 26-Apr	33	57
3:00 AM	38	55	1:00 AM	31	55
4:00 AM	37	52	2:00 AM	32	62
5:00 AM	43	57	3:00 AM	36	56
6:00 AM	43	61	4:00 AM	40	56
7:00 AM	44	61	5:00 AM	45	59
8:00 AM	64	69	6:00 AM	53	66
9:00 AM	62	69	7:00 AM	53	78
10:00 AM	66	69	8:00 AM	54	81
11:00 AM	48	63	9:00 AM	55	81
12:00 PM	63	66	10:00 AM	56	81
1:00 PM	66	69			

Table A-8-5 Recorded Hourly Average Ambient Sound Levels Location 4 (1-hr dBA L_{eq})

Location 4 - Hourly Leq					
Time	dBA	dBC	Time	dBA	dBC
4:00 PM	43	62	2:00 PM	56	70
5:00 PM	48	70	3:00 PM	59	72
6:00 PM	56	72	4:00 PM	53	75
7:00 PM	52	69	5:00 PM	53	68
8:00 PM	46	64	6:00 PM	60	81
9:00 PM	45	65	7:00 PM	53	78
10:00 PM	43	61	8:00 PM	47	71
11:00 PM	40	56	9:00 PM	43	64
Fri 23-Apr	39	65	10:00 PM	44	67
1:00 AM	37	53	11:00 PM	43	64
2:00 AM	37	52	Sun 25-Apr	44	69
3:00 AM	38	53	1:00 AM	38	59
4:00 AM	41	55	2:00 AM	38	54
5:00 AM	52	59	3:00 AM	44	72
6:00 AM	60	63	4:00 AM	38	65
7:00 AM	58	63	5:00 AM	42	65
8:00 AM	58	66	6:00 AM	59	72
9:00 AM	51	70	7:00 AM	63	69
10:00 AM	59	77	8:00 AM	58	65
11:00 AM	61	71	9:00 AM	68	74
12:00 PM	61	69	10:00 AM	64	81
1:00 PM	58	86	11:00 AM	54	81
2:00 PM	61	86	12:00 PM	59	76
3:00 PM	61	89	1:00 PM	61	71
4:00 PM	69	96	2:00 PM	45	69
5:00 PM	69	95	3:00 PM	53	72
6:00 PM	65	82	4:00 PM	60	70
7:00 PM	60	76	5:00 PM	58	68
8:00 PM	42	69	6:00 PM	60	62
9:00 PM	39	61	7:00 PM	48	59
10:00 PM	44	57	8:00 PM	44	59
11:00 PM	44	56	9:00 PM	45	58
Sat 24-Apr	39	54	10:00 PM	40	58
1:00 AM	38	54	11:00 PM	37	56
2:00 AM	36	53	Mon 26-Apr	37	60
3:00 AM	35	53	1:00 AM	39	68
4:00 AM	36	53	2:00 AM	41	69
5:00 AM	41	67	3:00 AM	37	65
6:00 AM	55	68	4:00 AM	40	63
7:00 AM	63	66	5:00 AM	46	63
8:00 AM	63	67	6:00 AM	64	67
9:00 AM	67	71	7:00 AM	53	74
10:00 AM	58	66	8:00 AM	58	79
11:00 AM	58	63	9:00 AM	61	82
12:00 PM	63	65	10:00 AM	59	80
1:00 PM	45	64			

Section 13

Traffic Management Plan and Baseline Road Study

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Shayelyn Marshall
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, CO 80202

Arcadis U.S., Inc.
11001 W. 120th Avenue
Suite 200
Broomfield
Colorado 80021
Tel 303 544 0043
Fax 720 887 6051
www.arcadis.com

Subject:
Traffic Management Plan for McGavin Pad

ENVIRONMENT

Date:
December 16, 2021

Contact:
Steve Rice

Phone:
303.710.7537

Email:
Steve.Rice@arcadis.com

Our ref:
30057047

Dear Ms. Marshall:

Kerr McGee Oil and Gas Onshore LP (Kerr McGee) has plans to develop mineral leases within the town limits of Firestone, Colorado and has contracted Arcadis U.S., Inc. (Arcadis) to prepare this Traffic Management Plan (TMP) to summarize the guidelines Kerr McGee will adhere to during the construction and development of Oil & Gas well facilities, and associated infrastructure. The objective of this TMP is to provide the Town of Firestone with a summary of the traffic anticipated by the development, along with supplemental information to demonstrate Kerr McGee's intent to comply with the requirements of the Town of Firestone to limit traffic impacts.

DEVELOPMENT PLAN OVERVIEW

The work will include the McGavin Pad. The McGavin Pad will include 26 wells, approximately 25.63 acres of temporary disturbance, and approximately 7.08 acres of final permanent disturbance. The grading plan, which include a layout of the pad, is provided in **Attachment 1.** The proposed haul routes and truck turning movements for the McGavin Pad are presented in **Attachment 2**. The anticipated traffic associated with development of this facility has been summarized in trip generation tables included as **Attachment 3**.

MANAGEMENT OF ROAD IMPACT CONCERNS

A baseline road survey was completed for the McGavin Pad to aid in future assessment of road damage that may occur due to Kerr McGee development activities (**Attachment 4**). Results from the baseline survey indicated County Road (CR) 19 is in good condition from a ride quality standpoint and that the

roadway shows low to moderate rutting, transverse cracking, and fatigue cracking in certain areas. Portions of CR 19 were actively receiving a chip seal treatment, or roadway improvement, during the baseline study. CR 20 is in fair to mediocre condition. The roadway showed signed of low to moderate transverse and block cracking, with moderate longitudinal rutting.

Once Kerr McGee's interim reclamation activities are complete, Arcadis will conduct a follow-up survey to determine if, and where, damage attributable to the added truck traffic occurred. In the event roads are damaged and warrant repair, Kerr McGee will use the baseline and post-completion survey data to determine the nature and extent of damage attributable to their traffic, and work with Firestone to determine how they prefer to handle the repairs.

MANAGEMENT OF TRAFFIC OPERATIONS

Kerr McGee understands the importance of maintaining positive relations with all community stakeholders. Kerr McGee will conduct neighborhood meetings prior to development to help address community concerns as it relates to traffic. As part of their community outreach they will also provide information on how members of the public can raise issues or complaints about traffic directly to Kerr McGee for resolution. The proposed haul route included as **Attachment 2** was selected following review of potential constraints. During route planning it was determined that there are no anticipated conflicts with weight or height restrictions, travel through school zones, or conflicts with routes that are heavily used by residential commuters.

Arcadis also modeled truck movements at the proposed access location and has confirmed the anticipated development phase traffic can safely negotiate all the necessary right- and left-hand turning movements along this route. Some minor access point modifications at the Pad, specifically driveway widening will likely be required. Truck turning movements are included in **Attachment 2**.

Based on Arcadis' review of the proposed route, existing roadway speed limits, unobstructed sight distance, and the anticipated levels of development traffic, Arcadis does not anticipate that restrictions on when deliveries are made to the facility, or use of supplemental traffic controls (e.g., flagging, temporary signage) are warranted.

Kerr McGee does not anticipate, and Arcadis agrees, that their use of public roads to develop this facility will result in a need for an increase in roadway maintenance. Any dust associated with on-site activities and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the site to the extent practical given wind conditions. Additionally, improvements to the access roads will be made such that they are constructed of 100 linear feet of crushed stone and 100 linear feet of hard surface from the point of connection to the respective public road to help mitigate dust and mud concerns. Kerr McGee will apply water or a low magnesium chloride product to dirt roads as necessary. Kerr McGee will also inspect the access regularly and clean/remove any mud or dirt that gets tracked onto public roadways, as necessary.

Kerr McGee instructs all its contractors to adhere to all posted speed limits and traffic controls as a matter of policy. Policy compliance is reinforced through a combination of training, use and review of telematics by their carriers to monitor safe behaviors and investigate concerns, and through periodic audit and review meetings.

Sincerely,

Arcadis U.S., Inc.



Steve Rice
Project Manager

Enclosures:

Attachments

1 Grading Plans
2 Haul Routes and Truck Turning Movements
3 Estimated Trip Generation Data
4 Baseline Roadway Assessment Report

ATTACHMENT 1

Grading Plans

WELL NAME:	C/F
MCGAVIN 19-1HZ	F0.5
MCGAVIN 19-2HZ	F0.6
MCGAVIN 19-3HZ	F0.6
MCGAVIN 19-4HZ	F0.8
MCGAVIN 19-5HZ	F0.9
MCGAVIN 19-6HZ	F0.9
MCGAVIN 19-7HZ	F1.2
MCGAVIN 19-8HZ	F1.2
MCGAVIN 19-9HZ	F1.2
MCGAVIN 19-10HZ	F1.3
MCGAVIN 19-11HZ	F1.3
MCGAVIN 19-12HZ	F1.2
MCGAVIN 19-13HZ	F1.2

NOTE:
FLARE IS TO BE LOCATED A MINIMUM OF 100' FROM THE NEAREST PROPOSED WELL HEAD.

WELL NAME:	C/F
MCGAVIN 19-14HZ	C3.4
MCGAVIN 19-15HZ	C3.6
MCGAVIN 19-16HZ	C3.6
MCGAVIN 19-17HZ	C3.8
MCGAVIN 19-18HZ	C3.9
MCGAVIN 19-19HZ	C4.0
MCGAVIN 19-20HZ	C4.2
MCGAVIN 19-21HZ	C4.3
MCGAVIN 19-22HZ	C4.3
MCGAVIN 19-23HZ	C4.4
MCGAVIN 19-24HZ	C4.5
MCGAVIN 19-25HZ	C4.6
MCGAVIN 19-26HZ	C4.8

PROPOSED ACCESS ROAD
PROPOSED CULVERT
OPERATIONAL DISTURBANCE BOUNDARY
COAL MINE BOUNDARY 100' OFFSET
COAL MINE BOUNDARY
PROPOSED CULVERT
PROPOSED SOUND MITIGATION
PROPOSED SEDIMENT TRAP (20' X 20')
PROPOSED 50' FLOWLINE CORRIDOR
PROPOSED CULVERT
PROPOSED ACCESS ROAD
PROPOSED MCGAVIN 6-19HZ FACILITY
PROPOSED 50' FLOWLINE CORRIDOR
WORKING PAD SURFACE
TOPSOIL STOCKPILE (≈8' TALL)
FLAT GRADED ELEVATION = 4929.9'
EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SI)
MLVT AREA
1.5% SLOPE DIVERSION DITCH
(3:1 TO 5:1) TRANSITIONAL FILL SLOPE
3% SLOPE DIVERSION DITCH
TOPSOIL ±11"
GROUNDWATER ±4.0'
GROUNDWATER ±7.8'
GROUNDWATER ±7.1'
GROUNDWATER >8'
0.5% SLOPE
1% SLOPE
FILL
CUT
A
A'
B
B'
C
C'
4930'
4940'
133'
175'
160'
230'
250'
240'
235'
100'
75'
50'
340'
15'

NOTE:
1. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
2. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.
3. CENTER OF WELL PAD REFERENCED BELOW CORRESPONDS TO THE SURFACE LOCATION OF THE MCGAVIN 19-7HZ WELL.
4. FLAT GRADED AREA TO BE RECLAIMED DURING INTERIM RECLAMATION.

WELL PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

WELL PAD QUANTITIES AND DESIGN PARAMETERS

EXISTING GRADE @ CENTER OF WELL PAD = 4928.7'
FINISHED GRADE ELEVATION = 4929.9'
CUT SLOPES = 3:1
FILL SLOPES = 3:1; EXCEPT AS NOTED
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED WELL PAD SURFACE AREA = 10.17 ACRES
TOTAL WELL PAD AREA = 11.08 ACRES
OPERATIONAL DISTURBANCE AREA = 25.63 ACRES

WELL PAD QUANTITIES

TOTAL CUT FOR WELL PAD = 34,053 C.Y.
TOTAL FILL FOR WELL PAD = 34,053 C.Y.
TOPSOIL @ 11" DEPTH = 16,389 C.Y.
IMPORT MATERIAL = 0 C.Y.

WELL PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH
BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

WELL PAD - MCGAVIN 6-19HZ

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

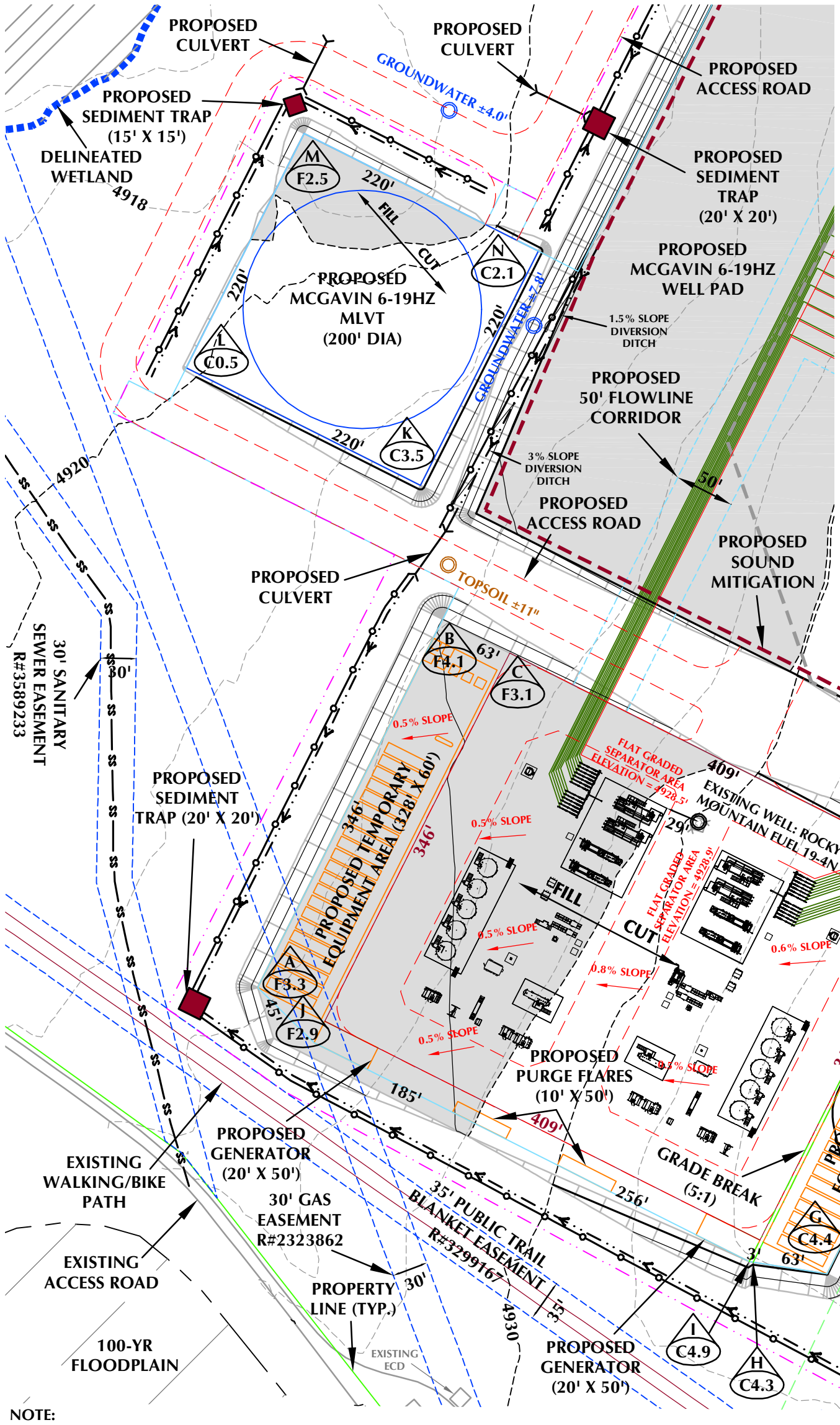
WELL PAD - GRADING PLAN
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ, MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ, MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ, MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ, MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ, MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ, MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
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SHERIDAN OFFICE
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Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=100' | DATE: 6/25/2020 | SHEET NO: 1 1 OF 1
REVISED: SRS 12/16/21

K:\NAD\ARKO\2016\2016_105_MCGAVIN_T2N, R67W, SEC_19\DWG\MCGAVIN_NEW_OPTION 2_MASONRY_FENCE.DWG, 12/16/2021 12:25:09 PM, steven



MLVT PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

FINISHED GRADE ELEVATION = 4919.3'
CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED MLVT PAD AREA = 1.11 ACRES
TOTAL MLVT PAD AREA = 1.31 ACRES

MLVT PAD QUANTITIES

TOTAL CUT FOR MLVT PAD = 1,178 C.Y.
TOTAL FILL FOR MLVT PAD = 1,178 C.Y.
TOPSOIL @ 11" DEPTH = 1,939 C.Y.
IMPORT MATERIAL = 0 C.Y.

TEMPORARY EQUIPMENT PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED PAD AREA = 0.78 ACRES
TOTAL PAD AREA = 0.87 ACRES

PAD QUANTITIES

TOTAL CUT FOR PAD = 3,634 C.Y.
TOTAL FILL FOR PAD = 2,252 C.Y.
TOPSOIL @ 11" DEPTH = 1,283 C.Y.
EXCESS MATERIAL = 1,382 C.Y.

POINT NUMBER	EXISTING GRADE	FINISHED GRADE
A	4923.8	4927.1
B	4923.9	4928.0
C	4925.2	4928.3
D	4935.6	4930.0
E	4935.6	4930.6
F	4936.1	4930.8
G	4934.3	4929.9
H	4933.9	4929.6
I	4933.9	4929.0
J	4924.4	4927.3

NOTE:

1. TOTAL EARTHWORK QUANTITIES BETWEEN THE FACILITY PAD AND TEMPORARY EQUIPMENT PAD BALANCE (0 C.Y. OF IMPORT MATERIAL). COMBINING THE PADS REQUIRE A TOTAL CUT OF 12,139 C.Y. AND FILL OF 12,139 C.Y.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987
3. DIVERSION DITCH AND/OR BERM TO BE CONSTRUCTED AROUND THE ENTIRE PAD LOCATION. BERM SECTIONS TO BE COMPACTED IN ACCORDANCE WITH STANDARD CONSTRUCTION PRACTICES.

FACILITY PAD - MCGAVIN 6-19HZ DESIGN SUMMARY

FACILITY PAD QUANTITIES AND DESIGN PARAMETERS

CUT SLOPES = 5:1
FILL SLOPES = 5:1
SHRINKAGE FACTOR = 1.10
SWELL FACTOR = 1.00
GRADED FACILITY PAD SURFACE AREA = 3.79 ACRES
TOTAL FACILITY PAD AREA = 4.45 ACRES
OPERATIONAL DISTURBANCE AREA = 25.63 ACRES

FACILITY PAD QUANTITIES

TOTAL CUT FOR FACILITY PAD = 8,422 C.Y.
TOTAL FILL FOR FACILITY PAD = 9,804 C.Y.
TOPSOIL @ 11" DEPTH = 6,584 C.Y.
IMPORT MATERIAL = 1,382 C.Y.

FACILITY PAD LEGEND

EXISTING WELL LOCATION
PROPOSED WELL LOCATION
EXISTING CONTOURS (2' INTERVAL)
PROPOSED CONTOURS (2' INTERVAL)
EXISTING PIPELINE
PROPOSED FLOWLINE
EXISTING FENCE
PROPOSED UNDERGROUND ELECTRIC LINE
DIVERSION DITCH
BERM

HORIZONTAL 0 50' 100' 1" = 100'
2' CONTOURS

FACILITY PAD - MCGAVIN 6-19HZ

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

FACILITY PAD - GRADING PLAN
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ,
MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ,
MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ,
MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ,
MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ,
MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ,
MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
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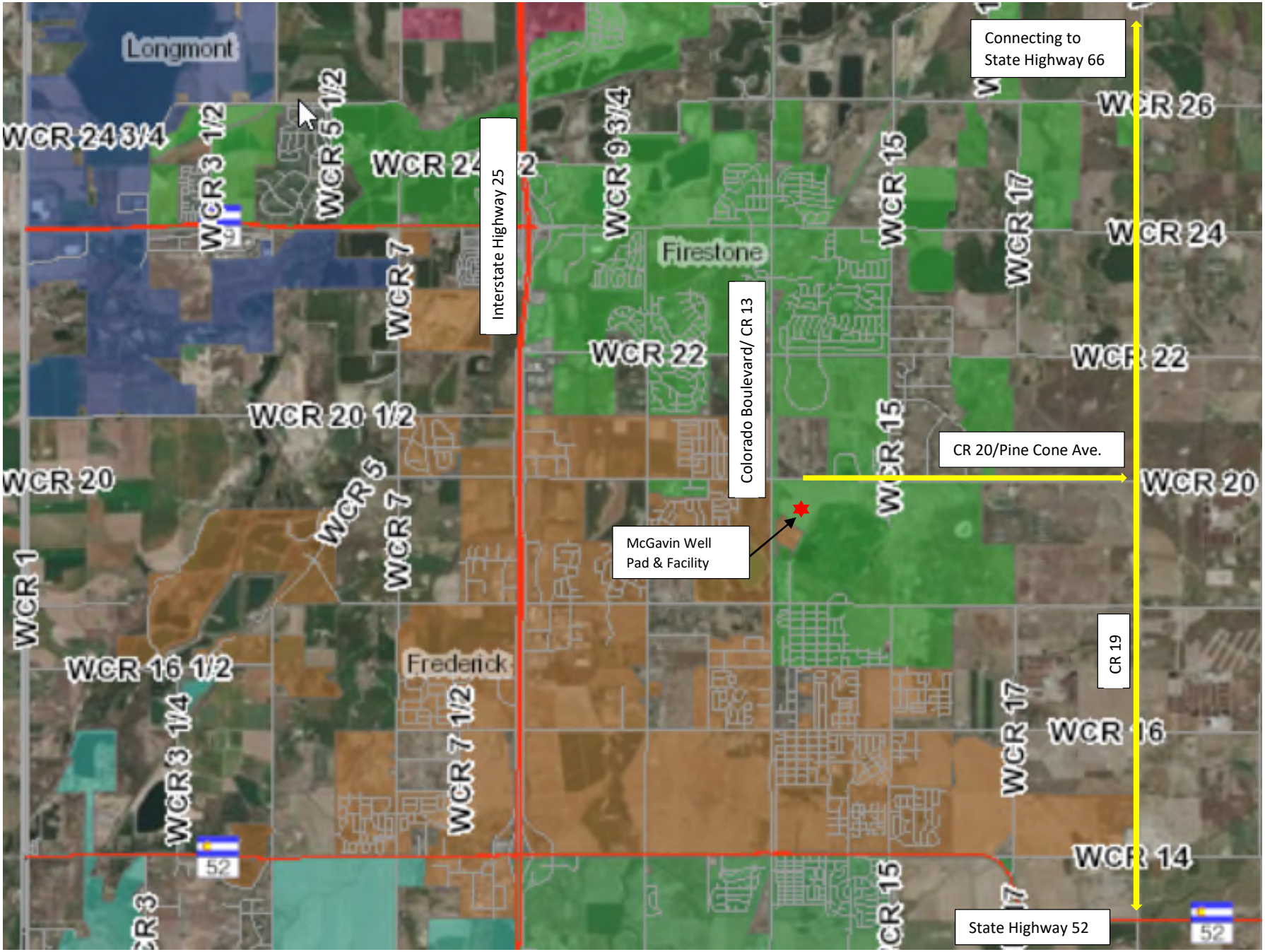
609 CONSULTING, LLC
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SCALE: 1"=100' | DATE: 6/25/2020 | SHEET NO: 1 1 OF 1
REVISED: HJL 12/16/21

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ATTACHMENT 2

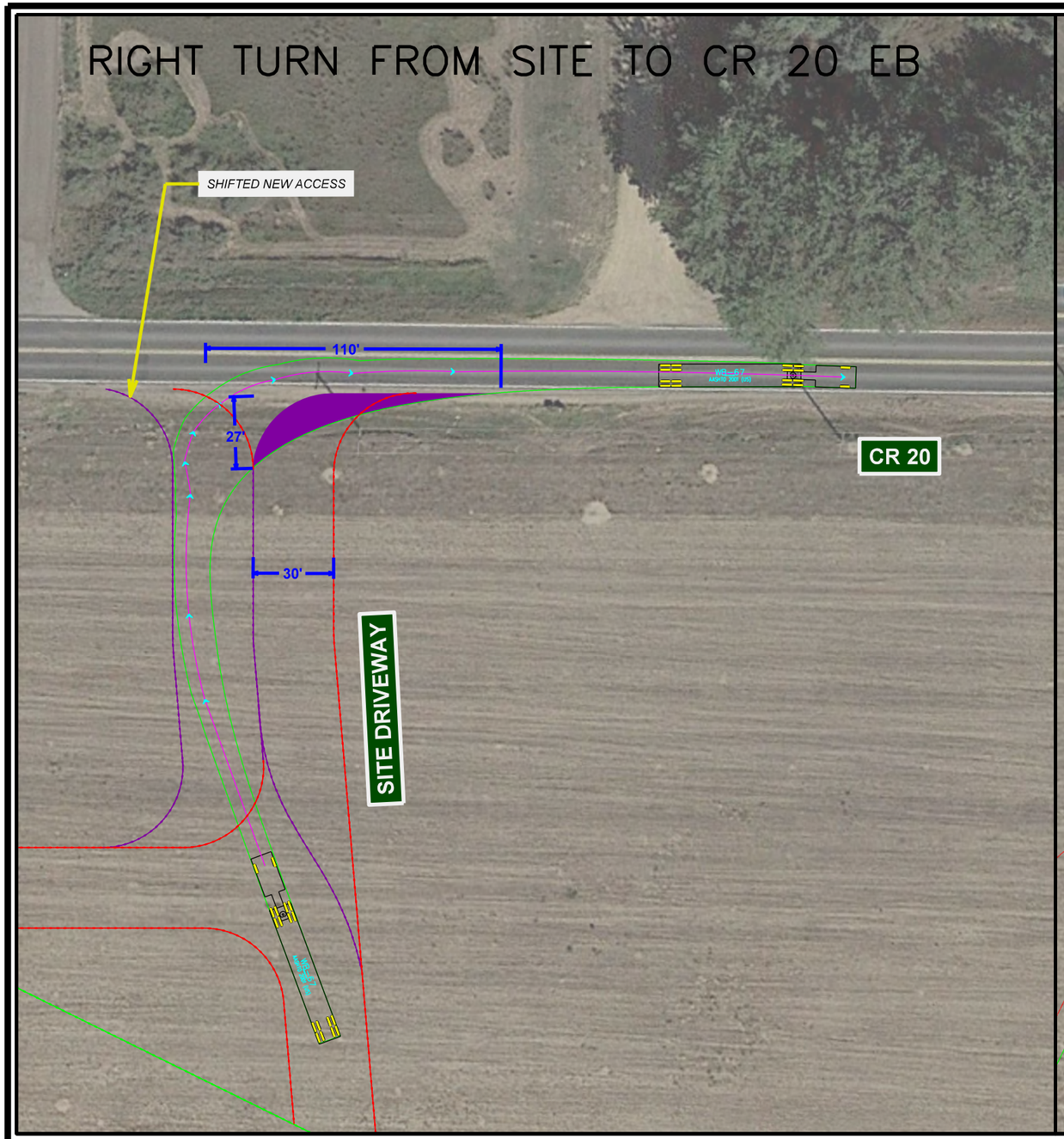
Haul Routes and Truck Turning Movements



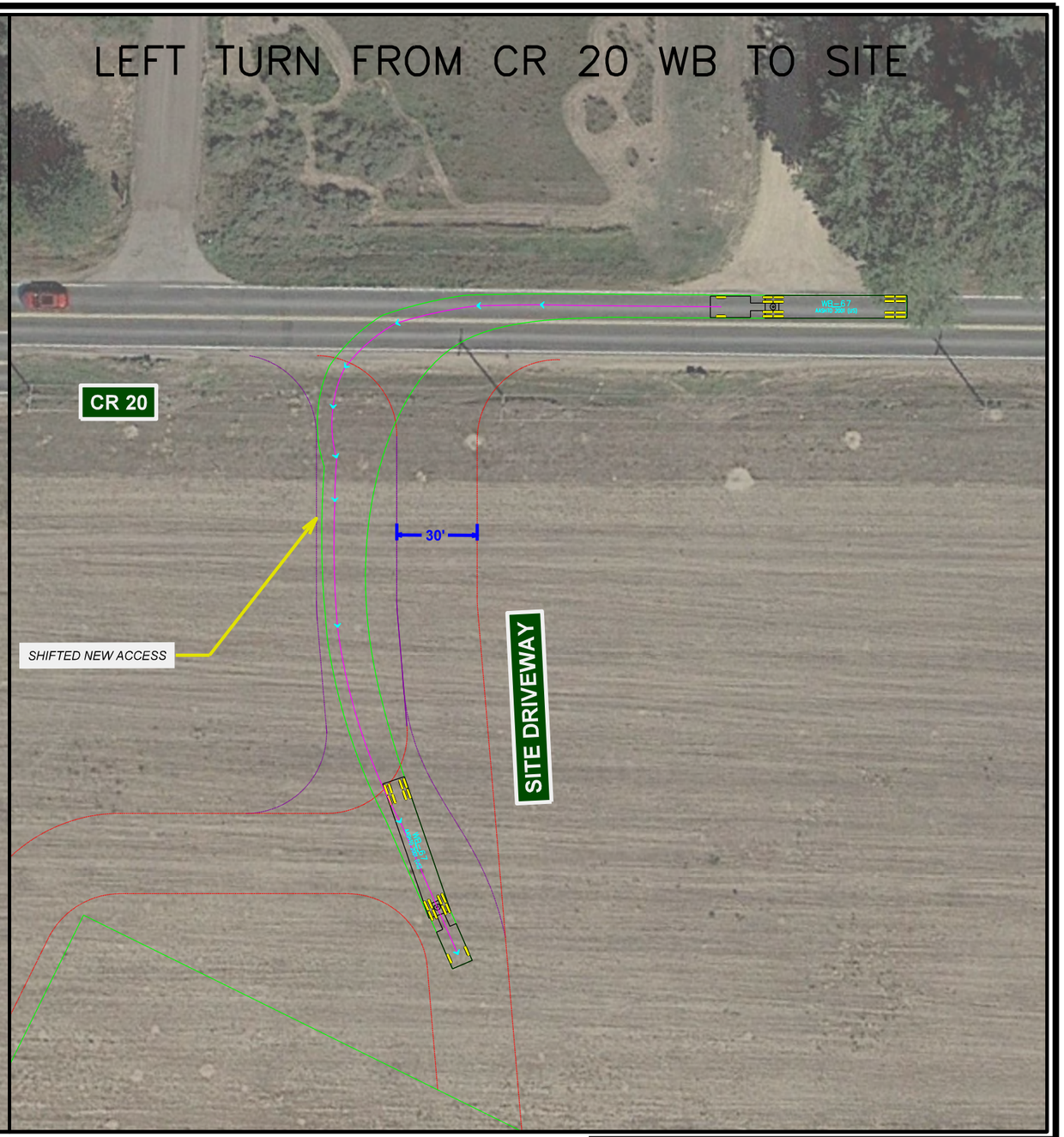
McGavin – Proposed Haul Routes

Firestone, Colorado

RIGHT TURN FROM SITE TO CR 20 EB



LEFT TURN FROM CR 20 WB TO SITE



LEGEND

PAVEMENT WIDENING FOR TRUCK TURNS

FIGURE 2 - TRUCKS ENTERING / EXITING MCGAVIN PAD
- RIGHT TURN FROM SITE TO CR 20 EB
- LEFT TURN FROM CR 20 WB TO SITE

N

0 50 100

GRAPHIC SCALE

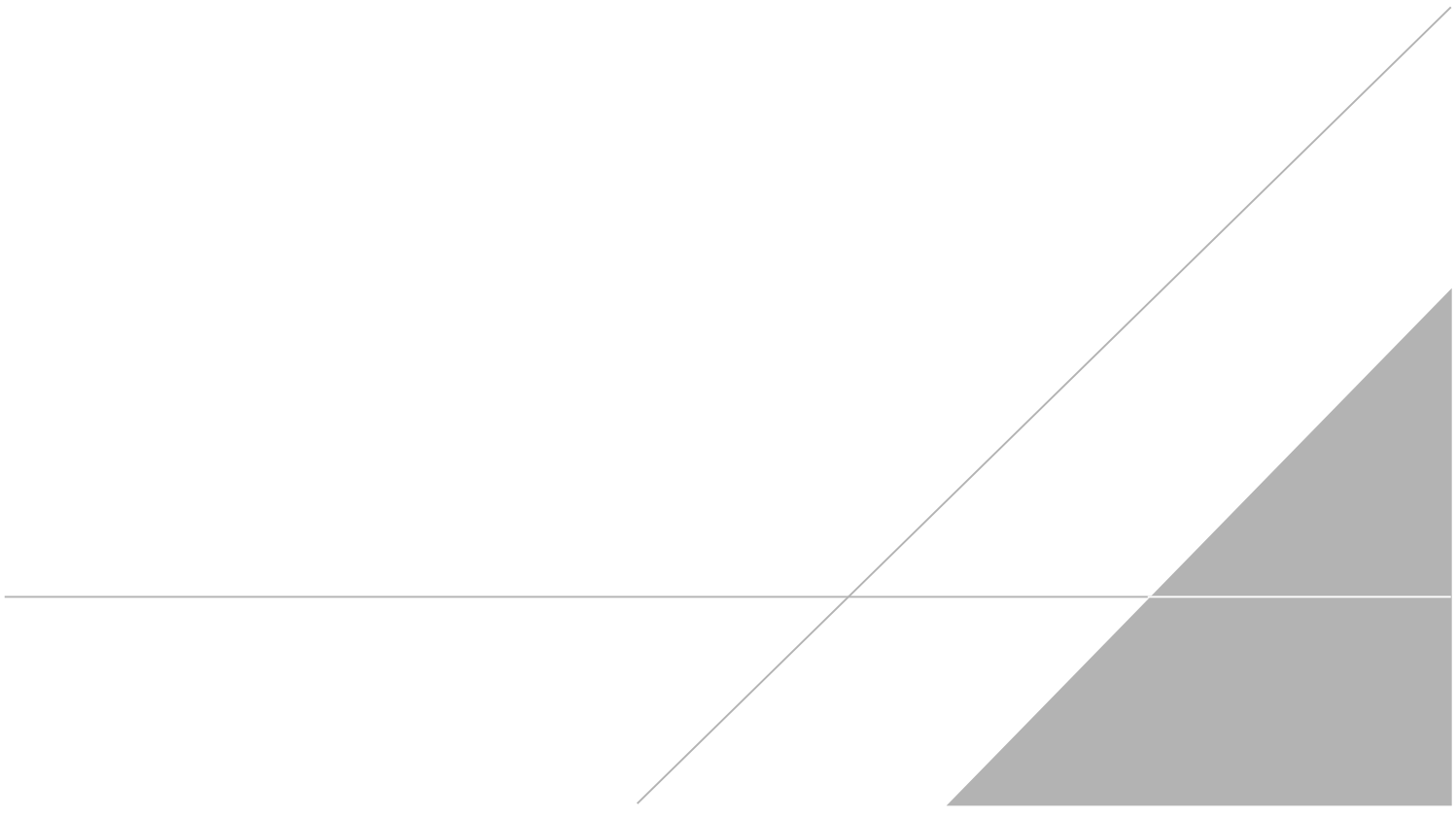
KERR MCGEE OIL AND GAS ONSHORE LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

TRUCK TURNING FIGURES

ARCADIS | FIGURE 2

ATTACHMENT 3

Estimated Trip Generation Data



MCGAVIN
Firestone, CO
Estimated Trip Generation Data
Site Preparation through Interim Reclamation

Phase of Development	Estimated Duration (days, max)[1]	Vehicle Type[2]	CDOT SHAC Equivalency Factor (PCE/Veh)[3]	Estimated Number of Veh/Day[4]		Average Daily Trips[5]		AM Peak Hour[6]						PM Peak Hour[6]						Total Trips	
								In		Out		Total		In		Out		Total			
				Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE	Veh	PCE
Site Preparation	30	Light Vehicle	1	3	3	6	6	*2*	*2*	*0*	*0*	**2**	**2**	*0*	*0*	*2*	*2*	**2**	**2**	176	176
		Single Unit	2	3	5	5	10	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	155	310
		Combo Unit	3	49	146	97	291	*5*	*15*	*5*	*15*	**10**	**30**	*5*	*15*	*5*	*15*	**10**	**30**	2,914	8,743
		Oversize Load	3	0	1	0	1	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	14	42
		Traffic Summary (Site Preparation):		**54**	**155**	**109**	**309**	*7*	*17*	*5*	*15*	**12**	**32**	*5*	*15*	*7*	*17*	**12**	**32**	**3,259**	**9,271**
Production Facility Construction	30	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	527	527
		Single Unit	2	2	4	4	9	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	130	260
		Combo Unit	3	9	27	18	54	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	543	1,629
		Oversize Load	3	1	2	1	4	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	41	123
		Traffic Summary (Production Facility Construction):		**21**	**42**	**41**	**85**	*7*	*11*	*3*	*7*	**10**	**18**	*3*	*7*	*7*	*11*	**10**	**18**	**1,241**	**2,539**
Surface Casing Preset	26	Light Vehicle	1	8	8	15	15	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	393	393
		Single Unit	2	2	4	4	7	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	91	182
		Combo Unit	3	49	148	98	295	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,558	7,673
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Surface Casing Preset):		**59**	**159**	**117**	**317**	*9*	*16*	*5*	*12*	**14**	**28**	*5*	*12*	*9*	*16*	**14**	**28**	**3,042**	**8,249**
Surface Rig Mobilization	2	Light Vehicle	1	9	9	18	18	*5*	*5*	*1*	*1*	**6**	**6**	*1*	*1*	*5*	*5*	**6**	**6**	36	36
		Single Unit	2	11	22	22	44	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	44	88
		Combo Unit	3	176	528	352	1,056	*8*	*24*	*8*	*24*	**16**	**48**	*8*	*24*	*8*	*24*	**16**	**48**	704	2,112
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Mobilization):[7]		**198**	**564**	**395**	**1,127**	*15*	*34*	*11*	*30*	**26**	**64**	*11*	*30*	*15*	*34*	**26**	**64**	**790**	**2,254**
Sequential Drilling and Pad Regrade	215	Light Vehicle	1	25	25	50	50	*15*	*15*	*3*	*3*	**18**	**18**	*3*	*3*	*15*	*15*	**18**	**18**	10,823	10,823
		Single Unit	2	2	4	4	8	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	837	1,674
		Combo Unit	3	8	23	16	47	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	3,368	10,104
		Oversize Load	3	0	1	1	3	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	208	624
		Traffic Summary (Sequential Drilling and Pad Regrade):		**35**	**54**	**71**	**108**	*18*	*23*	*6*	*11*	**24**	**34**	*6*	*11*	*18*	*23*	**24**	**34**	**15,236**	**23,225**
Surface Rig Demobilization	2	Light Vehicle	1	27	27	54	54	*16*	*16*	*3*	*3*	**19**	**19**	*3*	*3*	*16*	*16*	**19**	**19**	108	108
		Single Unit	2	11	21	21	42	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	42	84
		Combo Unit	3	146	437	291	873	*7*	*21*	*7*	*21*	**14**	**42**	*7*	*21*	*7*	*21*	**14**	**42**	582	1,746
		Oversize Load	3	2	5	3	9	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	6	18
		Traffic Summary (Surface Rig Demobilization):[7]		**185**	**489**	**369**	**978**	*25*	*42*	*12*	*29*	**37**	**71**	*12*	*29*	*25*	*42*	**37**	**71**	**738**	**1,956**
Well Completions	138	Light Vehicle	1	57	57	114	114	*34*	*34*	*7*	*7*	**41**	**41**	*7*	*7*	*34*	*34*	**41**	**41**	15,732	15,732
		Single Unit	2	8	15	15	30	*1*	*2*	*1*	*2*	**2**	**4**	*1*	*2*	*1*	*2*	**2**	**4**	2,070	4,140
		Combo Unit	3	19	57	38	114	*1*	*3*	*1*	*3*	**2**	**6**	*1*	*3*	*1*	*3*	**2**	**6**	5,244	15,732
		Oversize Load	3	0	0	0	0	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	0	0
		Traffic Summary (Well Completions):		**84**	**129**	**167**	**258**	*36*	*39*	*9*	*12*	**45**	**51**	*9*	*12*	*36*	*39*	**45**	**51**	**23,046**	**35,604**
Reclamation	30	Light Vehicle	1	15	15	30	30	*9*	*9*	*2*	*2*	**11**	**11**	*2*	*2*	*9*	*9*	**11**	**11**	902	902
		Single Unit	2	19	37	37	75	*2*	*4*	*2*	*4*	**4**	**8**	*2*	*4*	*2*	*4*	**4**	**8**	1,125	2,249
		Combo Unit	3	35	105	70	209	*3*	*9*	*3*	*9*	**6**	**18**	*3*	*9*	*3*	*9*	**6**	**18**	2,095	6,284
		Oversize Load	3	0	1	1	2	*0*	*0*	*0*	*0*	**0**	**0**	*0*	*0*	*0*	*0*	**0**	**0**	16	48
		Traffic Summary (Reclamation):		**69**	**158**	**138**	**316**	*14*	*22*	*7*	*15*	**21**	**37**	*7*	*15*	*14*	*22*	**21**	**37**	**4,138**	**9,484**
										Max AM Peak Hour:		**45**	**71**				*Max PM Peak Hour:*		**45**	**71**		
																				Development Totals:		**51,490**	**92,582**

Abbreviations:

ADT	Average Daily Trips	lbs.	pounds	PCE	Passenger Car Equivalents
CDOT	Colorado Department of Trans	GVW	Gross Vehicle Weight	SHAC	State Highway Access Code
ft	feet	KMG	Kerr McGee Oil & Gas Onshore, LP	Veh	Vehicle

Notes:

1 Estimate of phase durations is based on anticipated development expectations for each phase based on previous schedules provided by Anadarko

2 Arcadis has categorized the trip data into the four unique Vehicle Types based on trip profile data provided by KMG which summarizes traffic based on these categories. Vehicle categories include the following: Light Vehicles (e.g. pickup trucks) have a GVW between 4,500 and 8,500 lbs. and measures < 20 ft long; Single Unit vehicles (e.g. 3-axle bobtail or dump truck) having a GVW between 10,000 and 20,000 lbs. and measuring between 20-40 ft long; Combo Unit vehicles (typically a semi and Trailer) having GVW between 50,000 and 70,000 lbs., measuring between 40 and 60 ft long; Oversize Loads (low boy equip trailers, wide loads) usually having GVW greater than 70,000 lbs., and measuring between 40 and 60 feet long.

3 CDOT SHAC assumes: passenger vehicle < 20ft, single unit truck from 20 to 40 ft, multiple unit truck > 40 ft; 1 Single Unit truck = 2 PCE, and 1 Combo Unit truck = 3 PCE.

4 Estimated number of vehicles per day is based on trip generation breakdown summary provided by KMG for other similarly sized facilities. These data were then scaled/adjusted to approximate trip generation traffic for specific Pad/Facility based on the number of wells that will be drilled.

5 Average Daily Trips number assumes all vehicles make a round trip (e.g., ADT = No. of Vehicles per day x 2) and that the total trips in and out levels/evens out on a daily basis.

6 AM peak hour and PM peak hour trips are estimated based on input from KMG experience with similar facility development projects. Light truck traffic is almost entirely associated with daily crew/worker trips to the site; Approximately 60% of the worker trips associated with shift changes will likely occur during the AM and PM peak hours. The larger vehicle (Single unit, Combo units, Oversize loads), daily truck traffic will occur uniformly over the course of a 12 hour work day for the Site Preparation and Reclamation phases. Larger vehicle traffic (Single unit, Combo units, Oversize loads) during the remaining phases (e.g., casing preset, rig mobe/demobe, sequential drilling, and completions) will be spread uniformly over a 24 hour period.

7 Rig mobilization and demobilization will generally occur while temporary traffic controls are in place

ATTACHMENT 4

Baseline Roadway Assessment Report

ARCADIS Design & Consultancy for natural and built assets

Kerr McGee Oil and Gas Onshore LP

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 19 & COUNTY ROAD 20

McGavin Well Pad

Town of Firestone

Weld County, Colorado

July 23, 2020

BASELINE ROADWAY ASSESSMENT FOR COUNTY ROAD 19 AND COUNTY ROAD 20

McGavin Well Pad

Town of Firestone, Weld County, Colorado



Steve Rice
Project Manager

Prepared for:

Shayelyn Coppinger
Regulatory Analyst
Kerr McGee Oil and Gas Onshore LP
1099 18th Street
Denver, Colorado 80202

Prepared by:

Arcadis U.S., Inc.
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Highlands Ranch
Colorado 80129
Tel 720 344 3500
Fax 720 344 3535

Our Ref.: 30057047

Date:

July 23, 2020

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CONTENTS

Acronyms and Abbreviations ii

1 Introduction 1

2 Assessment Overview 1

3 Baseline Determinations 2

3.1 High-Speed Profiling 2

3.2 Visual Assessment 3

3.2.1 County Road 19 3

3.2.2 County Road 20 4

4 Conclusions and Recommendations 4

TABLES

Table 1. Road Distress: Type and Severity

Table 2. Baseline Ride Quality Data for County Road 19

Table 3. Baseline Ride Quality Data for County Road 20

FIGURES

Figure 1. Proposed Trucking Route

Figure 2. Baseline Roadway Assessment of Proposed Trucking Routes South/Westbound Lanes

Figure 3. Baseline Roadway Assessment of Proposed Trucking Routes North/Eastbound Lanes

APPENDICES

A: HSP Charts (on DVD)

B: Visual Assessment Photographic Log

ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis U.S., Inc.
Blvd	Boulevard
CDOT	Colorado Department of Transportation
CR	County Road
Firestone	City of Firestone
FHWA	Federal Highway Administration
HSP	High Speed Profiler
Hwy	Highway
in/mi	inches per mile
IRI	International Roughness Index
Kerr McGee	Kerr McGee Oil and Gas Onshore LP
MRI	Mean Roughness Index

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) completed a baseline road assessment on behalf of Kerr McGee Oil and Gas Onshore LP (Kerr McGee) to document the current condition of select roadways maintained by both the Town of Firestone (Firestone) and Weld County, within Weld County, Colorado. The purpose of the assessment was to document baseline roadway conditions prior to planned oil and gas development activities by Kerr McGee. The assessed road segments will be used to access areas designated for new construction, operation, and production at a proposed well pad site (McGavin Well Pad) within the town limit of Firestone. The facility will utilize roadways within Firestone for access.

The proposed trucking routes that will be utilized by Kerr McGee for facility access include portions of County Roads 19 and 20; the full length of roadways assessed include:

- 3 miles (6 lane miles) of County Road 20, between Colorado Blvd and County Road 19
- 8.6 miles (17.2 lane miles) of County Road 19, between Hwy 52 and Hwy 66

Sections of these roadways which will not be utilized by Kerr McGee but were assessed will serve as a comparison for roadway deterioration should a follow-up assessment be performed. Specific routes utilized for each well pad location are shown on **Figure 1.**

This report documents findings from a baseline roadway assessment conducted prior to use by Kerr McGee. After interim reclamation, Kerr McGee will conduct a follow-up assessment to evaluate the nature and extent of any impacts to this road that may be attributable to construction traffic. Those findings will be documented, as appropriate, in a subsequent report.

2 ASSESSMENT OVERVIEW

The baseline roadway assessment included two separate elements. First, a high-speed profiler (HSP) was used to measure and map relative smoothness of the roadway. Following collection of the surface roughness data, Arcadis conducted a visual inspection to qualify the nature of any pavement distresses and the potential causes of any roughness anomalies. The roadway assessment and documentation efforts were completed under the supervision of an Arcadis Professional Engineer. Further discussion of how the data were collected to support this assessment is provided below.

- To provide a quantitative measure of pavement conditions, the roadway was profiled utilizing the HSP, equipped with a laser scanner, to measure smoothness of the pavement. Scans were collected on July 14, 2020 of both the right and left wheel paths, for both lanes of traffic, along the entire truck hauling route. The profiler system was calibrated, and scanner data were collected, stored, and analyzed in accordance with Colorado Department of Transportation's (CDOT's) standard practice for HSP systems (Colorado Procedure 78-14). Applicable output files from the profiling system software (viewable in Google Earth) are provided as **Appendix A** on the attached DVD. In addition, all roadway surfaces were photo-logged at 50-foot intervals in both directions to provide additional details of baseline roadway conditions. Electronic copies of the photos and output files accompany this report as **Appendix A**.

- On July 20 and 22, 2020, Arcadis conducted a visual inspection to further assess roadway conditions, including any potential issues related to drainage or utility crossings. Photographic logs depicting key areas of concern and typical roadway conditions observed during the baseline inspection are attached as **Appendix B**. Roadway distress observations were documented and qualitatively classified using U.S. Department of Transportation guidelines and terminology[1]. **Table 1** summarizes the distress types and severity standards used to classify roadway distress during the visual assessment.

3 BASELINE DETERMINATIONS

This section summarizes the key findings and observations from the baseline assessment. The assessment included analysis of the data collected (as described in **Section 2**), as well as (1) review of findings from the HSP; and (2) observations from the visual assessment and inspection. Collectively, these data were used to prepare a summary of roadway conditions for each road segment.

3.1 High-Speed Profiling

The HSP scan was performed to record roughness and imperfections along the roadway surface. The HSP uses a line laser system to measure the ride quality of asphalt pavement, concrete pavement, and can also be used on gravel roads. The HSP system provides a high-resolution measurement of surface displacement along each wheel path over a longitudinal distance and is able to provide data output in one of several frequently used indices. These baseline results can later be compared to the final, post-completion assessment to provide a quantitative measure of roadway deterioration that occurred following the baseline survey. Baseline results of this profiling are provided in **Appendix A** and summarized on **Figures 2** and **3.** Additionally, the scanner data output, including International Roughness Index (IRI) and Mean Roughness Index (MRI) data for each lane segment, is summarized in **Tables 2 through 4**. Additional data was collected beyond to the east and west to serve as comparison of roadway deterioration beyond the segments utilized by Kerr McGee.

The IRI and MRI are measures of road smoothness, reported in units of inches per mile (in/mi). The IRI is a scale for roughness based on simulated response of a generic motor vehicle along a single wheel path of the road surface. The IRI value is determined by obtaining a suitably accurate measurement of the profile of the road, processing it through an algorithm that simulates a reference vehicle's (e.g., passenger car) response to the roughness inputs, while accounting for the suspension travel over time and distance. These indices are typically derived for one tenth of mile segments of roadway. The MRI is like IRI and is simply the calculated mean of the IRI from both wheel paths.

[1] Miller and Bellinger, 2003. "*Distress Identification Manual for the Long-Term Pavement Performance Program.*" U.S. Department of Transportation, Federal Highway Administration, Office of Infrastructure Research and Development; Publication No. FHWA-RD-031. June 2003. Fourth Edition.

In general terms, the lower the IRI or MRI, the smoother the road. For context, the Federal Highway Administration (FHWA) has established recommended IRI (or MRI) threshold values for highways and rural roadways. According to FHWA guidelines, roadways with IRI or MRI values:

- Less than 60 in/mi are considered to be in very good condition;
- Between 60 and 94 in/mi are considered to be in good condition;
- Between 95 and 119 in/mi are considered to be in fair condition;
- Between 120 and 170 in/mi are considered to be in mediocre condition; and
- Greater than 170 in/mi are considered to be in poor condition.

Typically, for asphalt or concrete paved roads, IRI values less than 170 in/mi (very good to mediocre conditions) are considered acceptable from a ride quality perspective. Road segments with IRI values greater than 170 in/mi are deemed less acceptable and often warrant further evaluation for repair or reconstruction.

3.2 Visual Assessment

The roadway visual assessment was completed using the guidelines provided in the US Department of Transportation, Distress Identification Manual to identify and further document and qualify roadway distress within the survey area. All documentation was done by walking the roadway and classifying typical roadway distress based on type and severity. Detailed photos and descriptions of the distress included in **Appendix B** document the findings of the visual assessment.

3.2.1 County Road 19

The portion of County Road 19 assessed was in the midst of being chip sealed at the time the visual survey was completed. The portion of roadway Kerr McGee intends to use runs approximately 8.5 miles between Hwy 52 and Hwy 66. For this roadway portion the overall ride quality was in good condition. Areas that were recently chip sealed showed minimal to no wear or deterioration. Areas that had yet to be chip sealed displayed low to moderate rutting, transverse cracking, and fatigue cracking.

Based on the FHWA recommended standards, the southbound lane of County Road 19 MRI values indicated that about 2 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 20 percent in fair-to-mediocre (95-170 in/mi) and 78 percent of the southbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire southbound segment was 83 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the southbound segment of County Road 19 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that approximately one percent of the roadway in the northbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 23 percent in fair-to-mediocre (95-170 in/mi) and 76 percent of the northbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire northbound segment was 85 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 2**. These values are also mapped for the northbound segment of County Road 19 and are depicted on **Figure 3.**

3.2.2 County Road 20

The portion of County Road 20 assessed runs from County Road 19 to Colorado Blvd, and is asphalt surfaced. This portion of roadway had low to moderate transverse and block cracking, with moderate longitudinal rutting. Overall ride quality was in fair to mediocre condition.

Based on the FHWA recommended standards, the westbound lane of County Road 20 MRI values indicated that 23 percent of the roadway in this direction has a ride quality that is less-than-acceptable (>170 in/mi), about 50 percent in fair-to-mediocre (95-170 in/mi) and 27 percent of the westbound lane were in good-very good (<95 in/mi). The overall average MRI for the entire westbound segment was 134 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the westbound segment of County Road 20 and are depicted on **Figure 2**.

The MRI values determined by the HSP indicate that 7 percent of the roadway in the eastbound direction has a ride quality that is less-than-acceptable (>170 in/mi), 63 percent in fair-to-mediocre (95-170 in/mi) and 30 percent of the eastbound lane were in good-very good (<95 in/mi) condition based on the FHWA recommended standards. The overall average MRI for the entire eastbound segment was 109 in/mi. MRI calculations, broken down into 0.1-mile segments are summarized in **Table 3**. These values are also mapped for the eastbound segment of County Road 20 and are depicted on **Figure 3.**

4 CONCLUSIONS AND RECOMMENDATIONS

The baseline road assessment is intended to provide documentation of current road conditions prior to the development activities planned by Kerr McGee. It was observed that County Road 19 is in good shape, while County Road 20 is in fair condition.

Kerr McGee will conduct a follow-up survey of these roadways once their interim reclamation activities are substantively complete. The follow up survey should include a visual assessment of the roads and an evaluation of ride quality using the HSP scanner. The assessment and HSP scan can then be compared to these baseline observations to identify roadway segments that may have been adversely impacted or distressed by construction traffic.

In the interim, Arcadis also recommends that Kerr McGee's construction foreman periodically inspect and monitor the condition of these roadways during the construction period. If, based on the monitoring, it is determined that interim repairs or further distress mitigation efforts are warranted, mitigation efforts (e.g., routing/filling cracks, pothole repairs) should be discussed with Arcadis, Firestone's Engineers, and performed as necessary to prevent significant or accelerated deterioration of these roadways.

TABLES



Table 1
Road Distress: Type and Severity

Distress Type	Distress Description	Severity Levels
Block Cracking	A pattern of cracks that turns pavement into approximately rectangle pieces, ranging from 0.1 m^2 (square meter) to 10 m^2.	Low - Cracks with a mean width ≤ 6 millimeters (mm). Moderate - Cracks with a mean width greater than (>) 6 mm and less than or equal to (≤) 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to low severity random cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to high-severity random cracking.
Fatigue Cracking	Occurs in areas subject to repeated traffic loading (wheel paths). Can be a series of interconnecting cracks in early stages of development. Develops into many-sided, sharp, angled pieces, usually less than 0.3 m. Often referred to as 'chicken wire' or 'alligator' cracking in later stages.	Low - An area of cracks with no or only few connecting cracks; cracks are not spalled or sealed. Moderate - An area of interconnecting cracks forming a complete pattern; may be slightly spalled, and cracks may be sealed. High - An area of interconnecting cracks forming a complete pattern; pieces may move when subject to traffic.
Longitudinal Cracking	Cracks predominantly parallel to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 mm and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low-severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to moderate- to high-severity random cracking.
Transverse Cracking	Cracks predominantly perpendicular to pavement center.	Low - A crack with a mean width ≤ 6 mm; or sealed with sealant material in good condition and with a width that cannot be determined. Moderate - A crack with a mean width > 6 m and ≤ 19 mm; or any crack with a mean width ≤ 19 mm and adjacent to any low severity cracking. High - Cracks with a mean width > 19 mm; or any crack with a mean width ≤ 19 mm and adjacent moderate- to high-severity random cracking.
Rutting	A rut is a longitudinal surface depression in the wheel path. It may be associated with transverse displacement.	Not applicable (N/A). Severity levels can be defined by categorizing the measurements collected.

Table 2

Baseline Ride Quality Data for County Road 19

Southbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	123.2	146.3	135
2	528	1056	528	89.0	77.6	83
3	1056	1584	528	96.0	70.2	83
4	1584	2112	528	75.1	63.9	70
5	2112	2640	528	72.4	71.6	72
6	2640	3168	528	68.2	64.5	66
7	3168	3696	528	73.7	70.3	72
8	3696	4224	528	69.1	79.1	74
9	4224	4752	528	62.6	77.0	70
10	4752	5280	528	77.6	112.4	95
11	5280	5808	528	49.8	58.8	54
12	5808	6336	528	62.1	74.4	68
13	6336	6864	528	67.1	85.3	76
14	6864	7392	528	58.1	82.1	70
15	7392	7920	528	58.1	86.3	72
16	7920	8448	528	56.0	69.1	63
17	8448	8976	528	67.7	80.2	74
18	8976	9504	528	64.5	72.8	69
19	9504	10032	528	57.2	58.0	58
20	10032	10560	528	120.5	143.0	132
21	10560	11088	528	94.9	116.9	106
22	11088	11616	528	80.4	101.8	91
23	11616	12144	528	96.3	115.8	106
24	12144	12672	528	105.4	124.4	115
25	12672	13200	528	79.3	80.0	80
26	13200	13728	528	94.4	141.7	118
27	13728	14256	528	80.5	95.5	88
28	14256	14784	528	85.5	109.0	97
29	14784	15312	528	85.1	114.2	100
30	15312	15840	528	90.7	124.8	108
31	15840	16368	528	136.6	163.2	150
32	16368	16896	528	57.2	57.6	57
33	16896	17424	528	50.3	60.9	56
34	17424	17952	528	59.2	55.9	58
35	17952	18480	528	71.1	86.4	79
36	18480	19008	528	63.1	77.1	70
37	19008	19536	528	56.0	67.8	62
38	19536	20064	528	46.8	67.7	57
39	20064	20592	528	55.3	62.1	59
40	20592	21120	528	48.9	52.4	51
41	21120	21648	528	62.8	70.5	67
42	21648	22176	528	48.9	57.1	53
43	22176	22704	528	51.0	60.2	56
44	22704	23232	528	50.3	68.0	59
45	23232	23760	528	45.1	52.5	49
46	23760	24288	528	68.6	73.9	71
47	24288	24816	528	54.9	64.8	60
48	24816	25344	528	61.9	81.5	72

Table 2

Baseline Ride Quality Data for County Road 19

49	25344	25872	528	68.7	71.1	70
50	25872	26400	528	59.9	76.7	68
51	26400	26928	528	147.3	138.5	143
52	26928	27456	528	68.8	75.1	72
53	27456	27984	528	76.4	72.7	75
54	27984	28512	528	68.3	62.2	65
55	28512	29040	528	70.7	70.2	70
56	29040	29568	528	62.8	80.4	72
57	29568	30096	528	62.4	72.9	68
58	30096	30624	528	100.5	106.3	103
59	30624	31152	528	88.5	118.3	103
60	31152	31680	528	63.4	60.8	62
61	31680	32208	528	72.4	85.5	79
62	32208	32736	528	59.4	81.3	70
63	32736	33264	528	72.7	91.0	82
64	33264	33792	528	92.5	105.1	99
65	33792	34320	528	64.9	98.8	82
66	34320	34848	528	71.8	84.0	78
67	34848	35376	528	63.4	70.6	67
68	35376	35904	528	60.9	71.6	66
69	35904	36432	528	72.5	74.7	74
70	36432	36960	528	86.2	85.0	86
71	36960	37488	528	104.7	111.2	108
72	37488	38016	528	64.7	77.1	71
73	38016	38544	528	66.2	76.0	71
74	38544	39072	528	80.8	87.8	84
75	39072	39600	528	73.0	95.7	84
76	39600	40128	528	80.3	95.9	88
77	40128	40656	528	79.3	120.5	100
78	40656	41184	528	75.6	106.6	91
79	41184	41712	528	84.0	108.5	96
80	41712	42240	528	70.8	80.9	76
81	42240	42768	528	88.9	102.3	96
82	42768	43296	528	67.9	69.2	69
83	43296	43824	528	63.2	94.9	79
84	43824	44352	528	69.4	112.1	91
85	44352	44880	528	75.0	97.6	86
86	44880	45194.8	315	601.3	571.8	587
			Overall Averages:	**77**	**90**	**83**

Northbound				IRI		MRI
Leg	**Start Location (inches)**	**Stop Location (inches)**	**Distance (inches)**	**Left Wheel (inches/mile)**	**Right Wheel (inches/mile)**	**Baseline (inches/mile)**
1	0	528	528	137.8	161.1	149
2	528	1056	528	80.4	104.8	93
3	1056	1584	528	71.4	74.6	73
4	1584	2112	528	79.3	100.7	90
5	2112	2640	528	81.3	76.7	79
6	2640	3168	528	115.5	105.0	110
7	3168	3696	528	80.7	97.2	89
8	3696	4224	528	78.8	89.3	84
9	4224	4752	528	84.4	77.4	81

Table 2

Baseline Ride Quality Data for County Road 19

10	4752	5280	528	82.6	100.7	92
11	5280	5808	528	68.0	92.5	80
12	5808	6336	528	84.1	102.2	93
13	6336	6864	528	80.1	79.1	80
14	6864	7392	528	85.4	84.6	85
15	7392	7920	528	101.1	130.7	116
16	7920	8448	528	74.3	87.8	81
17	8448	8976	528	70.5	94.2	82
18	8976	9504	528	65.0	69.0	67
19	9504	10032	528	71.7	71.5	72
20	10032	10560	528	66.4	64.2	65
21	10560	11088	528	82.9	86.7	85
22	11088	11616	528	107.9	114.3	111
23	11616	12144	528	83.9	107.1	95
24	12144	12672	528	74.4	103.1	89
25	12672	13200	528	79.5	114.4	97
26	13200	13728	528	82.6	101.4	92
27	13728	14256	528	79.1	82.2	81
28	14256	14784	528	108.4	113.9	111
29	14784	15312	528	79.9	79.4	80
30	15312	15840	528	87.1	108.0	98
31	15840	16368	528	118.7	146.8	133
32	16368	16896	528	97.5	100.0	99
33	16896	17424	528	90.7	138.8	115
34	17424	17952	528	75.7	84.0	80
35	17952	18480	528	76.5	69.6	73
36	18480	19008	528	167.0	168.1	168
37	19008	19536	528	102.2	74.6	88
38	19536	20064	528	87.4	65.9	77
39	20064	20592	528	85.8	63.1	74
40	20592	21120	528	93.3	75.9	85
41	21120	21648	528	94.9	71.1	83
42	21648	22176	528	90.2	58.3	74
43	22176	22704	528	74.1	66.3	70
44	22704	23232	528	117.9	65.9	92
45	23232	23760	528	118.5	73.8	96
46	23760	24288	528	93.8	86.0	90
47	24288	24816	528	84.4	54.9	70
48	24816	25344	528	66.7	59.3	63
49	25344	25872	528	58.5	59.5	59
50	25872	26400	528	62.6	76.4	70
51	26400	26928	528	85.8	90.4	88
52	26928	27456	528	89.8	84.5	87
53	27456	27984	528	69.4	56.7	63
54	27984	28512	528	64.4	62.6	64
55	28512	29040	528	77.6	68.8	73
56	29040	29568	528	128.5	157.2	143
57	29568	30096	528	77.4	84.7	81
58	30096	30624	528	69.8	78.7	74
59	30624	31152	528	86.4	90.4	88
60	31152	31680	528	88.3	114.8	102
61	31680	32208	528	95.2	106.3	101
62	32208	32736	528	103.0	93.7	98

Table 2

Baseline Ride Quality Data for County Road 19

63	32736	33264	528	108.8	119.4	114
64	33264	33792	528	83.2	102.4	93
65	33792	34320	528	101.7	108.2	105
66	34320	34848	528	111.9	99.1	106
67	34848	35376	528	69.0	78.9	74
68	35376	35904	528	79.9	87.9	84
69	35904	36432	528	68.3	64.4	66
70	36432	36960	528	47.4	50.9	49
71	36960	37488	528	58.8	67.6	63
72	37488	38016	528	43.4	51.5	47
73	38016	38544	528	57.7	63.1	60
74	38544	39072	528	53.3	60.8	57
75	39072	39600	528	61.5	69.0	65
76	39600	40128	528	60.7	77.3	69
77	40128	40656	528	53.2	63.0	58
78	40656	41184	528	66.7	77.0	72
79	41184	41712	528	54.3	62.2	58
80	41712	42240	528	67.1	73.5	70
81	42240	42768	528	66.4	69.4	68
82	42768	43296	528	51.8	54.1	53
83	43296	43824	528	59.9	65.1	63
84	43824	44352	528	59.4	80.1	70
85	44352	44880	528	67.4	96.6	82
86	44880	45140.6	261	215.2	259.3	237
			Overall Averages:	**83**	**88**	**85**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The southbound route began at GPS location 40.2038265215873 N 104.885933164921 W and ended at GPS location 40.0807181466162 N 104.886453600556 W. The northbound route began at GPS location 40.0800714961111 N 104.886415832222 W and ended at GPS location 40.2031560818519 N 104.885884058287 W.

Table 3

Baseline Ride Quality Data for County Road 20

Westbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	98.8	92.3	96
2	528	1056	528	65.3	67.5	66
3	1056	1584	528	64.1	63.9	64
4	1584	2112	528	95.7	96.7	96
5	2112	2640	528	62.3	52.1	57
6	2640	3168	528	78.0	65	72
7	3168	3696	528	83.0	96.1	90
8	3696	4224	528	76.2	56.7	66
9	4224	4752	528	87.0	62.7	75
10	4752	5280	528	79.3	69.3	74
11	5280	5808	528	148.2	141.6	145
12	5808	6336	528	201.5	237.4	219
13	6336	6864	528	166.9	136.6	152
14	6864	7392	528	171.1	175.5	173
15	7392	7920	528	127.7	167.2	147
16	7920	8448	528	147.5	123.2	135
17	8448	8976	528	125.3	125.4	125
18	8976	9504	528	144.8	116.6	131
19	9504	10032	528	167.2	155.8	161
20	10032	10560	528	161.2	238.1	200
21	10560	11088	528	176.5	219	198
22	11088	11616	528	157.8	197.1	177
23	11616	12144	528	131.7	134.4	133
24	12144	12672	528	146.0	132.7	139
25	12672	13200	528	154.3	128.7	142
26	13200	13728	528	159.6	176	168
27	13728	14256	528	134.8	201.8	168
28	14256	14784	528	116.9	163.9	140
29	14784	15312	528	149.7	243	196
30	15312	15514.9	203	320.0	319.3	320
			Overall Averages:	**129**	**138**	**134**

Eastbound				IRI		MRI
Leg	Start Location (inches)	Stop Location (inches)	Distance (inches)	Left Wheel (inches/mile)	Right Wheel (inches/mile)	Baseline (inches/mile)
1	0	528	528	183.8	250.4	217
2	528	1056	528	118.0	186.0	152
3	1056	1584	528	96.1	127.7	112
4	1584	2112	528	124.1	134.3	129
5	2112	2640	528	131.7	108.8	120
6	2640	3168	528	107.6	84.6	96
7	3168	3696	528	92.8	112.3	103
8	3696	4224	528	121.6	113.7	118
9	4224	4752	528	100.7	133.6	117
10	4752	5280	528	133.7	180.2	157
11	5280	5808	528	133.7	116.9	125
12	5808	6336	528	119.7	89.7	105

Table 3

Baseline Ride Quality Data for County Road 20

13	6336	6864	528	119.5	83.2	101
14	6864	7392	528	120.1	88.4	104
15	7392	7920	528	109.5	128.8	119
16	7920	8448	528	147.9	133.6	141
17	8448	8976	528	142.1	135.9	139
18	8976	9504	528	203.7	208.7	206
19	9504	10032	528	170.6	161.3	166
20	10032	10560	528	106.3	143.2	125
21	10560	11088	528	56.0	55.8	56
22	11088	11616	528	46.8	57.7	52
23	11616	12144	528	55.0	68.5	62
24	12144	12672	528	49.5	57.6	54
25	12672	13200	528	48.3	47.7	48
26	13200	13728	528	49.3	64.2	57
27	13728	14256	528	52.8	70.3	62
28	14256	14784	528	52.7	60.0	56
29	14784	15312	528	61.6	64.7	63
30	15312	15579.1	267	128.2	120.9	125
			Overall Averages:	**106**	**113**	**109**

Abbreviations:

IRI International Roughness Index
MRI Mean Roughness Index

Federal Pavement Roughness Thresholds for Interstate Facilities:

Good/Very Good <95 inches/mile	94.0
Fair/Mediocre 95-170 inches/mile	169.0
Less than acceptable >170 inches/mile	170.0

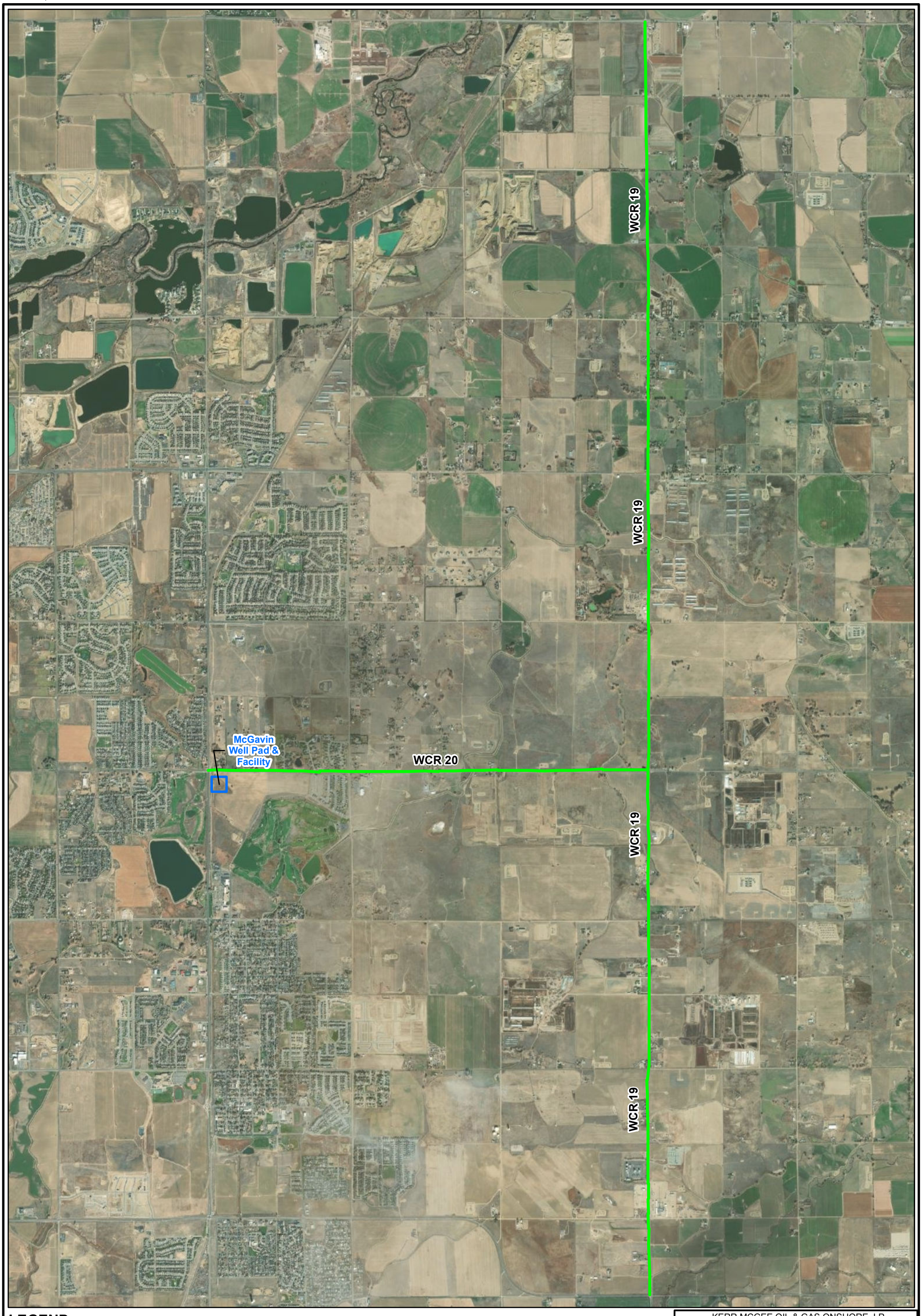
Notes:

Data was collected on July 14, 2020.

The start and stop locations were based on GPS coordinates. The westhbound route began at GPS location 40.1310865937374 N 104.886272024848 W and ended at GPS location 40.1314218750327 N 104.941010064575 W. The eastbound route began at GPS location 40.1313771766667 N 104.941839932222 W and ended at GPS location 40.1310726773611 N 104.887145734514 W.

FIGURES

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig1_Firestone_Trucking_Route_McGavin.mxd
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LEGEND

- Trucking Route
- Access Road
- Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

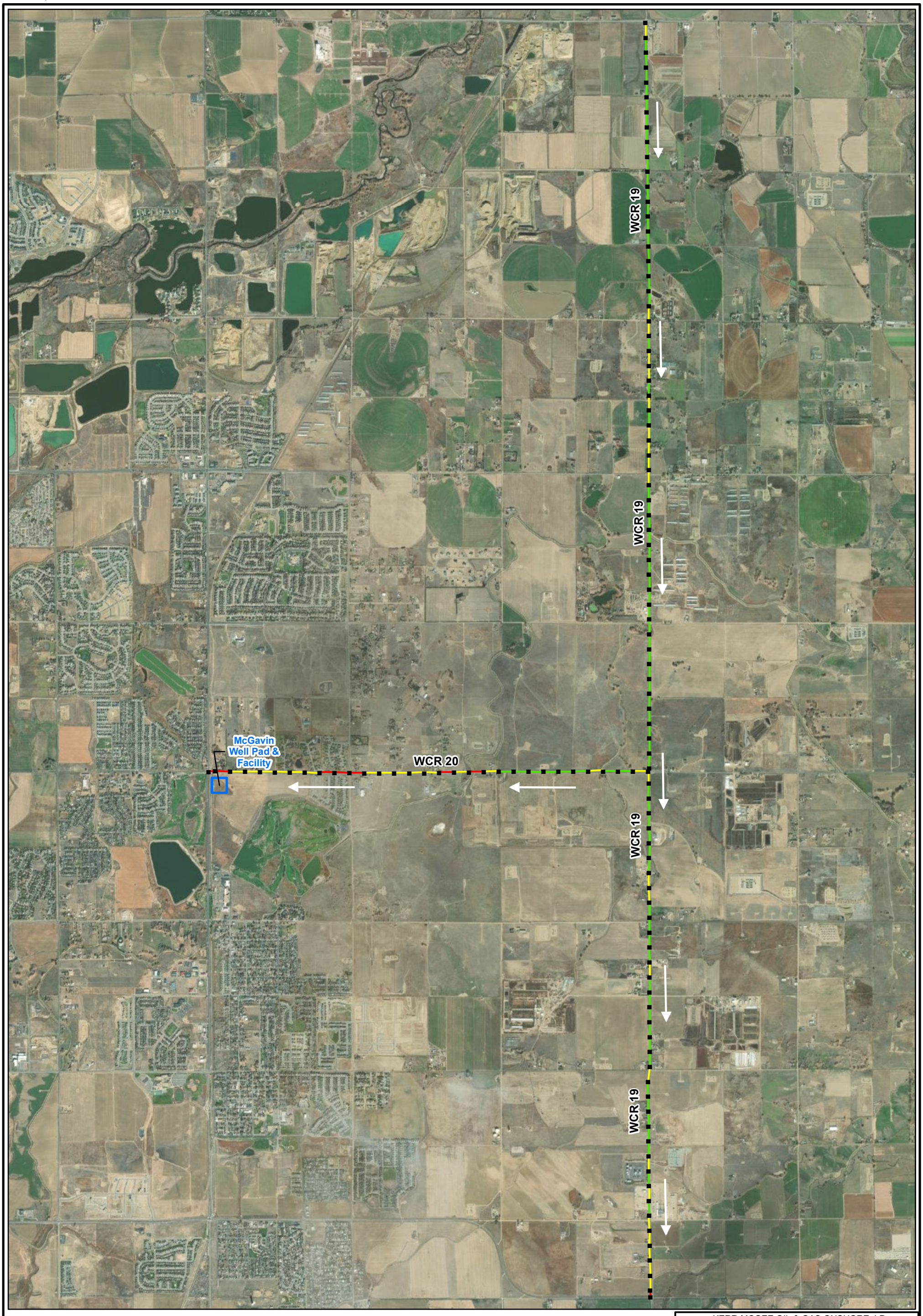
TRUCKING ROUTE
WELD COUNTY ROADS 19 AND 20

ARCADIS

FIGURE
1

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
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LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

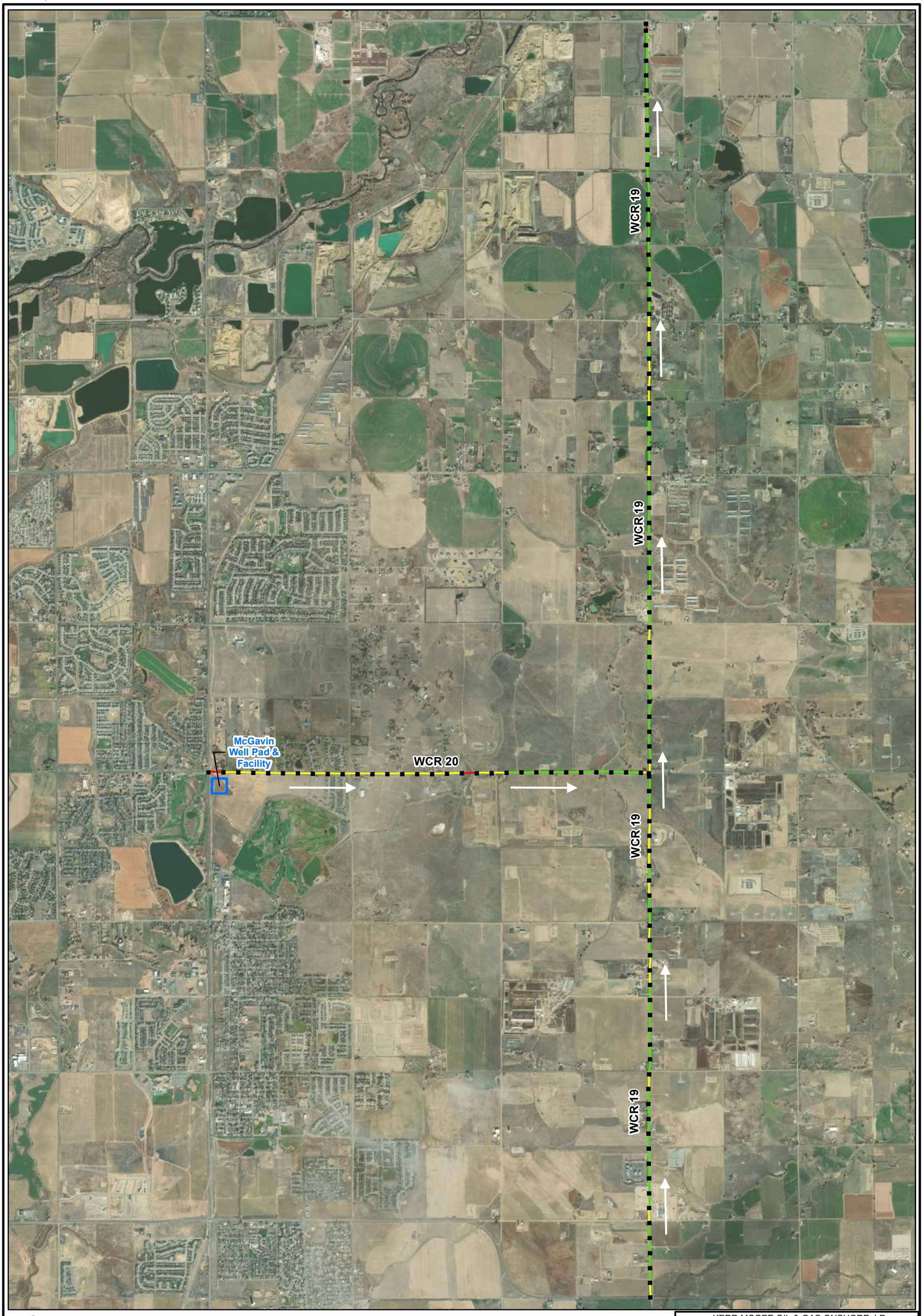
ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 19 AND 20 SOUTH/WESTBOUND

ARCADIS

FIGURE
2

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CITY:(DENTECH) DIV/GROUP:(ENV/GIS) DB:KKELLEY LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\APC_Weld_Colorado\GIS\ArcMap_MXD\Firestone_RoadSurvey\Occidental_PC_20200717\Revised_20211213\Fig3_Firestone_Northbound_Eastbound_McGavin.mxd
12/13/2021, 4:42:36 PM



LEGEND

Pavement Roughness Threshold

- Good/Very Good <95 inches/mile
- Fair/Mediocre 95-170 inches/mile
- Less than acceptable >170 inches/mile

Well Pad

WCR = WELD COUNTY ROAD

N

0 3,100 6,200

SCALE IN FEET

KERR MCGEE OIL & GAS ONSHORE, LP
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

ROADWAY ASSESSMENT
RIDE QUALITY DATA
WELD COUNTY ROADS 19 AND 20 NORTH/EASTBOUND

ARCADIS

FIGURE
3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX A

HSP Charts (on DVD)

APPENDIX B

Visual Assessment Photographic Log

Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	9:59:40 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.2033372524287	Longitude	-104.88592954
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:00:47 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.2035102919943	Longitude	-104.88595845
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:04:05 AM	Section:	Mile 0.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.195439346691	Longitude	-104.88589878
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:05:35 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1926557692914	Longitude	-104.88584477
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:07:25 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1847935416447	Longitude	-104.88580319
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:10:16 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.1747943941366	Longitude	-104.88575508
Primary Distress:	Fatigue (Alligator) Cracking	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:09:01 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1750818809408	Longitude	-104.88554018
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:	Fatigue (Alligator) Cracking	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:12:58 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1671455216539	Longitude	-104.88585588
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:15 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1597934500299	Longitude	-104.88595731
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:17:53 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1597814141739	Longitude	-104.88590627
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:20:11 AM	Section:	Mile 3.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1525085552292	Longitude	-104.88601847
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:05 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1456340336325	Longitude	-104.88612623
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:22:46 AM	Section:	Mile 4.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1452690824332	Longitude	-104.88604164
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:24:33 AM	Section:	Mile 4.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1366233153063	Longitude	-104.88609123
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:09 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1317873269072	Longitude	-104.88607846
Primary Distress:	None	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:26:53 AM	Section:	Mile 5.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1309659491344	Longitude	-104.88615778
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:29:26 AM	Section:	Mile 5.6
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1308417098263	Longitude	-104.88616857
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:32:15 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1164490931005	Longitude	-104.88631309
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:33:08 AM	Section:	Mile 6.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1166034760774	Longitude	-104.88625442
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:35:39 AM	Section:	Mile 6.5
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1145219424268	Longitude	-104.88618993
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:05 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1085079818709	Longitude	-104.88627954
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:38:55 AM	Section:	Mile 7.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1018067201925	Longitude	-104.88645202
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:42:07 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	North
Latitude:	40.1017782490729	Longitude	-104.88645283
Primary Distress:	Transverse Cracking	Severity:	High
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:43:20 AM	Section:	Mile 8.0
Field Personnel:	Ryan Cook	Photo Direction:	South East
Latitude:	40.0874621404114	Longitude	-104.88654459
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:	Rutting	Severity:	Low



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:46:29 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.0873702162933	Longitude	-104.88652399
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/22/2020	Road Name:	CR 19
Time:	10:48:47 AM	Section:	Mile 8.5
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.0802392466538	Longitude	-104.88660283
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:53:23 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1311074148566	Longitude	-104.88660206
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:55:25 AM	Section:	Mile 0.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.131125	Longitude	-104.886592
Primary Distress:	Rutting	Severity:	Low
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:57:48 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	East
Latitude:	40.1311787422972	Longitude	-104.90522115
Primary Distress:	Rutting	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:56:59 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1311957954733	Longitude	-104.90180907
Primary Distress:	Block Cracking	Severity:	Low
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	10:58:45 AM	Section:	Mile 1.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1311447831801	Longitude	-104.90523483
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:00:26 AM	Section:	Mile 1.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1311571663148	Longitude	-104.90521007
Primary Distress:	Block Cracking	Severity:	
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:02:55 AM	Section:	Mile 2.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1313342184852	Longitude	-104.9255581
Primary Distress:	Block Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:05:11 AM	Section:	Mile 2.5
Field Personnel:	Ryan Cook	Photo Direction:	West
Latitude:	40.1312192624291	Longitude	-104.92853809
Primary Distress:	Block Cracking	Severity:	Moderate
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:07:12 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	South
Latitude:	40.1314830018651	Longitude	-104.94152958
Primary Distress:	Transverse Cracking	Severity:	Moderate
Secondary Distress:		Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:07:48 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	South West
Latitude:	40.1314669380746	Longitude	-104.94138273
Primary Distress:	Transverse Cracking	Severity:	
Secondary Distress:	Bleeding	Severity:	



Photographic Log
Baseline Roadway Assessment
Kerr McGee Oil and Gas Onshore LP
Firestone Development Area
Weld County, Colorado

Date:	7/20/2020	Road Name:	CR 20
Time:	11:08:12 AM	Section:	Mile 3.0
Field Personnel:	Ryan Cook	Photo Direction:	North East
Latitude:	40.1314665029247	Longitude	-104.94140519
Primary Distress:		Severity:	
Secondary Distress:		Severity:	



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Section 14

Reclamation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado



Kerr-McGee Oil & Gas Onshore LP

Interim Reclamation Plan

MCGAVIN 6-19HZ PAD

Firestone, CO

June 2021

TABLE OF CONTENTS

1.0 INTRODUCTION....1
2.0 SITE DESCRIPTION....1
3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES....2
4.0 INSPECTION AND MAINTENANCE PROCEDURES....3
4.1 Inspections....3
4.2 Maintenance....3

APPENDICES

Appendix A Seed Mix
Appendix B Grading Plan for Production Phase

1.0 INTRODUCTION

Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) has developed this site-specific Interim Reclamation Plan to establish proper planning and execution for reclamation of the land within areas that are affected by oil and gas location construction and operations, but no longer in use by production operations. When all wells on a pad are completed and turned over to production, the drilling footprint will be reduced, and areas not needed for production will be restored and re-vegetated in accordance with Colorado Oil and Gas Conservation Commission (COGCC) Series 1000 Reclamation Rules and consistent with the requirements of Rule 1003. Interim Reclamation. Reference shall also be made to Rules 304.c(14) Topsoil Protection Plan and 304.c(15) Stormwater Management Plan within this process.

Soil and aggregate mix used to build a compacted drilling pad will be removed. All segregated soil horizons removed from the disturbance area shall be replaced to their original relative positions and contour based on final land use and shall be tilled adequately to alleviate compaction and re-establish a proper seedbed. Final contour, irrigation, and landscape construction, including plantings and perennial seeding, will occur in the first favorable season. The area shall be treated as necessary to prevent invasion of undesirable species and noxious weeds as practicable. The site will be stabilized, inspected, and maintained to control erosion.

2.0 SITE DESCRIPTION

Operator / ID	Kerr-McGee Oil & Gas Onshore LP
Project / Site Name:	McGavin 6-19HZ Well Pad and Facility
Location:	Sec 19, T2N, Range 67W, Firestone, Colorado
Total Area of Project:	25.63 acres
Description of Existing Vegetation:	Existing vegetation on the subject location is winter wheat, land use is agriculture
Soil Type(s):	47- Olney fine sandy loam, 1-3% slopes, 72- Vona loamy sand, 0-3% slopes and 4- Aquolls and Aquepts, flooded
Operator ID:	47120
Reclamation Manager/Contact:	Lynna Scranton, HSE Manager Occidental Petroleum Corporation 720-929-6317

3.0 PROPOSED SEQUENCE OF MAJOR ACTIVITIES

1) Surface Owner Consultation and Timing: KMOG is the surface owner and interim reclamation shall occur approximately no later than 10/30/2023 after conclusion of subsequent operations. If soil conditions are not conducive due to weather conditions, a Sundry Notice Form 4 shall be submitted, and reclamation commenced as soon as conditions allow and as practicable.
2) Recontouring, Compaction Relief and Topsoil Redistribution: Refer to the Topsoil Protection Plan to address site specific requirements.
3) Soil Preparation: Equipment to be cleaned from soil or debris prior to mobilizing and commencing soil preparation operations between properties.
    a) Compaction Alleviation: After topsoil redistribution, the interim reclamation area shall be cross ripped to a depth of eighteen inches with an agricultural ripper/subsoiler; however, this depth may be adjusted in rocky or shallow soils. Chiseling/ripping will be performed at the minimum depth of topsoil. Cultipacking or disking may be required to reduce soil clod size. Ripping with construction style shanks, for the purpose of surface ridge roughness as a stormwater BMP, is only allowed to a six-inch depth.
    b) Leveling: All areas will be leveled and graded to drain properly and blend to the adjacent undisturbed land.
    c) Soil Amendments: Necessary amendments will be determined by soil analysis completed during Topsoil Protection Plan Site Investigation, land use, site conditions at time of interim reclamation, and surface owner consultation.
    d) Seedbed Preparation: Incorporate soil amendments by disking, harrowing or cultipacking and to provide a seedbed that is firm and friable, and properly crimp straw mulch material.
    e) Surface Rock Removal: Surface rocks that interfere with agricultural operations, seeding equipment or future mowing operations will be removed.
4) Seeding: Seed mix is considered based on consultations with NRCS, CPW, and Surface Owner; also, by soil type, land use, adjacent reference area vegetation and in accordance with Rule 1202.a.6. Seeding shall not occur in windy conditions or when the soil is frozen or wet. Equipment to be cleaned from previous mixes, soil, or debris, prior to mobilizing and commencing seeding operations between properties. Seed shall be applied using appropriate equipment that can place the specified seed at the specified rate and depth included as Appendix A.
5) Mulching: Due to location being in cropland, mulch will not be applied.
6) Implement Post-Construction Stormwater Control Measures: Additional erosion control measures and materials should include consideration of land use, surface owner grazing practices, and potential damage to materials. Refer to a site-specific stormwater management plan prior to implementation.
7) Weed control: Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act.
    a) Weed control measures shall be conducted in consultation with the Surface Owner and County Weed Management Specialist(s) based on site specific conditions. Kerr-McGee will monitor and control noxious weeds until achieving reclamation threshold for release within

reclaimed disturbance areas, including monitoring to measure success of treatments. Weed control measures employed may include mowing or removal and herbicide treatment during the appropriate growing season. During drilling, production, and reclamation operations, all disturbed areas shall be kept reasonably free of noxious weeds and undesirable species.

4.0 INSPECTION AND MAINTENANCE PROCEDURES

4.1 Inspections

Post-construction stormwater inspections will be conducted in accordance with COGCC Rules 1002.f and 1003.e, to document the status of the location, maintenance needs, effectiveness of stormwater control measures, to evaluate pollution sources, and to document reclamation / final stabilization progress. Inspections will be managed by the Reclamation Contact and conducted by their designated representative(s). Inspection forms will document current conditions, including evidence of or potential for off-site erosion, additional control measures that are needed, or repair and maintenance issues.

Findings, inspection records and site maps are documented electronically and available within 24 hours of any inspection.

4.2 Maintenance

For maintenance items discovered, proposed repairs or upgrades to stormwater control measures, and reclamation areas will be documented and coordinated with production crews. Timeline for completion of maintenance items are a priority and will depend on scope; but in all cases, shall not be completed until field conditions allow for safe access, and utility clearance has been confirmed for items requiring ground disturbance / earthwork.

APPENDIX A

Seed Mix

FORM 2B INTERIM RECLAMATION PLAN
(Appendix A): Seed Mix

Project/Site Name	Location	Existing Vegetation	Operator ID
MCGAVIN 6-19HZ Well Pad and Facility	T 2N: 67W Sec 19	Winter wheat, agricultural field	47120

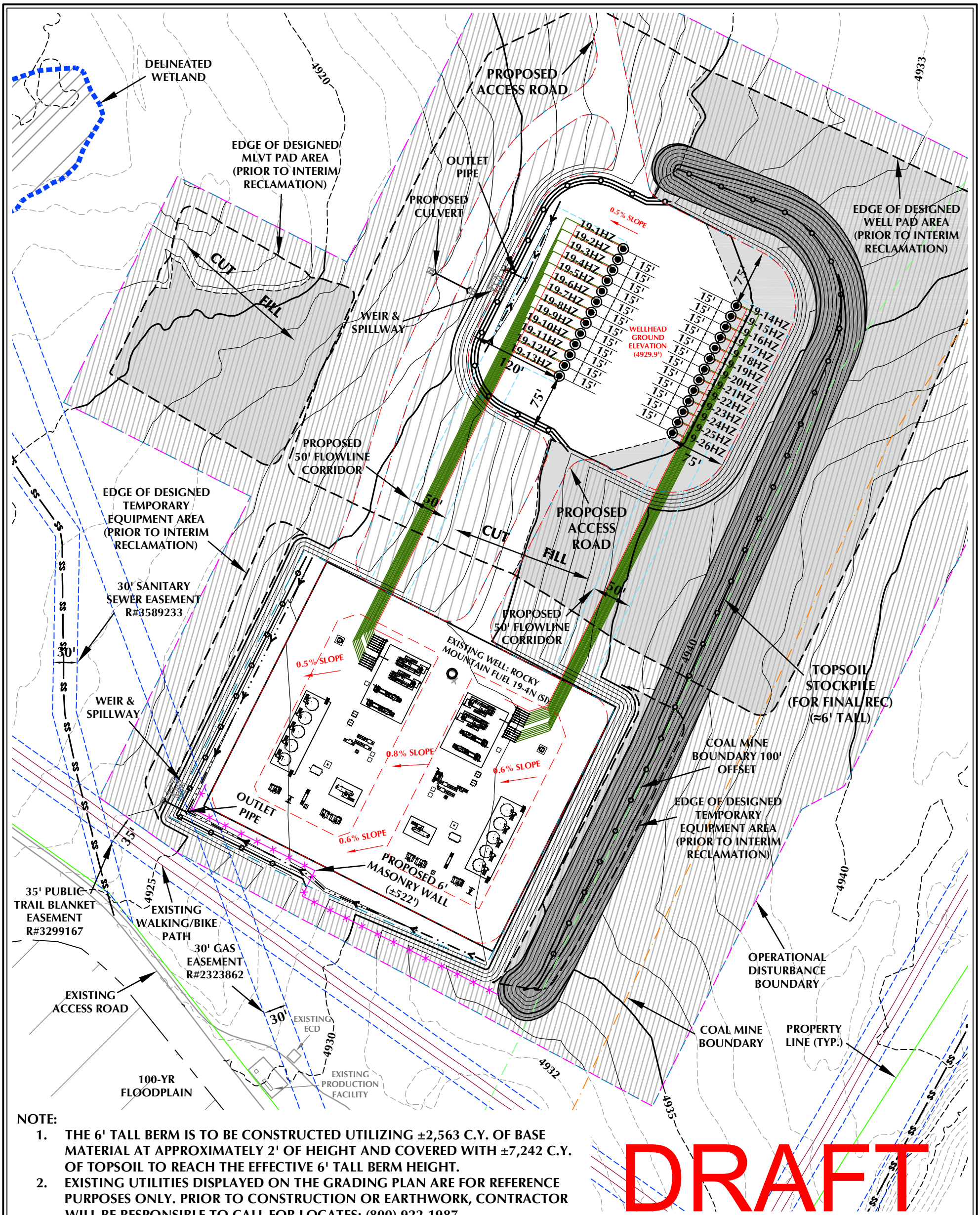
Landowner Requested Seed Mix

Crop Location

Due to the existing agricultural nature of the surrounding land to the proposed project, reclamation will be done to meet the requirements of Rule 1003.e.1. Segregated soil horizons will be replaced to their relative positions and contour, compaction alleviated, and proper preparation of the seed bed will occur.

APPENDIX B

Production Phase Grading Plan



NOTE:

1. THE 6' TALL BERM IS TO BE CONSTRUCTED UTILIZING ±2,563 C.Y. OF BASE MATERIAL AT APPROXIMATELY 2' OF HEIGHT AND COVERED WITH ±7,242 C.Y. OF TOPSOIL TO REACH THE EFFECTIVE 6' TALL BERM HEIGHT.
2. EXISTING UTILITIES DISPLAYED ON THE GRADING PLAN ARE FOR REFERENCE PURPOSES ONLY. PRIOR TO CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES: (800) 922-1987

DRAFT

FACILITY REVISION: X22070-STOR-00-PP-2020 REV 1H

PAD - MCGAVIN 6-19HZ INTERIM RECLAMATION SUMMARY

QUANTITIES AND DESIGN PARAMETERS

SHRINKAGE FACTOR = 1.00
SWELL FACTOR = 1.00
TOTAL DISTURBANCE AREA = 25.63 ACRES
AREA RECLAIMED DURING
INTERIM RECLAMATION = 18.34 ACRES
TOTAL WELL PAD AREA AFTER
INTERIM RECLAMATION = 3.50 ACRES
TOTAL FACILITY PAD AREA AFTER
INTERIM RECLAMATION = 3.79 ACRES

WELL/FACILITY PAD QUANTITIES

TOTAL CUT = 22,082 C.Y.
TOTAL FILL = 22,082 C.Y.
TOTAL EXPORT = 0 C.Y.
TOPSOIL @ 11" DEPTH
FROM WELL PAD = 16,389 C.Y.
TOPSOIL @ 11" DEPTH FROM
FACILITY/MLVT/TEMP EQUIPMENT PADS = 9,806 C.Y.
TOTAL TOPSOIL = 26,195 C.Y.
TOPSOIL USED FOR INTERIM REC = 18,953 C.Y.
TOPSOIL STORED FOR FINAL REC = 7,242 C.Y.
LAND USE = CROPLAND

LEGEND

- EXISTING WELL LOCATION
- PROPOSED WELL LOCATION
- EXISTING CONTOURS (1' INTERVAL)
- PROPOSED CONTOURS (1' INTERVAL)
- EXISTING PIPELINE
- PROPOSED FLOWLINE
- EXISTING FENCE
- RECLAMATION AREA
- DIVERSION DITCH
- BERM

HORIZONTAL 0 60' 120' 1" = 120'

1' CONTOURS

PAD - MCGAVIN 6-19HZ

PAD - INTERIM RECLAMATION
MCGAVIN 19-1HZ, MCGAVIN 19-2HZ,
MCGAVIN 19-3HZ, MCGAVIN 19-4HZ, MCGAVIN 19-5HZ, MCGAVIN 19-6HZ,
MCGAVIN 19-7HZ, MCGAVIN 19-8HZ, MCGAVIN 19-9HZ, MCGAVIN 19-10HZ,
MCGAVIN 19-11HZ, MCGAVIN 19-12HZ, MCGAVIN 19-13HZ, MCGAVIN 19-14HZ,
MCGAVIN 19-15HZ, MCGAVIN 19-16HZ, MCGAVIN 19-17HZ, MCGAVIN 19-18HZ,
MCGAVIN 19-19HZ, MCGAVIN 19-20HZ, MCGAVIN 19-21HZ, MCGAVIN 19-22HZ,
MCGAVIN 19-23HZ, MCGAVIN 19-24HZ, MCGAVIN 19-25HZ & MCGAVIN 19-26HZ
LOCATED IN SECTION 19, T2N, R67W, 6TH P.M.
WELD COUNTY, COLORADO

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

SCALE: 1"=120'	DATE:10/14/2020	SHEET NO:
REVISED:	HJL 10/11/21	1 1 OF 1

K:\AN\DARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\MCGAVIN_NEW_OPTION 2_MASONRY_FENCE.DWG, 10/11/2021 10:43:03 AM, steven

Section 15

Community Consultation Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

Community Consultation Plan

McGavin 6-19HZ and Columbine 4-29HZ Well Pads

DESCRIPTION OF AREA

The McGavin Working Pad Surface (WPS) is owned by the applicant and is located in the Town of Firestone, adjacent to the Town of Frederick. The McGavin pad is located south of Pine Cone Ave (CR 20) and east of Colorado Blvd (CR 13).

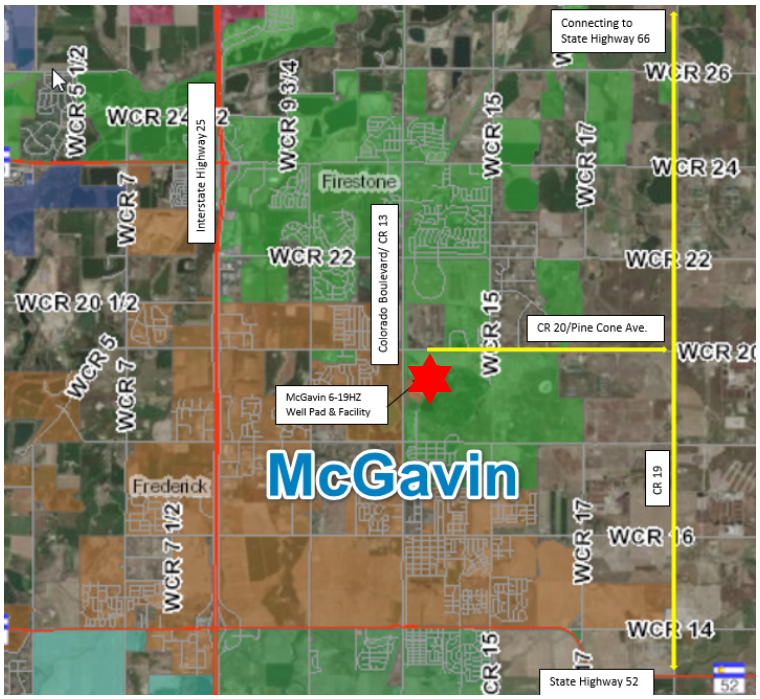


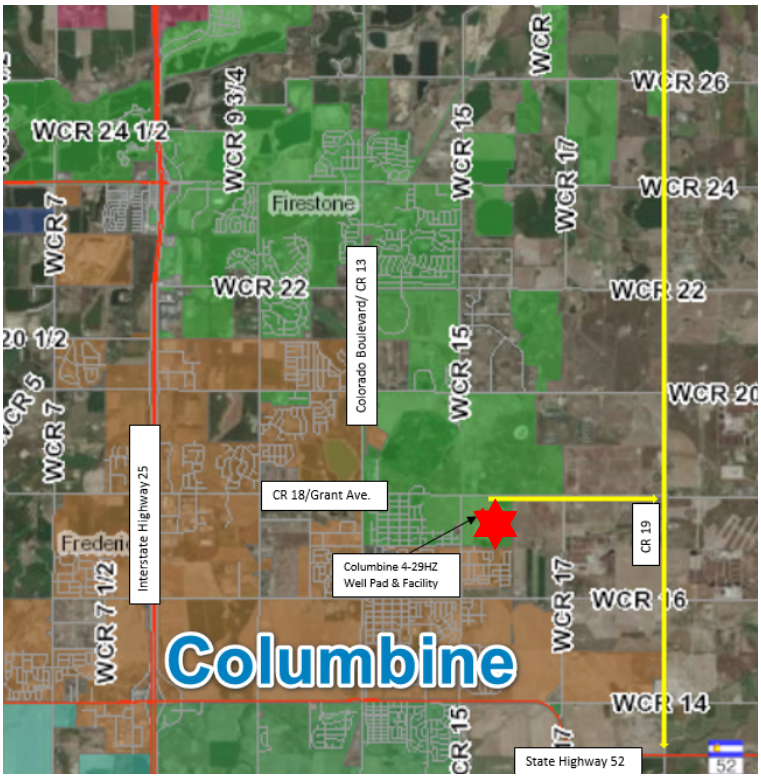
The Columbine WPS is also owned by the applicant and is located southeast of the McGavin pad near the intersection of Grant Ave (CR 18) and Frontier Street (CR 15).



PROPOSED OPERATIONAL HAUL ROUTES

Both the McGavin and Columbine locations will utilize CR 19 connecting to State Hwy 66 to the north and State Hwy 52 to the south. The McGavin location will be accessed via Pine Cone Ave (CR 20) and the Columbine location via Grant Ave (CR 18).

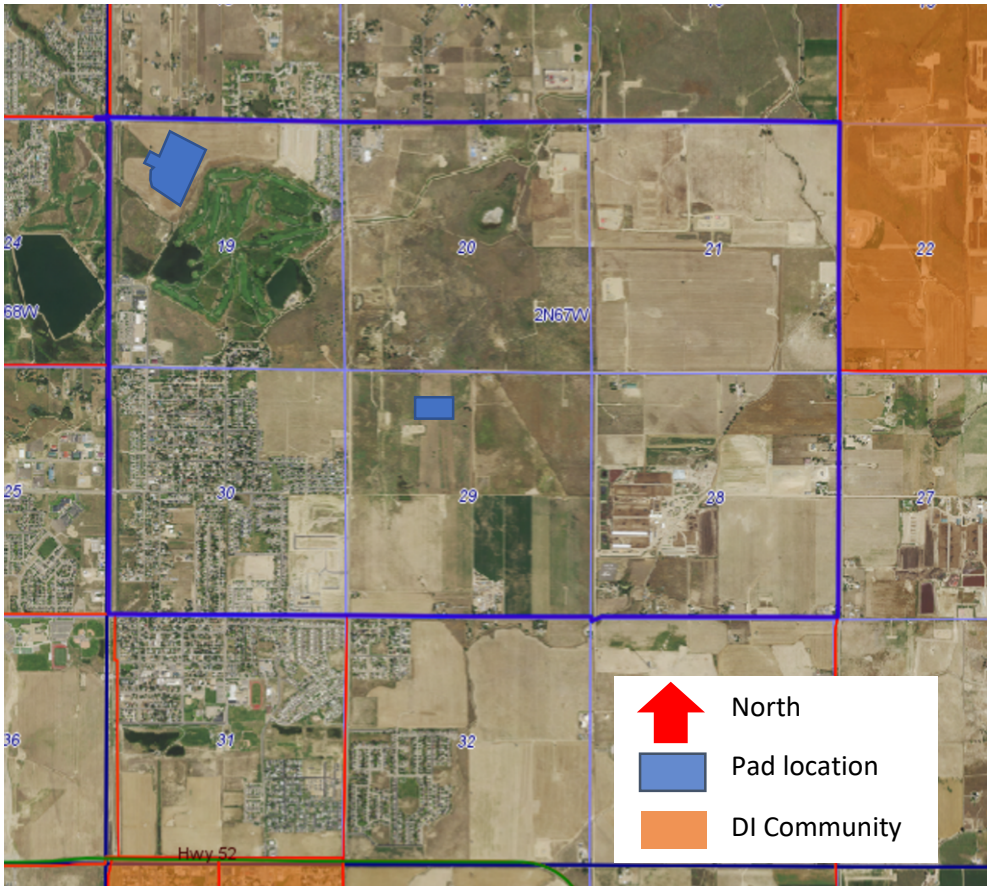




BLOCK GROUP DEMOGRAPHICS

Both the McGavin and Columbine locations fall within the same census block group and are approximately 1.5 miles east of the nearest disproportionally impacted community.

Block Group ID : 081230020161
Block Group Minority Population: 24.6 %
Linguistic Isolation: 1%
Median Household Income: $61,602



PLANNED COMMUNITY CONSULTATION

Because the area is not linguistically isolated (1%), we will send all notices and communications in English. However, we will provide translation services as requested. Our team will be available during daytime and evening hours via the Colorado Response Line and email.

We will consider owners and tenant's suggested mitigation measures and concerns related to public health, safety, welfare.

<u>Previous Communication:</u>

- In July 2020 we invited the neighborhood to a virtual community meeting to discuss the proposed projects. Out of the approximately 130 owners and residents that were invited only two registered to attend and three other residents contacted us after the scheduled meeting date. We contacted each of those residents and engaged and continue to engage with them individually.

Throughout Permitting:

- We will engage with owners and tenants within 2,000' of the WPS and within 300' of the property boundary and invite them to a virtual community meeting to learn more about the proposed projects. The community meeting will provide the owners and tenants with the following information:
    - A description and map of the physical siting of the proposed locations, including legal descriptions
    - A description, proposed timeline, and expected duration of different operations that are planned which include construction, drilling, completions, production, and reclamation
    - The number and orientation of wells, types of equipment, and other on- and off-location infrastructure related to planned operations
    - A description of each stage of operations along with a description of our best management practices to mitigate potential impacts including noise, vibration, light, odor, dust, traffic, and visual
    - Contact information for our Stakeholder Relations team, the Town of Firestone and the COGCC.
- After the first virtual community meeting, we will offer to meet with individuals and groups that have additional questions about the projects
- We will engage with homebuilders and provide information for them to provide to potential homebuyers about the proposed projects including and how to contact us
- Send the Completeness Determination Notice as described in COGCC Rule 303.e
- Complete any additional consultation as required under COGCC Rule 309.c
- Continue to engage with all owners and tenants within 2,000 feet of the WPS and within 300' of the property boundary prior to local and state public hearings

Prior to and after commencement of operations:

- Continue to engage with stakeholders to provide development updates and to answer questions or discuss concerns
- Send all required COGCC notices
- In addition to required notices, we frequently send courtesy notices to owners and tenants to ensure they have the most up to date information about our operations
- Throughout the lifecycle of the wells our Stakeholder Relations team is available to assist the community and can be reached at 866.248.9577 or ColoradoStakeholder@oxy.com Monday through Friday. Our 24-hour Integrated Operations Center can also be reached at 970.515.1500.

Section 16

Final Development Plan

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

APPROVAL BLOCK

ALL WORK SHALL BE CONSTRUCTED TO TOWN OF FIRESTONE DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS. THIS DRAWING HAS BEEN REVIEWED AND FOUND TO BE IN GENERAL COMPLIANCE WITH THESE STANDARDS AND SPECIFICATIONS AND OTHER TOWN REQUIREMENTS. THE ENGINEERING DESIGN AND CONCEPT REMAINS THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

APPROVED BY THE TOWN BOARD OF TRUSTEES OF THE TOWN OF FIRESTONE, COLORADO THIS ___ DAY OF _____,20___ BY RESOLUTION No. _____.

_____ MAYOR

_____ ATTEST:TOWN CLERK

ACCEPTANCE BLOCK AND NOTARY

_____ OWNER

STATE OF COLORADO)
)SS
COUNTY OF WELD)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___ DAY OF _____,20___ BY _____.

WITNESS MY HAND AND OFFICIAL SEAL

_____ NOTARY PUBLIC

_____ MY COMMISSION EXPIRES

BOARD OF TRUSTEES APPROVAL CERTIFICATE

THE MCGAVIN 6-19HZ SPECIAL REVIEW USE AND FINAL DEVELOPMENT PLAN WAS APPROVED AND ACCEPTED BY RESOLUTION NO. _____, PASSED AND ADOPTED AT A MEETING OF THE BOARD OF TRUSTEES OF FIRESTONE COLORADO, HELD ON THE _____ DAY OF _____, 20___.

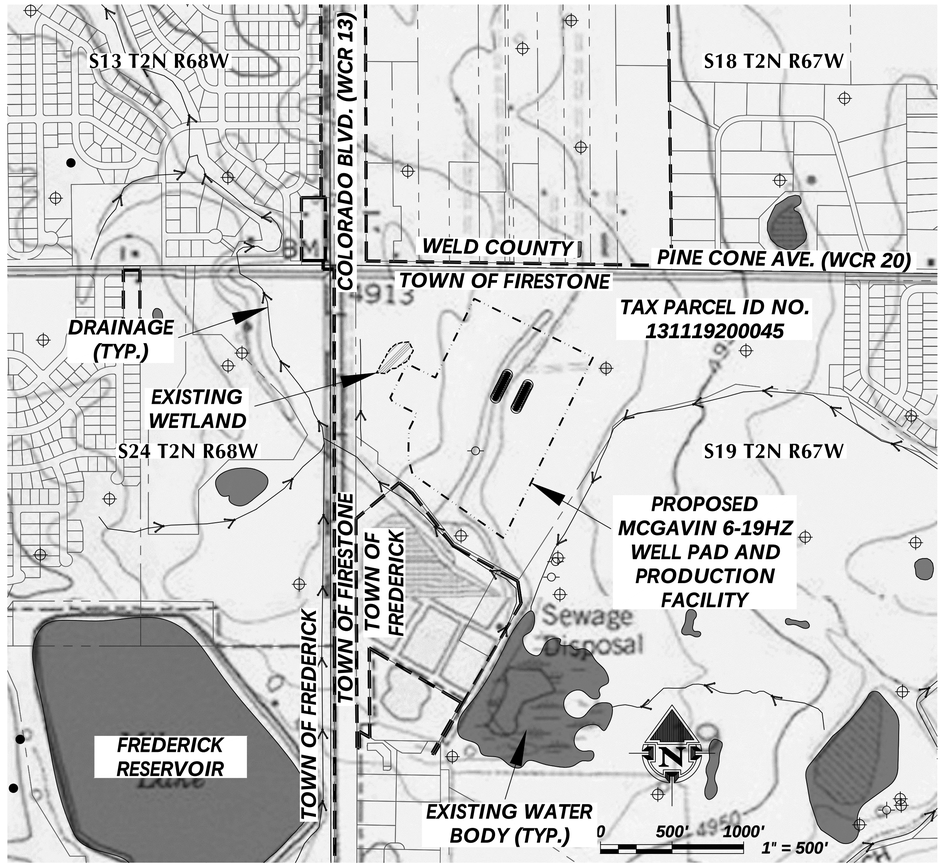
_____ MAYOR

ATTEST_____ TOWN CLERK

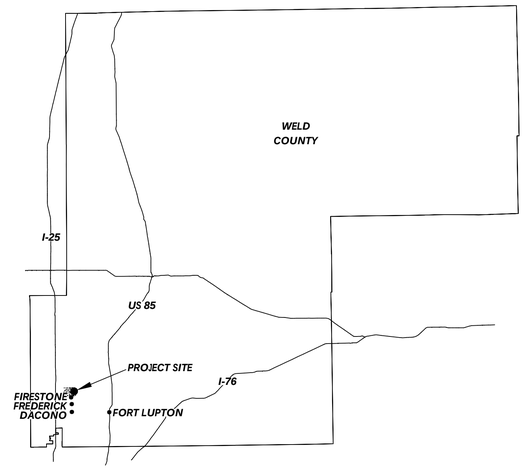
SURFACE OWNER: ANADARKO E&P ONSHORE LLC
ATTN: TRAVIS HOLLAND-APC PROPERTY TAX
PO BOX 173779
DENVER, COLORADO 80217-3779

OPERATOR AND MINERAL LEASE/EASEMENT OWNER: KERR-MCGEE OIL & GAS ONSHORE L.P.
1099 18TH STREET, SUITE 1800
DENVER, COLORADO 80202
(720) 929-6907

ENGINEERING SERVICE: 609 CONSULTING
1095 SABERTON AVENUE
SHERIDAN, WYOMING 82801
(307) 674-0609



OVERVIEW MAP
1" = 500'



LOCATION MAP
NOT TO SCALE

FINAL DEVELOPMENT PLAN	
SHEET NO.	SHEET NAME
FDP-1	COVER SHEET
FDP-2	VICINITY MAP
FDP-3	MULTI-WELL PLAN
FDP-4	CONSTRUCTION PHASE DRAWING
FDP-5	PRODUCTION PHASE DRAWING
FDP-6	FACILITY DRAWING
FDP-7	VISUAL MITIGATION & ACCESS PLAN
FDP-8	GRID TIE
FDP-9	GRID TIE DETAIL

LEGEND

- ***CONSTRUCTION LIMITS OF DISTURBANCE***
- ***PROPOSED WELL***
- ***EXISTING WELL (PRODUCING)***
- ***EXISTING WELL (PLUG & ABANDONED)***
- ***EXISTING WELL (SHUT IN)***
- ***EXISTING WELL (DRY AND ABANDONED)***
- ***EXISTING WELL (TEMPORARILY ABANDONED)***
- ***TOWN LIMITS***
- ***WATER BODY***
- ***PROPERTY LINE***
- ***EXISTING DITCH / STREAM***

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC
LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331
SHERIDAN OFFICE
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
COVER SHEET
SRU21-014 / FDP21-014

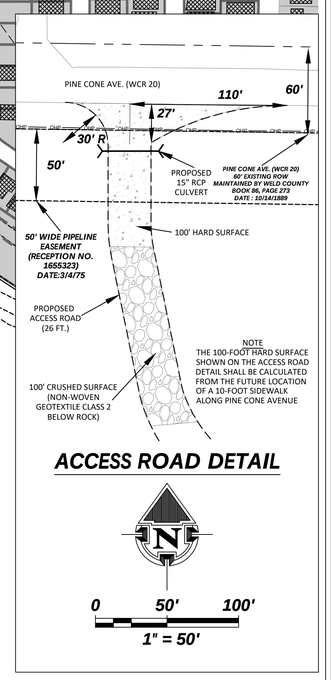
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SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_6-19HZ_FDP_COVER.dwg, 12/13/2021 10:08:02 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

SUBDIVISION: NONAME CREEK WEST
SUBDIVISION: NO NAME CREEK ESTATES
S13 T2N R68W
OWNER: FALK GREGORY A & VELUSCEK STEVEN (WELD COUNTY PARCEL I.D. 131313000059) ZONING: FREDERICK
SUBDIVISION: CANSANO RANCH
OWNER: TOWN OF FIRESTONE (WELD COUNTY PARCEL I.D. 131118000060) ZONING: FIRESTONE
OWNER: DUSO PEGGY DIVING TRUST (WELD COUNTY PARCEL I.D. 131118300009) ZONING: AG-A
OWNER: TYMOCZKO DARRELL R & TYMOCZKO NOLA M (WELD COUNTY PARCEL I.D. 131118000057) ZONING: AG-A
OWNER: KNUDSON ANITA R (WELD COUNTY PARCEL I.D. 131118300016) ZONING: AG-A
OWNER: KNUDSON FAMILY TRUST (WELD COUNTY PARCEL I.D. 131118300019) ZONING: AG-A
OWNER: OCONNOR DANIEL J & OCONNOR NICOLE L (WELD COUNTY PARCEL I.D. 131118300072) ZONING: AG-A
OWNER: KANE JOHN ARTHUR & KANE TRACY LEIGH (WELD COUNTY PARCEL I.D. 131118300071) ZONING: AG-A
OWNER: LAM CRAIG A & (WELD COUNTY PARCEL I.D. 131118300013) ZONING: AG-A
OWNER: GRAY JENNIFER L & GRAY DANIEL P (WELD COUNTY PARCEL I.D. 131118300011) ZONING: AG-A
OWNER: DVORAK KATHERINE M (WELD COUNTY PARCEL I.D. 131118300014) ZONING: AG-A
OWNER: ALDERFER LOWELL M & ALDERFER BETTY L (WELD COUNTY PARCEL I.D. 131118000035) ZONING: AG-A
WELD COUNTY
TOWN OF FIRESTONE
PINE CONE AVE. (WCR 20)
SUBDIVISION: OWL LAKE ESTATES SUB
S18 T2N R67W
PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK HEIGHTS
SUBDIVISION: LAWSON SUB
OWNER: PETRAS TIMOTHY (WELD COUNTY PARCEL I.D. 131324000064) ZONING: AG-A
OWNER: CLEVER LARRY C & CLEVER SUSAN K (WELD COUNTY PARCEL I.D. 131313000048) ZONING: AG-A
CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01
DRAINAGE (TYP.)
EXISTING WATER BODY
COLORADO BLVD. (WCR 13)
COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK
SUBDIVISION: MOORE FARM
EXISTING WATER BODY (BELLA ROSA POND)
S24 T2N R68W
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324411017) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000054) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000050) ZONING: FREDERICK
OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000028) ZONING: FREDERICK
EXISTING WATER BODY (FREDERICK RESERVOIR)
100-YEAR FLOODPLAIN
TOWN OF FREDERICK
TOWN OF FIRESTONE
TOWN OF FREDERICK
OWNER: BEILAND KATHRYN & BEILAND KEVIN D (WELD COUNTY PARCEL I.D. 131118300076) ZONING: AG-A
APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93
30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08
SEE ACCESS ROAD DETAIL
OWNER: YEAGER JUDITH E (WELD COUNTY PARCEL I.D. 131118300066) ZONING: AG-A
PROPOSED ACCESS ROAD
COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)
PROPOSED FIRE HYDRANT (APPROXIMATE LOCATION)
16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01
OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE
EXISTING FACILITY
30' WIDE PIPELINE EASEMENT (RECEPTION NO. 2238664) DATE: 1/17/91
50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75
VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08
EXISTING ACCESS ROAD
COAL MINE BOUNDARY
EXISTING WETLANDS
PROPOSED MLVT
PROPOSED MCGAVIN 6-19HZ WELL PAD
TEMPORARY EQUIPMENT AREA (328' X 60')
EXISTING WALKING/BIKE PATH
PROPOSED MCGAVIN 6-19HZ FACILITY PAD
TEMPORARY EQUIPMENT AREA (150' X 60')
35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05
OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE
VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05
EXISTING FACILITY
SUBDIVISION: ST. VRAIN SANITATION DISTRICT MINOR SUBDIVISION 1
OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK
100-YEAR FLOODPLAIN
OWNER: ST VRAIN SANITATION DISTRICT (WELD COUNTY PARCEL I.D. 131119209002) ZONING: FREDERICK
S19 T2N R67W
EXISTING WATER BODY
EXISTING WATER BODY
EXISTING WATER BODY
SUBDIVISION: SADDLEBACK FG



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- OHP — EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- SS — EXISTING SANITARY SEWER LINE
- EPL — ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING RESIDENTIAL BUILDING
- EXISTING ROW/EASEMENT
- 100-YEAR FLOODPLAIN
- EXISTING SUBDIVISION
- EXISTING BUILDING

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE***

609 CONSULTING, LLC

LOVELAND OFFICE
6706 North Franklin Avenue
Loveland, Colorado 80538
Phone 970-776-4331

SHERIDAN OFFICE
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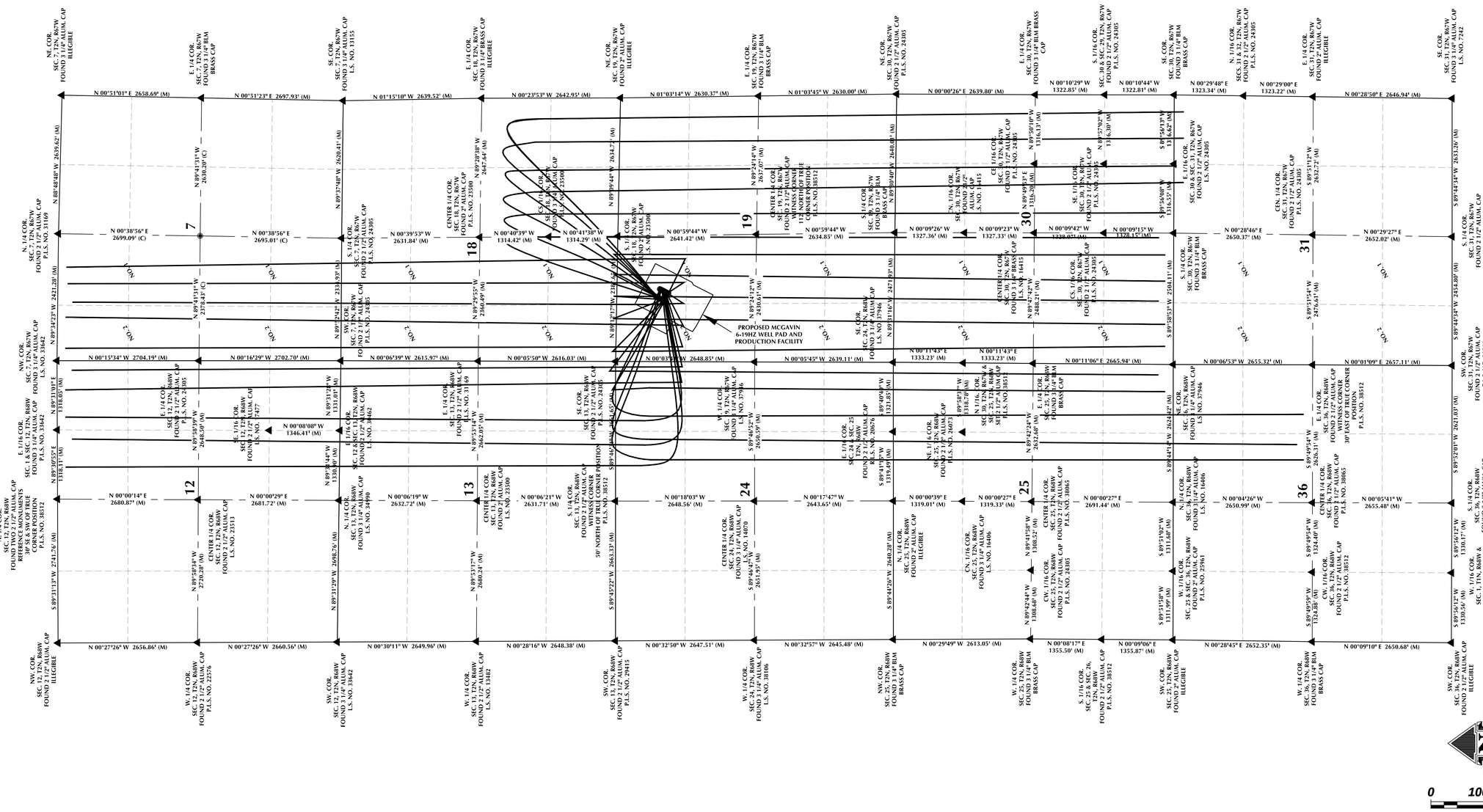
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VICINITY MAP
SRU21-014 / FDP21-014

SCALE:	1" = 200'	SHEET:	FDP-2
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- PROPOSED WELL
- WELL BORE
- INDICATES FOUND SECTION CORNER
- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- OPERATIONAL DISTURBANCE BOUNDARY

NOTES:
1. BASIS OF BEARING DERIVED FROM COLORADO COORDINATE SYSTEM 1983, NORTH ZONE UNLESS OTHERWISE NOTED.
2. ALL MEASURED DISTANCES ARE GRID, U.S. SURVEY FEET. COMBINED SCALE FACTOR: 0.99972362 CALCULATED FROM THE NE. CORNER OF SECTION 29, T2N, R67W.

GENERAL NOTES:
- ORIGINAL DOCUMENT SIZE: 24" x 36"
- SEE FDP-6 FOR PROPOSED WELL AND PRODUCTION FACILITY PAD GRID TIE

609 CONSULTING, LLC

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1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
MULTI-WELL PLAN
SRU21-014 / FDP21-014

SCALE:	1" = 1000'	PAGE:	FDP-3
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

S18 T2N R67W

S24 T2N R68W

S19 T2N R67W

WELD COUNTY

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

COLORADO BLVD. (WCR 13)

TOWN OF FREDERICK

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

SEDIMENT TRAP

PROPOSED SOUND WALL

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

PROPOSED MLVT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 19-1HZ
MCGAVIN 19-2HZ
MCGAVIN 19-3HZ
MCGAVIN 19-4HZ
MCGAVIN 19-5HZ
MCGAVIN 19-6HZ
MCGAVIN 19-7HZ
MCGAVIN 19-8HZ
MCGAVIN 19-9HZ
MCGAVIN 19-10HZ
MCGAVIN 19-11HZ
MCGAVIN 19-12HZ
MCGAVIN 19-13HZ

MCGAVIN 19-14HZ
MCGAVIN 19-15HZ
MCGAVIN 19-16HZ
MCGAVIN 19-17HZ
MCGAVIN 19-18HZ
MCGAVIN 19-19HZ
MCGAVIN 19-20HZ
MCGAVIN 19-21HZ
MCGAVIN 19-22HZ
MCGAVIN 19-23HZ
MCGAVIN 19-24HZ
MCGAVIN 19-25HZ
MCGAVIN 19-26HZ

50' FLOWLINE CORRIDOR

TOPSOIL STOCKPILE

PROPOSED CULVERT

EXISTING WALKING/BIKE PATH

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 328021

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N, (DJ) API: 05-123-34478, TOTAL MEASURED DEPTH: 9240'

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

SEDIMENT TRAP

TEMPORARY EQUIPMENT AREA (328' X 60') & (350' X 60')
(TEMPORARY TANKS - 44)
(TEMPORARY ECDs - 13)
(TEMPORARY PROPANE TANK - 2)

TEMPORARY GENERATOR (50' x 20')

TEMPORARY PURGE GAS AREA (10' x 30')

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666, TOTAL MEASURED DEPTH: 5026'

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318, TOTAL MEASURED DEPTH: 5094'

COAL MINE BOUNDARY

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 1311190000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

4910'

4915

4920

4925

4930

4935

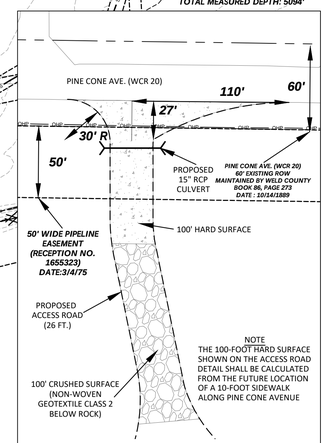
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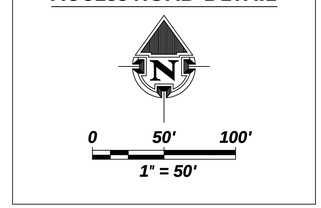
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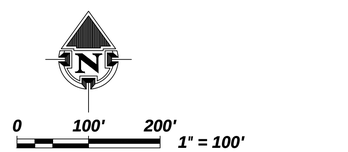
4950

4930'

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- PROPOSED SLOPE PROTECTION
- DIVERSION DITCH

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"

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Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
CONSTRUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-4
SURVEY DATE:	5/4/21	DATE:	7/2/21
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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014

S13 T2N R68W

WELD COUNTY

S18 T2N R67W

TOWN OF FIRESTONE

PINE CONE AVE. (WCR 20)

EXISTING BIKE PATH

EXISTING ROAD

30' WIDE SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3589233 & 3593372) DATE: 11/12/08 & 12/5/08

50' WIDE PIPELINE EASEMENT (RECEPTION NO. 1655323) DATE: 3/4/75

PROPOSED CULVERT

SEE ACCESS ROAD DETAIL

PINE CONE AVE. (WCR 20) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

PROPOSED ACCESS ROAD (26 FT.)

CL OF PIPELINE ROW (RECEPTION NO. 2843044) DATE: 4/25/01

APPROXIMATE LOCATION OF 30' WIDE PIPELINE ROW EASEMENT (RECEPTION NO. 2857509 & 2323862) DATE:6/14/01 & 3/3/93

EXISTING WETLANDS

COLORADO BLVD. (WCR 13) 60' EXISTING ROW MAINTAINED BY WELD COUNTY BOOK 86, PAGE 273 DATE : 10/14/1889

COLORADO BLVD. (WCR 13)

STORMWATER STORAGE BERM

COGCC 2A DISTURBANCE BOUNDARY (25.63 ACRES)

SEE BLACK STEEL FENCE, IMPASSE BY AMERISTAR DETAIL ON FDP-7

OUTLET PIPE

WEIR & SPILLWAY

PROPOSED CULVERT

PROPOSED MCGAVIN 6-19HZ WELL PAD

MCGAVIN 18-1HZ
MCGAVIN 18-2HZ
MCGAVIN 18-3HZ
MCGAVIN 18-4HZ
MCGAVIN 18-5HZ
MCGAVIN 18-6HZ
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MCGAVIN 18-21HZ
MCGAVIN 18-22HZ
MCGAVIN 18-23HZ
MCGAVIN 18-24HZ
MCGAVIN 18-25HZ
MCGAVIN 18-26HZ

OFF-SITE FLOW DEFLECTION

STORMWATER STORAGE BERM

50'

50' FLOWLINE CORRIDOR

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNW COGCC LOCATION NUMBER: 320821

EXISTING WELL: ROCKY MOUNTAIN FUEL 19-4N (SU) API: 05-123-24478, TOTAL MEASURED DEPTH: 9249'

SEE BLACK STEEL FENCE IMPASSE BY AMERISTAR DETAIL ON FDP-7

SEEDED TOPSOIL STOCKPILE FOR FINAL REC

SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6

SEE VISUAL MITIGATION BERM CROSS SECTION ON FDP-7

WEIR & SPILLWAY

OUTLET PIPE

PROPOSED MCGAVIN 6-19HZ FACILITY PAD

EXISTING WALKING/BIKE PATH

S24 T2N R68W

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000074) ZONING: FREDERICK

OWNER: TOWN OF FREDERICK (WELD COUNTY PARCEL I.D. 131324000075) ZONING: FREDERICK

TOWN OF FREDERICK

TOWN OF FIRESTONE

TOWN OF FREDERICK

OWNER: E & J ROCKY MOUNTAIN PROPERTIES LLC (WELD COUNTY PARCEL I.D. 131119209001) ZONING: FREDERICK

ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW COGCC LOCATION NUMBER: 406529

100-YEAR FLOODPLAIN

EXISTING ROCKY MOUNTAIN FUEL CO D-62N67W 19SWNW FACILITY PAD

SEE MASONRY WALL DETAIL ON FDP-7

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA), API: 05-123-08667, TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

16.5' WIDE UTILITY EASEMENT (RECEPTION NO. 2857509) DATE: 6/14/01

VARYING WIDTH SANITARY SEWER LINE EASEMENT (RECEPTION NO. 3586220) DATE: 10/27/08

OWNER: ANADARKO E&P ONSHORE LLC (WELD COUNTY PARCEL I.D. 131119200045) ZONING: FIRESTONE

ROCKY MOUNTAIN FUEL CO D-62N67W 19NENW COGCC LOCATION NUMBER: 406528

ROCKY MOUNTAIN FUEL CO D-62N67W 19NWNE COGCC LOCATION NUMBER: 407234

COAL MINE BOUNDARY

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA), API: 05-123-08666 TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 12, (PA), API: 05-123-10318 TOTAL MEASURED DEPTH: 5094'

EXISTING ROAD

35' WIDE PUBLIC TRAIL (RECEPTION NO. 3299167) DATE: 6/30/05

S19 T2N R67W

OWNER: SADDLEBACK GOLF CLUB LLC (WELD COUNTY PARCEL I.D. 131119000005) ZONING: FIRESTONE

VARYING WIDTH DRAINAGE EASEMENT (RECEPTION NO. 3106304 & 3316421) DATE: 9/15/03 & 8/24/05

4910'

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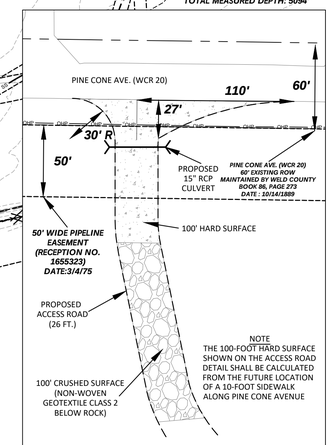
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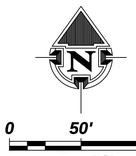
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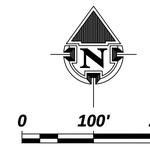
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4950

ACCESS ROAD DETAIL







LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- EXISTING OVERHEAD POWERLINE
- COUNTY ROAD ROW
- EXISTING DITCH / STREAM
- TOWN LIMITS
- EXISTING WATER BODY
- ROAD PROPOSED
- PROPERTY LINE
- ROAD PRIMITIVE
- EXISTING PIPELINE
- EXISTING FENCE
- EXISTING ROW/EASEMENT
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- PROPOSED PERMANENT SEEDING
- MASONRY WALL
- DIVERSION DITCH

GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***
- ***SEE PRODUCTION FACILITY EQUIPMENT DETAIL ON FDP-6***

609 CONSULTING, LLC

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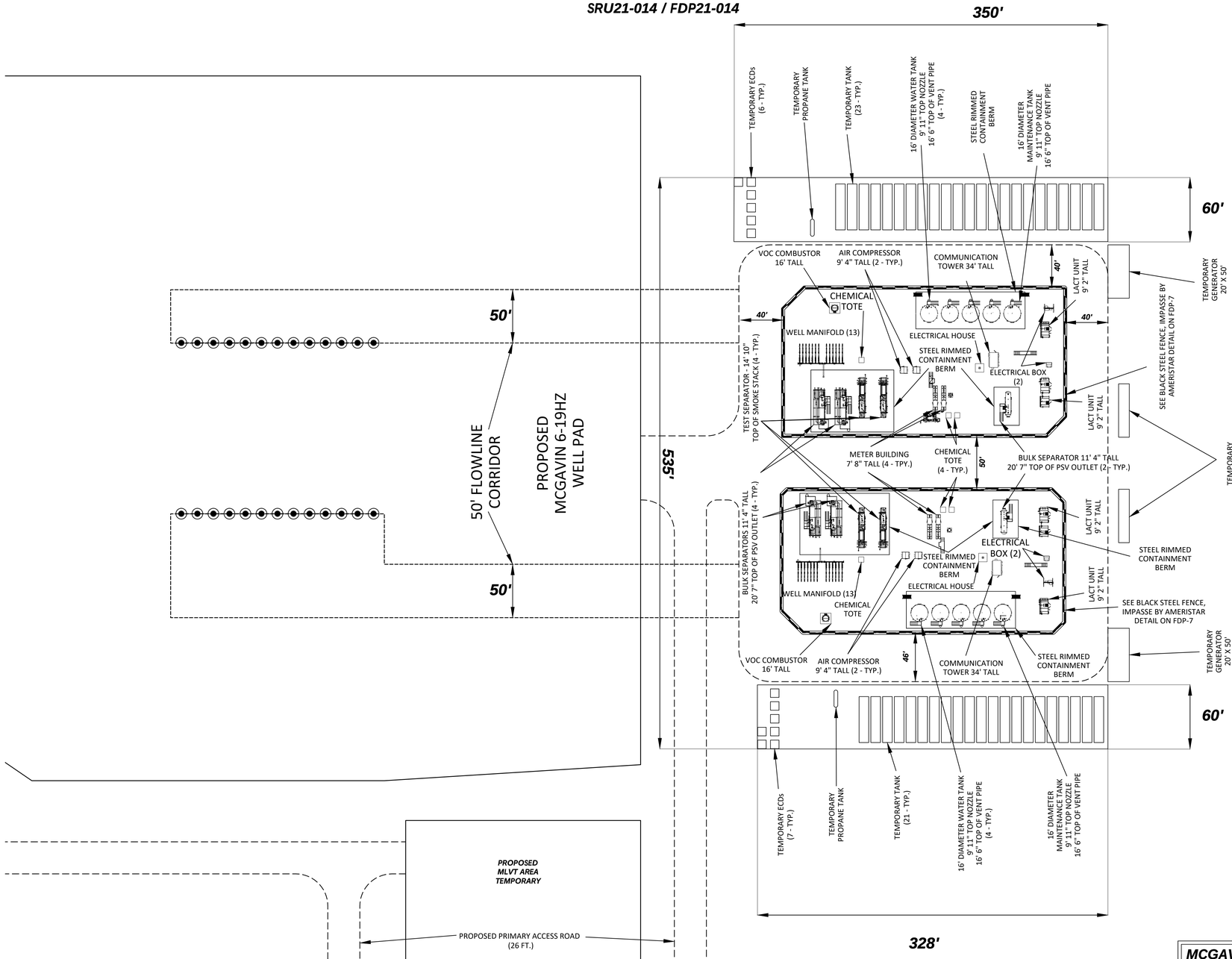
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
PRODUCTION PHASE DRAWING
SRU21-014 / FDP21-014

SCALE:	1" = 100'	SHEET:	FDP-5
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

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MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
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GENERAL NOTES:

- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

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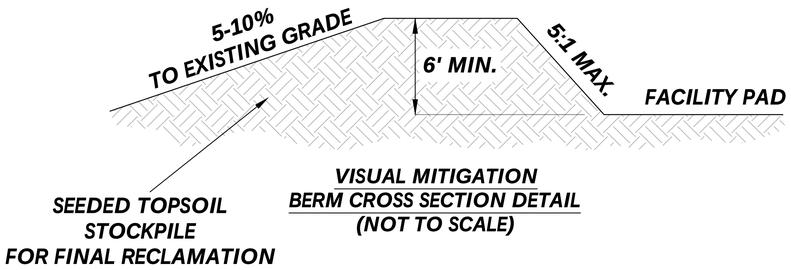
Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
FACILITY DRAWING
SRU21-014 / FDP21-014

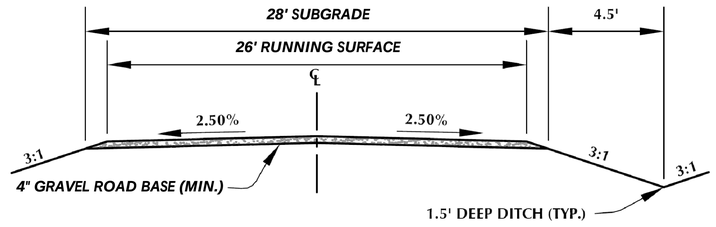
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SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

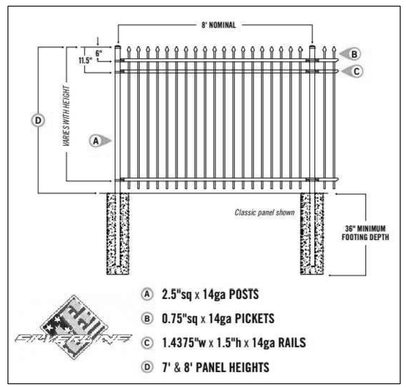
Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



VISUAL MITIGATION BERM CROSS SECTION DETAIL (NOT TO SCALE)



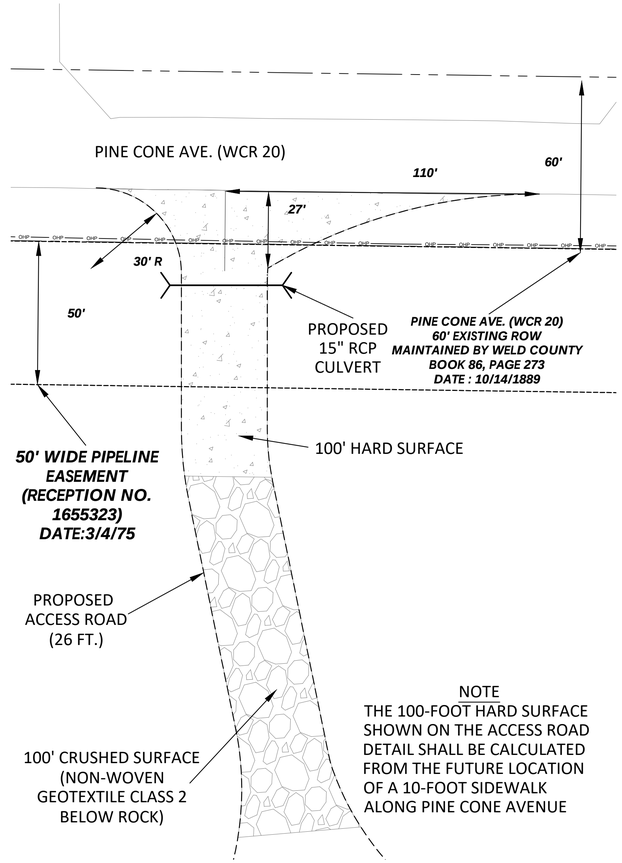
CROSS SECTION OF TYPICAL ACCESS DRIVE DETAIL (NOT TO SCALE)



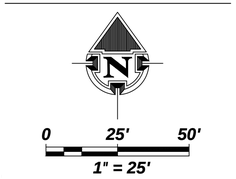
TYPICAL FENCE - BLACK STEEL FENCE, IMPASSE BY AMERISTAR OR EQUIVALENT DETAIL (NOT TO SCALE)



TYPICAL MASONRY WALL (NOT TO SCALE)



ACCESS ROAD DETAIL



GENERAL DESIGN NOTES:

1. DESIGN SPEED UTILIZED FOR THE MCGAVIN 6-19HZ ACCESS ROAD CONTAINED WITHIN THE PLANS IS 25 MPH, UNLESS OTHERWISE SPECIFIED.
2. PRIOR TO ANY CONSTRUCTION OR EARTHWORK, CONTRACTOR WILL BE RESPONSIBLE TO CALL FOR LOCATES (811 OR 1-800-922-1987).
3. MINIMUM COVER FOR CORRUGATED METAL PIPE CULVERTS IS 12 INCHES OR HALF THE DIAMETER OF THE CULVERT, WHICHEVER IS GREATER.
4. TOPSOIL WILL BE STRIPPED AND PLACED AT EDGES OF DISTURBANCE AND THEN SPREAD EVENLY FROM THE DISTURBANCE BOUNDARY TO THE EDGE OF FINISHED ROADBEDS ON GRAVEL SURFACED ROADS.
5. AFTER TOPSOIL IS SPREAD, TOPSOIL WILL BE RESEEDED WITH AN APPROVED SEED MIXTURE.
6. FILL MATERIAL IN ROAD EMBANKMENTS SHALL BE PLACED IN 6 TO 12 INCH LIFTS AND COMPACTED USING MOBILE EQUIPMENT. FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. IT IS RECOMMENDED THAT THE FILL MATERIAL BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7. ROADWAYS WILL BE COVERED WITH A MINIMUM OF 4 INCHES OF GRAVEL ROAD BASE.
8. ACCESS ROADS SHALL MEET THE REQUIREMENTS IN SECTION 503.2 AND APPENDIX D OF THE 2018 IFC.
9. ACCESS ROADS SHALL BE CONSTRUCTED WITH AN ALL-WEATHER SURFACE THAT CAN SUPPORT AN 80,000-POUND FIRE APPARATUS. MAXIMUM GRADE OF ROADWAY SHALL NOT EXCEED 10%. THE ANGLE OF APPROACH AND DEPARTURE FOR ANY ROADWAY SHALL NOT EXCEED 8 DEGREES.
10. ALL CONSTRUCTION PER APPROVED DRAWINGS, WHERE APPLICABLE.

GENERAL NOTES:
- ***ORIGINAL DOCUMENT SIZE: 24" x 36"***

609 CONSULTING, LLC
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Phone 307-674-0609

Kerr-McGee Oil & Gas Onshore L.P.
1099 18th Street
Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
VISUAL MITIGATION & ACCESS PLAN
SRU21-014 / FDP21-014

SCALE:	VARIOUS	SHEET:	FDP-7
SURVEY DATE:	5/4/21	DATE:	7/2/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\16_105_MCGAVIN_T2N_R67W_SEC_19\GWG\FINAL DEVELOPMENT PLAN\MCGAVIN_19-19HZ_FDP.dwg, 12/13/2021 10:03:42 AM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY

NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.

TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO

SRU21-014 / FDP21-014

NW. COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
P.L.S. NO. 24305

N. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2" ALUM. CAP
L.S. NO. 23500

N 89°12'17" W 2387.65'
(N. LINE OF THE NW1/4 OF SECTION 19)

N 89°09'45" W 927.97'
N 89°09'45" W 282.70'
N 83°43'12" W 316.62'

60' PINE CONE AVE. (WCR 20)

PINE CONE AVE. (WCR 20)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

SEE ACCESS ROAD DETAIL

N 83°09'44" W 279.51'
N 83°30'43" W 243.86'

50' WIDE PIPELINE EASEMENT
(RECEPTION NO. 1655323)
DATE: 3/4/75
GRID TIE TO CENTERLINE

CL OF PIPELINE ROW
(RECEPTION NO. 2843044)
DATE: 4/25/01

50'
30'

30' WIDE SANITARY SEWER
LINE EASEMENT
(RECEPTION NO. 3589233 &
3593372)
DATE: 11/12/08 & 12/5/08

N 71°43'21" W 1157.86'

APPROXIMATE LOCATION
OF 30' WIDE PIPELINE
ROW EASEMENT
(RECEPTION NO. 2857509
& 2323862)
DATE: 6/14/01 & 3/3/93

SEE GRID TIE
DETAIL ON FDP-9

S 63°17'59" E 1160.00'

N 26°42'01" E 479.00'

S 63°17'59" E 240.00'

N 26°42'01" E 179.26'

N 63°17'59" W 384.57'

N 26°42'01" E 437.37'

PROPOSED
MCGAVIN 6-19HZ
WELL PAD

PROPOSED
MCGAVIN 6-19HZ
FACILITY PAD

EXISTING WELL:
ROCKY MOUNTAIN FUEL 19-4H,
(SI), API: 05-123-16476,
TOTAL MEASURED DEPTH: 8248'

N 63°17'59" W 128.00'

N 0°03'41" W 2648.85'
(W. LINE OF THE NW1/4 OF SECTION 19)

COLORADO BLVD. (WCR 13)

35' WIDE PUBLIC TRAIL
(RECEPTION NO. 3299167)
DATE: 6/30/05
GRID TIE TO CENTERLINE

60'

COLORADO BLVD. (WCR 13)
60' EXISTING ROW
MAINTAINED BY WELD COUNTY
BOOK 86, PAGE 273
DATE : 10/14/1889

S 58°16'24" W 1184.18'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 10, (PA),
API: 05-123-08665,
TOTAL MEASURED DEPTH: 5010'

VARYING WIDTH DRAINAGE
EASEMENT
(RECEPTION NO. 3106304 & 3316421)
DATE: 9/15/03 & 8/24/05

N 35°32'29" E 880.04'
N 34°43'39" E 882.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 8, (PA),
API: 05-123-08666,
TOTAL MEASURED DEPTH: 5026'

EXISTING WELL: ROCKY
MOUNTAIN FUEL CO D 12, (PA),
API: 05-123-10318,
TOTAL MEASURED DEPTH: 5094'

16.5'

16.5' WIDE
UTILITY EASEMENT
(RECEPTION NO. 2857509)
DATE: 6/14/01

VARYING WIDTH SANITARY
SEWER LINE EASEMENT
(RECEPTION NO. 3586220)
DATE: 10/27/08

30'

30' WIDE
PIPELINE EASEMENT
(RECEPTION NO. 2238664)
DATE: 1/17/91
GRID TIE TO CENTERLINE

S 0°03'41" E 2648.85'
(E. LINE OF THE NW1/4 OF SECTION 19)
N 00°59'44" W 2641.42'

S 5°56'20" W 740.00'

S 43°13'14" E 2315.64'

S 44°47'25" W 61.65'

S 35°52'40" W 724.00'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-3 JI,
(PA), API: 05-123-20218,
TOTAL MEASURED DEPTH: 8440'

EXISTING WELL: ROCKY MTN FUEL V 19-5JI, (SI),
API: 05-123-20217,
TOTAL MEASURED DEPTH: 8358'

EXISTING WELL: ROCKY MOUNTAIN FUEL V 19-6JI, (SI),
API: 05-123-19583,
TOTAL MEASURED DEPTH: 8100'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 13,
(PA), API: 05-123-10317,
TOTAL MEASURED DEPTH: 5076'

S 53°17'52" E 1050.43'
S 54°59'08" E 1048.17'
S 60°56'59" E 1011.11'
S 65°38'39" E 907.33'

EXISTING WELL: ROCKY MOUNTAIN FUEL CO D 5, (PA),
API: 05-123-08531,
TOTAL MEASURED DEPTH: 8095'

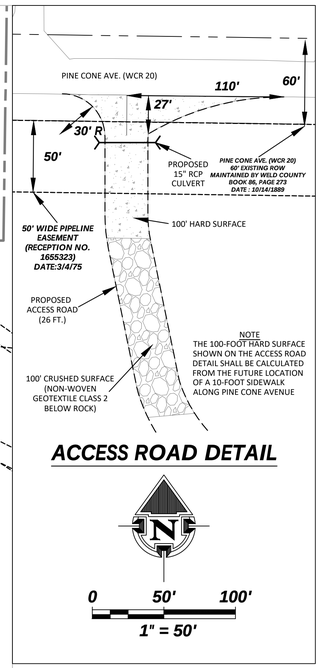
S 68°37'02" W 1175.60'

W. 1/4 COR.
SEC. 19, T2N, R67W
FOUND 3 1/4" ALUM. CAP
L.S. NO. 37946

(S. LINE OF THE NW1/4 OF SECTION 19)
N 89°24'12" W 2430.61'

CENTER 1/4 COR.
SEC. 19, T2N, R67W
FOUND 2 1/2" ALUM. CAP
WITNESS CORNER
112' NORTH OF TRUE CORNER POSITION
P.L.S. NO. 38512

0 150' 300'
1" = 150'



ACCESS ROAD DETAIL

LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- SECTION CORNER
- EXISTING ROW/EASEMENT
- ROAD PROPOSED
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR
- COUNTY ROAD ROW

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
- GRID TIES TO EXISTING EASEMENTS AND RIGHTS-OF-WAY ARE BASED UPON INFORMATION FOUND WITHIN THE RECORDED DOCUMENTS LABELED AND DISPLAYED ON THE MAP BY RECEPTION NUMBER. BEARINGS AND DISTANCES MAY VARY SLIGHTLY FROM RECORDED DOCUMENTS BASED ON CURRENT SURVEYS. OFFICIAL DEEDS AND RECORDED DOCUMENTS SHOULD BE REFERENCED FOR THE EXACT LOCATION OF EXISTING EASEMENTS AND RIGHTS-OF-WAY.

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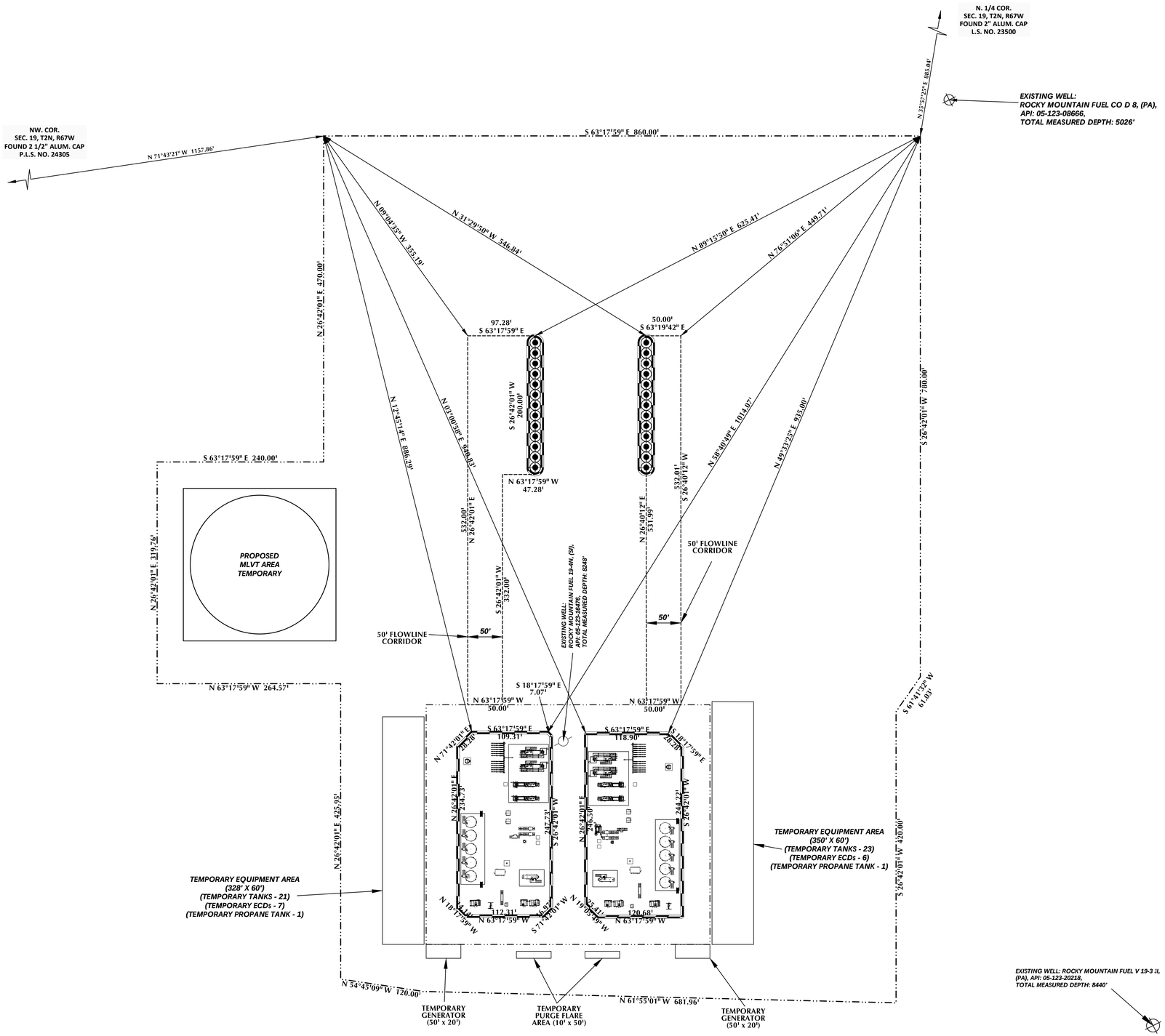
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE
SRU21-014 / FDP21-014

SCALE:	1" = 150'	SHEET:	FDP-8
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/14/2021 1:25:46 PM, casey

MCGAVIN 6-19HZ FINAL DEVELOPMENT PLAN

Kerr-McGee Oil & Gas Onshore LP
MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
NW1/4 OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 67 WEST OF THE 6TH P.M.
TOWN OF FIRESTONE, WELD COUNTY, STATE OF COLORADO
SRU21-014 / FDP21-014



LEGEND

- COGCC 2A DISTURBANCE BOUNDARY
- PROPOSED WELL
- EXISTING WELL (PRODUCING)
- EXISTING WELL (PLUG & ABANDONED)
- EXISTING WELL (SHUT IN)
- EXISTING WELL (DRY AND ABANDONED)
- EXISTING WELL (TEMPORARILY ABANDONED)
- BLACK STEEL FENCE, IMPASSE BY AMERISTAR

GENERAL NOTES:

- ORIGINAL DOCUMENT SIZE: 24" x 36"
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Denver, Colorado 80202

MCGAVIN 6-19HZ WELL PAD AND PRODUCTION FACILITY
GRID TIE DETAIL
SRU21-014 / FDP21-014

SCALE:	1" = 75'	SHEET:	FDP-9
SURVEY DATE:	5/4/21	DATE:	10/18/21
DRAFTED BY:	CDJ	REVISED:	12/10/21

K:\ANADARKO\2016\2016_105_MCGAVIN_T2N_R67W_SEC_19\DWG\FINAL DEVELOPMENT PLAN\MCGAVIN_18-19HZ_FDP.dwg, 12/13/2021 10:11:19 AM, casey

Section 17

Alta Survey

McGavin 6-19HZ Well Pad and Facility

Township 2N, Range 67W: Section 19, NW/4
Firestone, Colorado

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19,

T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO

EXCEPTIONS PER TITLE COMMITMENT,
COMMITMENT NUMBER 515-F0489354-171-MSK AMENDMENT NO. 4:

8. Reservation of all minerals, including but not limited to coal, oil and gas as well as the right of ingress and egress, by the grantor, it's successors in interest and assigns upon and across said lands for the purposes of prospecting for, mining, treating, processing, taking and transporting any and all minerals and for the construction of plants, houses, buildings, offices, dumps, roads, power lines, pipelines, and other structures incidental to such operations as contained in instrument from the Rocky Mountain Fuel Company recorded December 6, 1946 in Book 1193 at Page 66. NOT PLOTTABLE.

9. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

   Granted to: Dennis Sullivan and R.B. Sullivan
   Purpose: Ditch purposes
   Recording Date: March 28, 1908
   Recording No: Book 278 at Page 140. NOT PLOTTABLE.

   NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

10. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: American Telephone and Telegraph Company
    Purpose: Communication facilities and appurtenances
    Recording Date: April 25, 1941
    Recording No: Book 1078 at Page 78. NOT PLOTTABLE.

11. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Andrew Dier and William A. Dier
    Purpose: Pipeline purposes
    Recording Date: May 12, 1958
    Recording No: Book 1502 at Page 484. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

12. An oil and gas lease for the term therein provided with certain covenants, conditions and provisions, together with easements, if any, as set forth therein, and any and all assignments thereof or interests therein.

    Recording Date: March 31, 1970
    Recording No: Reception No. 544576. NOT PLOTTABLE.

13. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Panhandle Eastern Pipe Line Company
    Purpose: Pipeline purposes and appurtenances
    Recording Date: March 4, 1975
    Recording No: Reception No. 1655323. PLOTTED HEREON.

14. Terms, conditions, provisions, agreements and obligations contained in the Surface Damage Agreement as set forth below:

    Recording Date: August 18, 1975
    Recording No.: Reception No. 1667440
    Amendment(s) of said instrument

    Recording Date: April 10, 1981
    Recording No.: Reception No. 1854858. NOT PLOTTABLE

15. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: The Mountain States Telephone and Telegraph Company
    Purpose: Communication facilities and appurtenances
    Recording Date: December 6, 1976
    Recording No: Reception No. 1705164. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

16. Terms, conditions, provisions, agreements and obligations contained in the Surface Damage Agreement as set forth below:

    Recording Date: June 6, 1978
    Recording No.: Reception No. 155703. NOT PLOTTABLE.

17. Order for Inclusion Within the Central Weld County Water District recorded August 27, 1979 as Reception No. 1801424. NOT PLOTTABLE.

18. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Amoco Production Company
    Purpose: Pipeline purposes and appurtenances
    Recording Date: January 17, 1991
    Recording No: Reception No. 2238664. PLOTTED HEREON.

19. Terms, conditions, provisions, agreements and obligations contained in the Line Extension and Cost Recovery Agreement as set forth below:

    Recording Date: October 5, 1998
    Recording No.: Reception No. 2644871. NOT PLOTTABLE.

20. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: United Power, Inc.
    Purpose: Electric facilities and appurtenances
    Recording Date: November 12, 1996
    Recording No: Reception No. 2520129. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

21. All matters located on the Land as set forth on the Land Survey Plat recorded May 7, 1999 as Reception No. 2692422, or to the extent pertaining to the land. PLOTTED HEREON.

22. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: United Power, Inc.
    Purpose: Electric facilities and appurtenances
    Recording Date: June 30, 2000
    Recording No: Reception No. 2777912. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

23. Terms, conditions, provisions, agreements and obligations contained in the Memorandum of Surface Use Agreement as set forth below:

    Recording Date: March 20, 2001
    Recording No.: Reception No. 2833735. NOT PLOTTABLE.

24. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

    Granted to: Duke Energy Field Services, LP
    Purpose: Pipeline purposes and appurtenances
    Recording Date: April 25, 2001
    Recording No: Reception No. 2843044. PLOTTED HEREON.

25. Terms, conditions, provisions, agreements and obligations contained in the Outline Development Plan as set forth below:

    Recording Date: June 15, 2001
    Recording No.: Reception No. 2857773. NOT PLOTTABLE.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

26. All matters located on the Land as set forth on the ALTA/ACSM Land Title Survey dated March 9, 2001, prepared by Albers, Drexel & Pohly, Inc., recorded June 14, 2001 as Reception No. 2857509, or to the extent pertaining to the Land. PLOTTED HEREON.

27. Terms, conditions, provisions, agreements and obligations contained in the Surface Water Drainage Easement Agreement as set forth below:

    Recording Date: September 15, 2003
    Recording No.: Reception No. 3106304. EASEMENT LIES ADJACENT TO PROPERTY. PLOTTED HEREON.

28. Terms, conditions, provisions, agreements and obligations contained in the Golf Course Waiver, Disclaimer and Easement as set forth below:

    Recording Date: September 15, 2003
    Recording No.: Reception No. 3106305. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

29. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Town of Firestone
    Purpose: Public trail purposes and appurtenances
    Recording Date: June 30, 2005
    Recording No: Reception No. 3299167. PLOTTED HEREON.

30. Terms, conditions, provisions, agreements and obligations contained in the Surface Water Drainage Easement Agreement as set forth below:

    Recording Date: August 24, 2005
    Recording No.: Reception No. 3316421. EASEMENT LIES ADJACENT TO PROPERTY. PLOTTED HEREON.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

31. Terms, conditions, provisions, agreements and obligations contained in the Golf Course Waiver, Disclaimer and Easement as set forth below:

    Recording Date: August 24, 2005
    Recording No.: Reception No. 3316422. DOES NOT AFFECT SUBJECT PROPERTY.

    NOTE: DOES NOT AFFECT SUBJECT PROPERTY. SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER

32. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: Weld County Tri-Area Sanitation District
    Purpose: Sanitary sewer line purposes and appurtenances
    Recording Date: October 27, 2008
    Recording No: Reception No. 3586220. PLOTTED HEREON.

33. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein, as granted in a document:

    Granted to: St. Vrain Sanitation District
    Purpose: Sanitary sewer line purposes and appurtenances
    Recording Date: November 12, 2008
    Recording No: Reception No. 3589233; and
    Recording Date: December 5, 2008
    Recording No: Reception No. 3593372. PLOTTED HEREON.

34. Easement(s) for the purpose(s) shown below and rights incidental thereto, together with terms, conditions, provisions, agreements and obligations contained therein , as granted in a document:

    Granted to: Summerfield Holdings, LLC
    Purpose: Temporary construction and roadway purposes
    Recording Date: March 14, 2013
    Recording No: Reception No. 3917081. PLOTTED HEREON.

35. All matters located on the Land as set forth on the ALTA/ACSM Land Title Survey dated February 12, 2013, prepared by Power Surveying Company, Inc., recorded_____, 20_ as Reception No._____, or to the extent pertaining to the Land. NOT PLOTTABLE.

36. INTENTIONALLY DELETED.

37. Terms, conditions, provisions, agreements and obligations contained in the Memorandum of Option Agreement recorded January 3, 2000 as Reception No. 2741821 and Option Agreement recorded June 13, 2000 as Reception No. 2774527; as amended by Amendment to Option Agreement recorded January 31, 2003 as Reception No. 3029223 and as amended by that Amendment to Option Agreement recorded December 3, 2003 as Reception No. 3131950. NOT PLOTTABLE.

    NOTE: SAID EXCEPTION WILL NOT APPEAR ON THE POLICY TO BE ISSUED HEREUNDER UPON RECORDATION OF ITEM j. LISTED HEREIN SCHEDULE B-SECTION 1 (REQUIREMENTS)

38. Right of Way and rights incidental thereto for County Roads 30 feet on either side of Section and Township lines as established by the Board of County Commissioners for Weld County, as set forth in a document:

    Recording Date: October 14, 1889
    Recording No: Book 86, Page 273. PLOTTED HEREON.

39. The following Notices concerning underground facilities have been filed with the Weld County Clerk and Recorder. These statements are general and do not necessarily give notice of underground facilities within the Land:

    Mountain Bell Telephone Company, recorded October I, 1981, in Book 949 at Reception No. 1870705. NOT PLOTTABLE.

    Union Rural Electric Association, Inc., recorded October 5, 1981, in Book 949, at Reception No. 1871004. NOT PLOTTABLE.

    Public Service Company of Colorado, recorded November 9, 1981, in Book 952 at Reception No. 1874084. NOT PLOTTABLE.

    Colorado Interstate Gas Company, recorded August 31, 1984, in Book 1041 at Reception No. 1979784. NOT PLOTTABLE.

    Western Gas Supply Company, recorded April 2, 1985, in Book 1063 at Reception No. 2004300. NOT PLOTTABLE.

    Associated Natural Gas, Inc., recorded April 23, 1986, in Book 1110 at Reception No. 2050953. NOT PLOTTABLE.

    Panhandle Eastern Pipe Line Company, recorded June 26, 1986, in Book 1117 at Reception No. 2058722. NOT PLOTTABLE.

    Associated Natural Gas, Inc., recorded April 10, 1989, in Book 1229 at Reception No. 2175917. NOT PLOTTABLE.

    United Power, Inc., formerly Union Rural Electric Association, Inc., recorded January 24, 1991, in Book 1288 at Reception No. 2239296. NOT PLOTTABLE.

DESCRIPTION PER TITLE REPORT

A tract of land located in the N1/2 of Section 19, T2N, R67W of the 6th P.M., Town of Firestone, County of Weld, State of Colorado, described as follows:

Beginning at the N1/4 Corner of said Section 19, from which the Northwest Corner of said Section 19 bears S89°59'35"W, 2387.90 feet (Basis of Bearing); thence S89°59'35"W, 2208.09 feet along the North Line of the NW1/4 of said Section 19 to the Easterly Right-of-Way Line of the Former Union Pacific Railroad conveyed to the Union Pacific Railroad Company as described in Warranty Deed recorded June 13, 1910, in Book 320 at Page 187 of the records of Weld County, Colorado;

Thence S00°52'37"E, 1207.59 feet along the Easterly Right-of-Way Line of said Former Union Pacific Railroad to a point from which the Northwest Corner of that tract of land conveyed to The Weld County Tri-Area Sanitation District as described in Court Decree recorded May 31, 1968, in Book 595 as Reception No. 1517031 of the records of Weld County, Colorado, Bears S00°52'37"E, 583.37 feet along the Easterly Right-of-Way Line of said Former Union Pacific Railroad , said point also being an angle point of parcel A of Saddleback Golf Course conveyed to Coal Ridge Management, Inc. as described in Bargain and Sale Deed recorded December 13, 2000, as Reception No. 2813046 of the records of Weld County, Colorado;

The following courses and distances are along the Northerly Line of said Parcel A of Saddleback Golf Course:
Thence S55°09'54"E, 197.36 feet;

Thence S00°00'00"E, 80.00 feet;

Thence S55°09' 54"E, 304.22 feet;

Thence S38°52'55"E, 467.85 feet;

Thence S61°32'37"E, 523.03 feet;

Thence N31°50'07"E, 967.17 feet to the most Southerly Corner of Parcel C of Saddleback Golf Course described at said Reception No. 2813046;

The following courses and distances are along the Westerly Line of said Parcel C of Saddleback Golf Course;
Thence N29°13'07"E, 143.45 feet;

Thence N12°17'39"E, 107.46 feet;

Thence N36°03'32"E, 33.42 feet;

Thence N54°06'01 "E, 105.25 feet to an angle point of said Parcel A of Saddleback Golf Course, and being the most Westerly Corner of Parcel D of Saddleback Golf Course as described at said Reception No. 2813046;

The following courses and distances are along the Northerly line of said Parcel D of Saddleback Golf Course;
Thence N54°06'01 "E, 75.01 feet;

Thence N80°33'53" E, 314.32 feet to the Northerly Line of said Parcel A of Saddleback Golf Course;

The following courses and distances are along the Northerly Line of said Parcel A of Saddleback Golf Course;
Thence N75°33'24"E, 209.97 feet;

Thence N64°35'44"E, 227.29 feet;

Thence S84°37'34"E, 653.85 feet;

Thence leaving the Northerly Line of said Parcel A of Saddleback Golf Course, N00°00'00"W, 212.37 feet; Thence N89°09'11 "E, 100.01 feet; Thence N00°00'00"W, 648.43 feet to a Point on the North Line of the NE1/4 Corner of said Section 19;

Thence N89°58'18"W, 1214.05 feet along the North Line of the NE1/4 of said Section 19 to the N1/4 Corner of said Section 19 and the Point of Beginning.

DESCRIPTION PER SURVEY

A portion of the North One-half (N1/2) of Section 19, T2N, R67W of the 6th P.M., Town of Firestone, County of Weld, State of Colorado, described as follows:

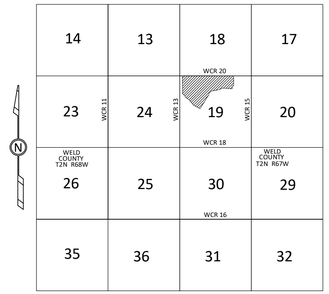
Beginning at the North One-quarter (N1/4) Corner of said Section 19, being marked by a 2" aluminum cap, L.S. No. 23500 and proceeding along the North line of the Northeast One-quarter (NE1/4) of said Section 19, S89°09'44"E, 1214.26 feet;

Thence departing said North line, S00°48'30"W, 648.70 feet;
Thence N89°53'59"W, 99.72 feet;
Thence S00°57'56"W, 212.27 feet to a point on the northerly boundary of Saddleback Golf Club LLC.;
Thence along said northerly boundary the following 15 courses:

N83°49'58"W, 653.60 feet;
S65°24'04"W, 227.35 feet;
S76°22'12"W, 209.87 feet;
S81°22'36"W, 314.32 feet;
S54°57'34"W, 75.00 feet;
S54°55'49"W, 105.31 feet;
S36°58'54"W, 33.38 feet;
S13°06'45"W, 107.46 feet;
S29°58'20"W, 143.59 feet;
S32°38'41"W, 967.17 feet;
N60°43'52"W, 522.95 feet;
N38°04'14"W, 467.95 feet;
N54°21'53"W, 304.17 feet;
N00°40'52"E, 80.16 feet;
N54°20'19"W, 197.24 feet;

Thence departing said north line, N00°05'32"W, 1207.35 feet to a point on the North line of the Northwest One-quarter (NW1/4) of said Section 19;
Thence along the North line of said Northwest One-quarter, S89°12'17"E, 2208.49 feet to the Point of Beginning.

Said parcel contains 103.89 acres (4,525,304 square feet).



LOCATION MAP

Notes:

1. Easements and exceptions shown hereon are based on Fidelity National Title Company, Commitment Number: 515-F0489354-171-MSK, Amendment No. 4, with an effective date of September 1, 2015, at 7:00 a.m. and Fidelity National Title Insurance Company Endorsement with an effective date of June 8, 2021.
2. Bearings are based on the North line of the Northwest 1/4 as being S89°12'17"E. Monumented as shown.
3. Basis of bearing derived from Colorado Coordinate System NAD83, North Zone.
4. This parcel contains 4,525,304 square feet or 103.89 acres, more or less.
5. Utilities shown hereon are those which were visible on the surface of the ground and were located with paint and flags at the date of the survey.
6. Oil and gas well names and data taken from COGCC website.
7. Distances are U.S. Survey Foot.
8. Address: Vacant Land, Firestone, CO 80504.
9. Adjoiner property owner information taken from Weld County, Colorado GIS map server.
10. According to Colorado state law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date on the certification shown hereon.
11. There are no buildings on the property.

Surveyor's Certificate

To: Town of Firestone.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 3, 4, 7(a), 8, and 11 of Table A thereof. The field work was completed on June 29, 2021.

COLORADO LICENSED
RANDALL K. FRENCH
38512
PROFESSIONAL LAND SURVEYOR
10/18/2021

Randall K. French

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

ALTA/NSPS LAND TITLE SURVEY
A PORTION OF THE NORTH 1/2
OF SECTION 19, T2N, R67W, 6TH P.M.,
TOWN OF FIRESTONE, WELD COUNTY, COLORADO

REVISIONS:
10/18/21 - ADD WELL INFORMATION

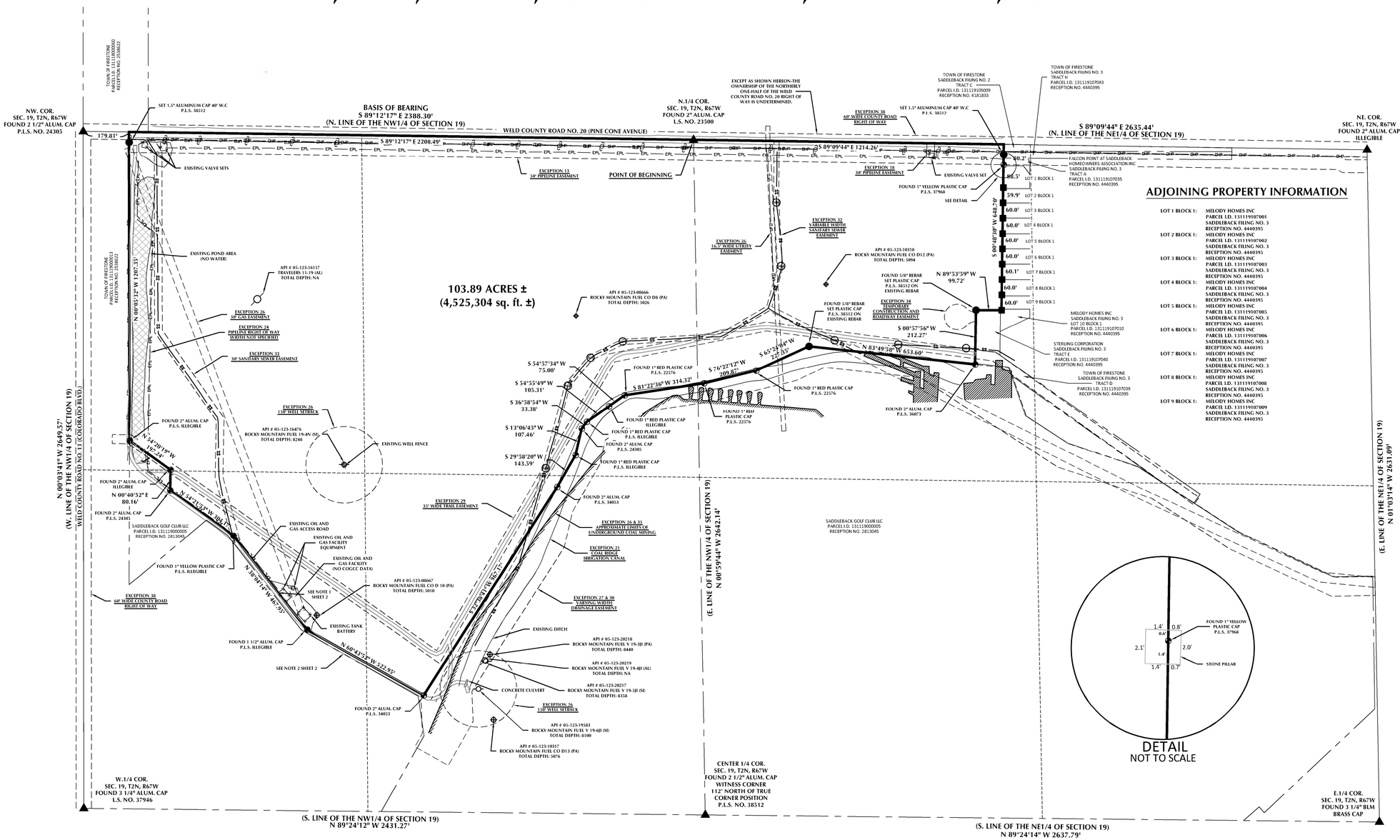
609 CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY: RZP
CHECKED BY: RKF
DATE: 6/29/2021
JOB: 16-105
SHEET NO: 1 OF 2

K:\ANDADRO\2016\2016_105_NGSAVIN_T2N_R67W_SEC_19\DWG\ALTA\NGSAVIN_ALTA.dwg, 10/19/2021 10:52:19 AM, samuel

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19, T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO



LEGEND:

- SECTION LINE
- QUARTER SECTION LINE
- SIXTEENTH SECTION LINE
- PROPERTY LINE
- EDGE OF DIRT ROAD
- EXISTING PIPELINE
- EXISTING EASEMENT
- FENCE
- UNDERGROUND FIBER OPTIC LINE
- OVERHEAD POWER LINE
- EXISTING PIPELINE
- POWER POLE
- ABANDONED OIL/GAS WELL LOCATION (AL)
- SHUT IN OIL/GAS WELL (SI)
- PLUGGED & ABANDONED OIL/GAS WELL (PA)
- MANHOLE
- FOUND SECTION CORNER MONUMENT AS INDICATED
- GRAVEL/DIRT
- POND AREA
- FOUND PROPERTY CORNER AS NOTED
- SET 5/8" REBAR WITH PINK PLASTIC CAP, P.L.S. NO. 38512
- FOUND 1" RED PLASTIC CAP P.L.S. 29040 ON PROPERTY LINE

Notes:

1. FENCE CORNER IS ± 0.16' NORTHEASTERLY OF PROPERTY LINE
2. GOLF CART PATH MEANDERS ACROSS PROPERTY LINE AT MULTIPLE LOCATIONS.

COLORADO LICENSED RANDALL K. FRENCH 38512 10/18/2021 PROFESSIONAL LAND SURVEYOR

RANDALL K. FRENCH
PROFESSIONAL LAND SURVEYOR
COLORADO REGISTRATION NUMBER 38512
rfrench@609consulting.com

SCALE: 1" = 200'

REVISIONS:
10/18/21 - ADD WELL INFORMATION

ALTA/NSPS LAND TITLE SURVEY

A PORTION OF THE NORTH 1/2 OF SECTION 19, T2N, R67W, 6TH P.M., TOWN OF FIRESTONE, WELD COUNTY, COLORADO

CONSULTING, LLC
1095 Saberton Avenue
Sheridan, Wyoming 82801
Phone 307-674-0609
Fax 307-674-0182

DRAWN BY: RZP
CHECKED BY: RKF
DATE: 6/29/2021
JOB: 16-105
SHEET NO. 2 OF 2

K:\ANDARKO\2016\2016_105_NCOG\VIN_T2N_R67W_SEC_19\DWG\ALTA\NCGAVIN_ALTA.dwg, 10/19/2021 10:51:33 AM, samuel

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COOPERATIVE DEVELOPMENT PLAN AGREEMENT

This Cooperative Development Plan Agreement ("Agreement") is made and entered into this 14th day of April, 2021 (the "Effective Date"), by and between the Town of Firestone, a Colorado municipal corporation ("Firestone" or "Town"), whose address is 151 Grant Ave, P.O. Box 100, Firestone, Colorado 80520, Kerr-McGee Oil & Gas Onshore LP ("Kerr-McGee"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202, and Anadarko E&P Onshore LLC, a Delaware limited liability company ("AEP"), whose address is 1099 18th St., Suite 1800, Denver, Colorado 80202. Kerr-McGee, AEP, and Firestone or Town may be referred to individually as a "Party" or collectively as the "Parties."

BACKGROUND

Firestone and Kerr-McGee recognize the importance of the public health, safety and welfare, as well as the environment and wildlife resources to Colorado's economy and culture, including the citizens of Firestone. The Parties also recognize that responsible and orderly development of oil and gas resources in the Town must be consistent with and subject to Firestone's land use authority and general police powers to protect the health, safety, and welfare of the Town's residents, including the protection of the environment and wildlife resources, to prevent waste in the production and utilization of oil and gas, and to avoid or minimize any adverse impacts to public health, safety and welfare and the environment associated with oil and gas development. To achieve such mutual objectives in a cooperative manner, Firestone and Kerr-McGee enter into this Agreement to accomplish the following:

1. To site new well pads and associated facilities and rights-of-way that Kerr-McGee plans to develop within Firestone at locations that will protect public health, safety, and welfare and the environment by avoiding impacts associated with oil and gas operations and minimizing and mitigating the extent and severity of those impacts that cannot be avoided, consistent with Firestone's land use authority and general police powers;

2. To further minimize and mitigate the unavoidable impacts and other land use effects associated with this type of development, by developing oil and gas operational standards needed for responsible development, including requirements for odor mitigation, noise mitigation, lighting installation, road maintenance, and landscape restoration that supplement state environmental requirements in an efficient and cost-effective manner, all to benefit the Town and its residents; and

NOW THEREFORE, the Parties agree as follows:

ARTICLE I. GENERAL PROVISIONS

1. Intent to Supplement State Rules and Regulations. The Parties recognize that pursuant to the Colorado Oil and Gas Conservation Act, Colo. Rev. Stat. § 34-60-101 et seq., as amended, the Colorado Oil and Gas Conservation Commission ("COGCC") regulates the development and

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production of oil and gas resources in Colorado, and the Act authorizes the COGCC to adopt statewide rules and regulations, which the COGCC has done. The Operational Standards developed jointly by the Parties and identified in this Agreement are not intended to abrogate, repeal or impair any state rules and regulations, but instead are intended to supplement any existing or future state rules and regulations. The Parties acknowledge that the Operational Standards set forth herein are subject to future rulemaking by the COGCC; thus, in the event of a conflict or overlap between any Operational Standards set forth herein and any existing or future rule or regulation promulgated by the COGCC, whichever standard, rule, or regulation imposes the more stringent restriction shall prevail, and Kerr-McGee shall abide by the more stringent restriction.

2. **Exercise of Local Land Use Authority**. The Parties further recognize that Firestone, through its land-use authority and general police powers, can regulate various aspects of oil and gas operations in a reasonable manner as specified in C.R.S. § 29-20-104(1)(h)(I)-(IV) and to protect and minimize adverse impacts to public health, safety and welfare and the environment. Furthermore, the Parties recognize that to implement the powers and authority granted in C.R.S. § 29-20-104(1)(h), Firestone has the authority to inspect facilities, impose fines for leaks, spills and emissions, and impose fees to cover the costs of permitting and regulating oil and gas operations within its boundaries, in accordance with C.R.S. § 29-20-104(2). Provided, however, the Town will comply with any and all written or oral safety requirements when entering Kerr-McGee facilities, including, but not limited to, complying with the use of personal protective equipment and complying with necessary distance restrictions. Finally, the Parties also recognize that Kerr-McGee must apply for, and obtain approval from, Firestone for siting oil and gas surface locations before it can obtain approval for, an Application for Permit to Drill or Spacing Unit Applications, as set forth in C.R.S. § 34-60-106(f)(I)(A).

3. **Applicability.** This Agreement and the Operational Standards will apply to all new wells that Kerr-McGee drills on the Identified Well Pads during the Term of this Agreement. This Agreement will not apply to any wells for which Kerr-McGee is not the operator.

4. **Term.** This Agreement shall commence on the Effective Date, and shall expire four (4) years from the Effective Date ("Term"). The Term may be extended by mutual written agreement of the Parties.

5. **Effect of Termination on Special Use Permit Approval.** Termination of this Agreement by either Party shall in no way affect or limit either Parties' legal or equitable remedies it may have under the Code (defined below) or at law or in equity. In the event this Agreement expires or is otherwise terminated, such expiration or termination shall not prevent any operations and/or development of the Identified Well Pads and well(s) that were previously permitted or otherwise approved by the Town prior to the expiration or termination of this Agreement, nor shall expiration or termination of this Agreement exempt such operations and/or development of the Identified Well Pads, new wells drilled at the Identified Well Pads during the Term of this Agreement, or previously approved wells from any applicable Town development review regulations and processes. Additionally, such expiration or termination shall in no way affect or limit the Town's right in the future to refuse to grant a special use permit, or suspend any special use permit for oil and gas wells requested by or granted to Kerr-McGee pursuant to the Code. Nothing in this Agreement shall be construed as granting or creating any statutory vested development rights at the Identified Well Pads.

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6. **Drilling and Development Schedule.** In consultation with Firestone, Kerr-McGee has developed a Drilling and Development Schedule that includes: McGavin and Columbine well pad sites (the "Identified Well Pads"); and (ii) the operational standards that will apply to such development. The operational standards are listed in Exhibit A ("Operational Standards"), and the Identified Well Pads are depicted in the Cooperative Development Area and Land Contribution Map attached as Exhibit B. Kerr-McGee will not drill more than thirty-three (33) wells total from the two identified well pad sites collectively.

ARTICLE II. APPROVAL PROCESS, OPERATIONS, AND CONSIDERATION

1. **Special Review Use and Final Development Plan Submission Requirements.** For each new oil and gas well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will follow the requirements, procedures, and application elements outlined in Section 7.11, Special Review Use and Section 7.10, Final Development Plan of the Firestone Development Code (the "Code"), as amended, for special review use and final development plan approvals. The Town's Board of Trustees will review the applications using the criteria outlined in Section 7.11 and Section 7.10 of the Code, as amended. If Section 7.11 and Section 7.10 of the Code are amended and any such ordinance amending Section 7.11 and Section 7.10 of the Code is legally pending on the date of a special review use and final development plan application submissions, Kerr-McGee will comply with the amended requirements and procedures for its operations established in such ordinance. The Town recognizes that time is of the essence with respect to approval of special review use and final development plans, and will use its best efforts to process Kerr-McGee's applications submitted pursuant to this Article II, Section 1 in a prompt and timely manner. To that end, the Town agrees that staff review of the applications will take no longer than ninety (90) calendar days after the Town determines the application is complete.

2. **Incorporation of Operational Standards as Conditions of Special Review Use and Final Development Plan.** Each application for special review use and final development plan approval for an oil and gas well that Kerr-McGee submits shall include, as part of the application elements required under the Code, the Operational Standards set forth on Exhibit A, and each special review use and final development plan granted by the Town shall contain the Operational Standards as conditions of operations for such special review use and final development plan.

3. **Kerr-McGee's Operations.** For each new well Kerr-McGee drills on the Identified Well Pads, Kerr-McGee will operate such well in compliance with the Operational Standards as set forth in Exhibit A, the Code, as amended, and any other conditions or requirements of the special review use and final development plan approvals issued by the Town for such well.

4. **Kerr-McGee's Contributions.** To minimize and mitigate potential impacts from the Identified Well Pads and associated wells, and to otherwise foster future development opportunities for the Town, AEP, on behalf of Kerr-McGee, shall make contributions to the Town as follows:

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a. Land Contribution.

(i) Within sixty days of Kerr-McGee receiving all necessary local and state permits, approvals, and all necessary easements, Anadarko E&P Onshore LLC ("AEP or Grantor") shall convey to the Town by special warranty deed good, marketable, title (the "Interest"), but specifically reserving and excluding any mineral interest, to approximately seventy-eight (78) acres of real property generally located at the southwest corner of Grant Avenue and Frontier Street and west of the Columbine well pad site ("Grant and Frontier Parcel"), as depicted on Exhibit B (. The Parties agree that the Town may obtain title insurance for the Interest at its own cost, expense, and risk.

The Interest. The Interest includes all of AEP's rights, title and interest, if any, in and to all appurtenances thereto, including but not limited to any fences, buildings, landscaping, and other improvements now located thereon, including all fixtures of a permanent nature, but specifically excluding any fixtures used for or associated with oil and natural gas development, if any, but shall specifically exclude any and all interests or ownership of AEP in any and all minerals in place or under the entirety of the Grant and Frontier Parcel ("Mineral Interest"). The Parties acknowledge and agree that the Mineral Interest shall be reserved to the Grantor in the deed of conveyance executed by AEP and delivered to the Town. The Interest shall also include all of AEP's right, title and interest, if any, in and to all strips and gores of land lying between the Interest and adjoining property or streets, roads or highways, open or proposed. Finally, the Interest shall include all surface and subsurface water and water rights, ditches and ditch rights, ponds and pond rights, springs and spring rights, wells and well rights, whether decreed or not, if any, attached or appurtenant to or used in connection with the Grant and Frontier Parcel and owned by AEP and any title, interest, or right that AEP may have to convey water to the Grant and Frontier Parcel.

Title and Taxes. AEP shall deliver to the Town a special warranty deed, in the form set forth on Exhibit C, attached hereto, duly executed and acknowledged by an authorized corporate representative or officer, sufficient to convey good and marketable title to the Grant and Frontier Parcel to the Town, but reserving to AEP the Mineral Interest described above, free and clear of all liens, tenancies and encumbrances except only those permitted exceptions mutually agreed upon by the parties. Neither Kerr-McGee nor AEP shall not, after the Effective Date hereof, sell, convey, option or contract to do any of the foregoing or otherwise convey, abandon, relinquish, cloud or encumber title to the Grant and Frontier Parcel or any part thereof or contract to do any of the foregoing in a manner which would survive delivery of the special warranty deed. AEP shall be responsible for all real and personal property taxes on the Grant and Frontier Parcel, prorated to the date of

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delivery of the special warranty deed based on the most recent assessed valuations and mill levy available, which proration shall be deemed a final settlement between the parties.

(ii) AEP hereby agrees to grant to the Town a right of first refusal to acquire approximately fifteen (15) acres of real property generally located at the southeast corner of Colorado Boulevard and Pine Cone Avenue and west of the McGavin Well Pad (the "Pine Cone Parcel") as generally depicted on Exhibit B, subject to the terms and conditions specified herein.

Right of First Refusal. For a period of five years from the date of execution of this Agreement, AEP will not sell the Pine Cone Parcel, or any part thereof, without first offering it to the Town for purchase. The right of first refusal granted to the Town shall be honored by AEP and exercised in the following manner:

(1) If, during the period of the right of First Refusal, AEP receives a third-party offer to purchase or otherwise acquire title to the Pine Cone Parcel, or any part thereof, any contract which may be entered into between AEP and such purchaser shall specifically provide that the transaction shall be subject to the right of first refusal set forth in this Agreement.

(2) In the event that AEP enters into such contract with a third-party purchaser, the Town shall have the prior right to purchase and acquire title to the Pine Cone Parcel, or the portion thereof described in such contract, upon the same terms and conditions as therein provided or, at the Town's option, for cash.

(3) AEP shall submit to the Town a term sheet, containing the same terms and conditions as the purchase and sale contract with the third-party purchaser. If, after the receipt of such documents, the Town shall fail to exercise the Town 's right of first refusal by signing and returning to AEP within thirty (30) days of receipt, a signed copy of a contract, together with the earnest money payment therein provided, AEP shall have the right to conclude the proposed sale and conveyance on the same terms and conditions, and no other, as in a contract reflective of the term sheet with the bona fide third-party purchaser.

(4) The Town's failure to exercise the Town's right of first refusal, or the Town 's written disclaimer of such right, shall be deemed a waiver and cancellation of such right of first refusal if the proposed sale and conveyance to the same bona fide third party purchaser is consummated. If the proposed sale and conveyance to the same bona fide third-party purchaser is not consummated, the right of first refusal herein set forth shall not be deemed waived or cancelled, but shall remain in full force and effect.

(5) If any offer made by AEP according to the terms and conditions herein stated is rejected or is allowed to expire without acceptance by

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the Town, the Town agrees, within 10 days after receipt of a written request from AEP, to give to AEP or to any third person AEP shall designate, a written statement properly signed and acknowledged in recordable form that: i) an offer has been made by AEP in accordance with the terms and conditions of this Agreement, together with disclosure of the offering price and the terms and conditions of a proposed sale; ii) said offer has been rejected by the Town or has been allowed to expire; and AEP or any designated third person may rely upon such statement by the Town as evidence of the submission and rejection or expiration of a valid offer made to the Town pursuant to and in accordance with this Agreement.

(6) This right of first refusal shall apply to all transactions involving a conveyance of title to the Pine Cone Parcel, or any portion thereof, including but not limited to a purchase, an exchange, or any other transfer of an interest in the Pine Cone Parcel for consideration, other than a lease of no more than three years' duration.

Exempt Transfers. The parties agree that a transfer of the Pine Cone Parcel, or any portion thereof, shall be made only after compliance with all of the provisions of this Agreement, except that the following transfers shall be exempt from the terms and conditions of this Agreement to the extent herein provided and subject to all the other terms and conditions of this Agreement:

(1) A transfer to one or more corporations, partnerships, limited liability companies, trusts, or other entities in which AEP or AEP's heirs, successors, or assigns have sufficient control to be able to cause said entities at any time to transfer the Pine Cone Parcel or portion thereof to the Town and fulfill the other obligations of AEP under the terms and conditions of this Agreement; further, AEP's covenants that during the existence of this Agreement, AEP or AEP's heirs, successors, or assigns will continue to retain sufficient control of said entities to be able to cause said entities to transfer the Pine Cone Parcel or portion thereof, as aforesaid, and to fulfill all of AEP's obligations under this Agreement; and all certificates evidencing ownership of said entities shall be issued bearing a notation thereon that the transfer thereof is restricted and subject to the terms and conditions of this Agreement.

(2) A transfer by foreclosure or deed in lieu of foreclosure to any bona fide mortgagee or deed of trust beneficiary holding a first or second lien on the Pine Cone Parcel, provided that any subsequent sale and conveyance of the Pine Cone Parcel or any part thereof by such lien or shall be restricted and subject to the terms and conditions of this Agreement.

(3) If an exempt transfer is made, the transferee(s) shall be bound by all the covenants, terms, and conditions of this Agreement to the same extent as AEP.

Term. All rights and interests herein created and set forth in this Agreement shall

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remain in existence and shall constitute a valid encumbrance upon the Pine Cone Parcel for a term of five (5) years, commencing on the Effective Date; except that the same shall be extinguished by the occurrence of any one or more of the following events:

(1) a sale of the entire Pine Cone Parcel to the Town pursuant to the exercise of the right of first refusal, as herein provided, and upon compliance by AEP with all of the terms and conditions of this Agreement; or

(2) a sale of the entire Pine Cone Parcel to any person other than the Town or those persons mentioned in exempt transfers above pursuant to and upon compliance by AEP with all of the terms and conditions of this Agreement.

Binding Effect. This right of first refusal shall be binding upon, and inure to the benefit of, the parties and their respective heirs, assigns, legal representatives, and successors.

5. **Submissions to the COGCC.** Provided that they are in conformity with the terms of this Agreement, the Town will not object to any of Kerr-McGee's submissions to the COGCC pertaining to the Identified Well Pads and the wells located thereon. Furthermore, upon Town approval of operations pertaining to a new well, Town will promptly notify the COGCC in writing that the Town has approved such operations under its land use review procedures and pursuant to this Agreement.

ARTICLE III. OTHER PROVISIONS

1. No Waiver of Rights. The Parties acknowledge and agree that this Agreement will not be used as evidence that either Party has waived any rights to assert its claims concerning the validity of Firestone's land use authority or jurisdiction or Kerr-McGee's rights to develop its mineral resources. Nothing herein will be construed as an admission by either Party of any legal right or obligation.

2. Force Majeure. Neither Party will be liable for any delay or failure in performing under this Agreement in the event and to the extent that the delay or failure arises out of causes beyond a Party's reasonable control, including, without limitation, war, civil commotion, act of God, strike or other stoppage (whether partial or total) of labor, any law, decree, regulation or order of any government or governmental body (including any court or tribunal), or inability to obtain permits, licenses, consents, easements, or rights-of way. If any Party is rendered, wholly or in part, unable to carry out its obligations under this Agreement due to any such force majeure event, it is agreed that, upon the affected Party's giving notice and a description of such delay in reasonable detail in writing to the other Party as soon as reasonably possible after the occurrence of the causes relied on, the obligation of the Party giving such notice, so far as it is affected by such condition or event, will be suspended and any time periods will be extended for a period equal to the period of the continuance of the event or condition.

3. **Authority to Execute Agreement.** Each Party represents that it has the full right and authority to enter into this Agreement.

4. **Governing Law.** This Agreement will be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of law's provisions.

5. **No Third-Party Beneficiaries.** This Agreement is not intended to, and does not, create any right, benefit, responsibility or obligation that may be enforced by any non-party. Additionally, nothing in this Agreement will entitle any third party to any claims, rights or remedies of any kind.

6. **Notices.** All notices and other correspondence related to this Agreement will be in writing and will be delivered by: (i) certified mail with return receipt, (ii) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.), (iii) fax transmission if verification of receipt is obtained, or (iv) email with return receipt, to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

Firestone: Town of Firestone
151 Grant Ave
P.O. Box 100
Firestone, Colorado 80520
Attn: Town Manager
Telephone: 303.833.3291
Fax: 303.833.4863
Email: [_____]

Kerr-McGee: Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Danielle Piernot
Telephone: 720-929-6157
Fax:
Email: danielle_piernot@oxy.com

AEP: Anadarko E&P Onshore LLC
1099 18th Street, Suite 1800
Denver, CO 80202
Attn: Surface Land Manager
Telephone: 720-929-6026
Fax:
Email: Don_Jobe@oxy.com

With a copy to:

Robert C. Mathes

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Managing Counsel – Rockies
Telephone: 720-929-4326
Email: Robert_Mathes@Oxy.com

7. **No Presumption.** The Parties to this Agreement and their attorneys have had a full opportunity to review and participate in the drafting of the final form of this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction against the Party causing the Agreement to be drafted.

8. **Severability.** If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws. If any section, paragraph, provision, or portion thereof of this Agreement is held by any Court to be void and/or unenforceable for any reason, such section, paragraph, provision, or portion thereof shall be excised from the Agreement and shall be replaced with terms and provisions that are most consistent with, and which reflect, the Parties' intention. All remaining sections, paragraphs, provisions, or portions thereof shall remain in full force and effect.

9. **Dispute Resolution.** If either Party believes that the other Party has violated any provision of this Agreement, the Party claiming that a violation has occurred will send written notice to the other Party, identifying the violation and invoking the dispute resolution process in this Section. Upon receiving such written notice, the other Party will have thirty (30) calendar days to remedy the alleged violation, unless such violation involves operations at a well pad site, in which case the time period will be ten (10) days. If the other Party denies the alleged violation, then the Parties will meet to resolve the alleged violation within ten (10) or thirty (30) calendar days (as the case may be) of the date of delivery of the initial written notice. If a resolution of the matter cannot be achieved at the meeting, both Parties agree to make a reasonable effort to work through and with a mutually acceptable mediator to attempt to resolve the dispute. Notwithstanding the foregoing, if either Party believes that the dispute will not otherwise be resolved in a sufficiently prompt and effective manner, such Party may, at its discretion, institute a legal proceeding in a court of proper jurisdiction to seek appropriate remedies. Such remedies may include, without limitation, an injunction to stop an alleged violation or an order requiring the performance of all acts and things required by the Agreement. Provided, however, that no such legal proceeding will be initiated for a period of at least thirty (30) calendar days after delivery of the initial written notice.

10. **Amendments to Agreement.** No changes, alterations or modifications to any of the provisions hereof will be effective unless contained in a written agreement signed by both Parties.

[*Signature page follows.*]

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by a duly authorized representative on the day and year first above written.

FIRESTONE:

THE TOWN OF FIRESTONE

By: Bobbi Sindelar
Name: Bobbi Sindelar
Title: Mayor
Date: April 14, 2021

KERR-MCGEE:

Kerr-McGee Oil & Gas Onshore LP

DocuSigned by:
By: Danielle Piernot
DCF1AB1984DD497...
Name: Danielle Piernot
Title: Regulatory Affairs Director
Date: 3/29/2021

Anadarko E&P Onshore LLC

DocuSigned by:
By: David J. Woest
794A124B0778445...
Name: David J. Woest
Title: Attorney-in-fact
Date: 3/29/2021

DocuSign Envelope ID: A133C6C4-FA93-4872-8B09-2B91DA546AB8

EXHIBIT A
OPERATIONAL STANDARDS FOR IDENTIFIED WELL PADS

1. **Odor Mitigation**: Kerr-McGee will suppress odors, to the maximum extent practicable, through the use of closed loop systems. Odor emissions from Well Pads must be controlled as soon as reasonably practicable with utmost diligence and dispatch. Kerr-McGee will minimize odors by proactively addressing citizen concerns within 24 hours. Kerr-McGee will add additives to drilling fluids to minimize odors using natural odor neutralizing compounds, not masking agents. In order to meet the provisions of this section, Kerr-McGee will implement the following measures:

   A. Utilization of certain additives to drilling mud to neutralize odors using a specific designed blend of essential oils from natural plant extracts;

   B. Continue to evaluate different additive formulations that have the potential to better suppress odors, including but not limited to non-diesel-based additives;

   C. During flowback and well completions, utilize closed-loop green completion techniques to the maximum extent practicable to minimize emissions and the flaring of natural gas;

   D. Wiping down the drill pipe, to the extent practicable without creating a safety hazard or unsafe work condition, each time that the drilling operation "trips" out of the hole; and

   E. Drill cuttings, while temporarily on location, will be run through a centrifugal dryer to remove residual drilling fluid to the maximum extent practical prior to transportation for disposal.

2. **Noise Mitigation.** To reduce the noise effects on the Town and its residents during drilling, and to provide cost benefits to Kerr-McGee, all permanent equipment with engines or motors that can be electrified will be electrified from the power grid. Additionally,

   A. Kerr-McGee agrees to use the quiet completion technology substantially similar to that utilized by Halliburton or Liberty on all well sites for completion operations;

   B. Kerr-McGee will install sound walls during the drilling and completion of the Wells. The location of the sound walls will be mutually agreed upon by Kerr-McGee and the Town.

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C. Kerr-McGee will develop and implement in consultation with the Town a Noise Mitigation and Monitoring Plan that provides for continuous monitoring from four (4) sides of the facility at least 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based noise mitigation. Kerr-McGee will share all information and reports from such monitoring and modeling with the Town.

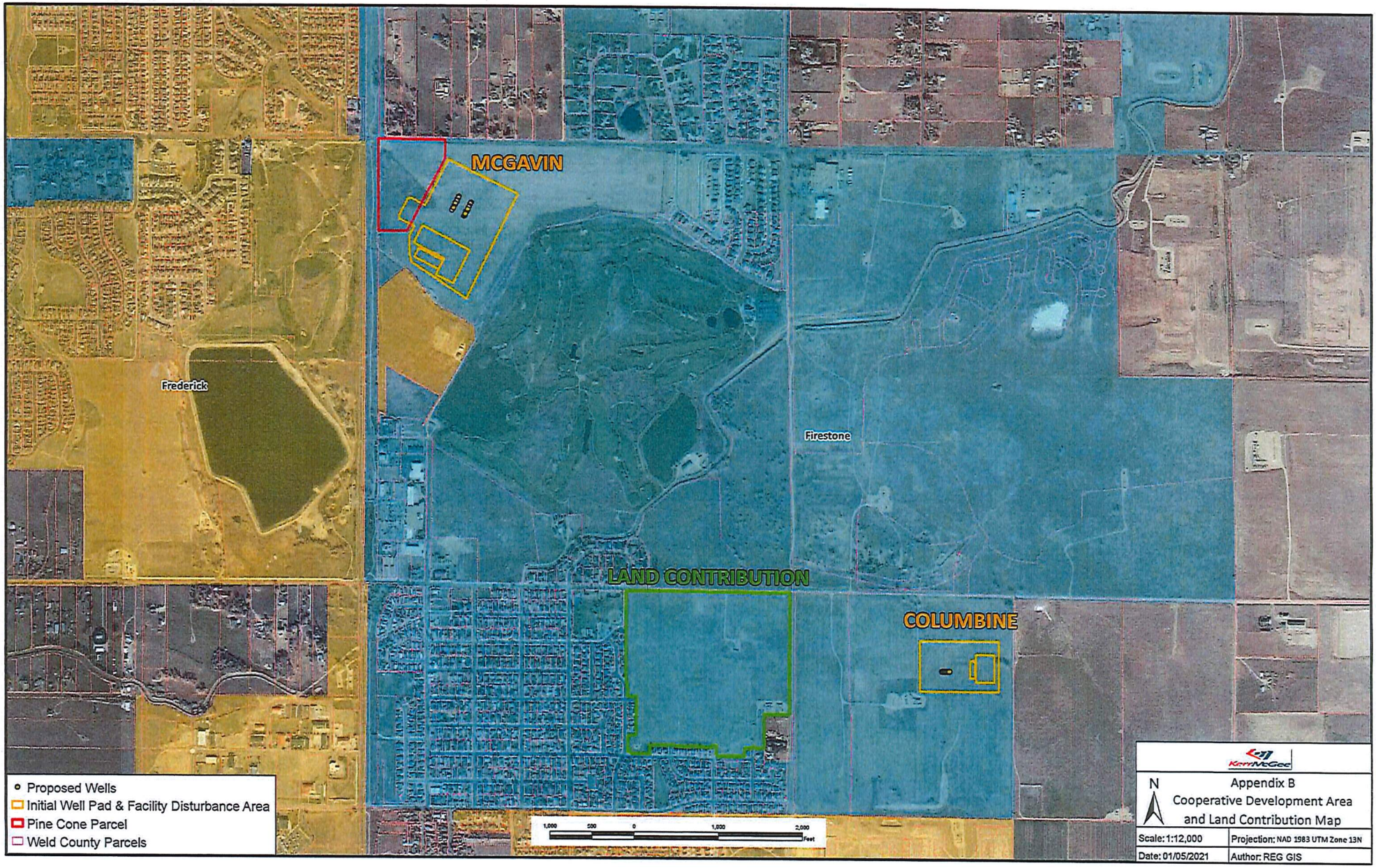
3. **Lighting.** Kerr-McGee will install down cast lighting or some other form of lighting that mitigates light pollution and spill-over onto adjacent properties; provided, however, that Kerr-McGee may still use lighting that is necessary for public and occupational safety.

4. **Road Repairs.** The Parties recognize that truck traffic accessing the Identified Well Pads may cause damage to Firestone roads and that road repairs may be needed to mitigate such damage. Kerr-McGee will arrange for a qualified outside consultant to perform a road impact study for all Firestone roads that are used to access an Identified Well Pad during the Term. The consultant will conduct the first part of the study prior to Kerr-McGee's drilling phase of operations at such Identified Well Pad and the second part of the study after Kerr-McGee completes all drilling, completions, and reclamation activities at such Identified Well Pad. The Parties will use these studies to determine the extent of any damage accruing to the road during the study period. Kerr-McGee will then promptly pay proportionate share to Firestone to repair such damage or else arrange and pay the cost of such repairs itself based on Firestone's preference.

5. **Drilling Pipe and other Large Tubulars Loading.** Kerr-McGee will make all attempts possible to avoid loading large tubulars between 10:00 pm and 7:00 am Mountain Time.

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EXHIBIT B
COOPERATIVE DEVELOPMENT AREA AND LAND CONTRIBUTION MAP


MCGAVIN
Frederick
Firestone
LAND CONTRIBUTION
COLUMBINE
Proposed Wells
Initial Well Pad & Facility Disturbance Area
Pine Cone Parcel
Weld County Parcels
1,000 500 0 1,000 2,000
Feet
N
Appendix B
Cooperative Development Area
and Land Contribution Map
Scale: 1:12,000
Projection: NAD 1983 UTM Zone 13N
Date: 01/05/2021
Author: REG GIS

Firestone Neighborhood Meeting Summary
McGavin 6-19HZ and Columbine 4-29HZ Oil and Gas Applications

Kerr McGee Oil & Gas Onshore, LP (KMOG), a subsidiary of Occidental, conducted a virtual neighborhood meeting on Wednesday, August 25th from 6-7:00 p.m. for stakeholders within close proximity to the proposed McGavin 6-19HZ and Columbine 4-29HZ pads. The purpose of the meeting was for KMOG's subject matter experts to provide an overview of the proposed projects, listen to feedback, and provide answers to stakeholder questions. On August 9th, KMOG mailed invitations to all owners and tenants within 300 feet of the property boundaries, those within 2,000 feet of the working pad surface, and businesses in the shopping center south of the McGavin 6-19HZ pad. Additionally, neighborhood meeting signs were posted on both properties on August 9th.

Fifty-three stakeholders and seven local and state government representatives registered for the meeting. Thirty-five stakeholders, four unknown cell phone numbers, plus fourteen KMOG panelists participated in the neighborhood meeting. Please see the list below including names of attendees. KMOG extended the meeting from 7:00 to 7:15 to finish addressing the ninety-nine questions and comments submitted by twenty-two stakeholders. KMOG uploaded the meeting slide deck to our website (OxyColoradoStakeholder.com) on August 26th and emailed the deck to stakeholders on August 30th. KMOG's Stakeholder team, a dedicated resource for community members, will continue to work with owners and residents to provide frequent and transparent information, answer questions, and seek feedback.

Meeting Attendees:

1. Sheryl Adam
2. Scott Anderson
3. Garrett B
4. Garold Bell
5. Kate Cloud
6. Steven & Alene Colvin
7. Donna Dansdill
8. William Deegan
9. Carl Enright
10. Kris Escalante
11. Beth Faller
12. Belinda Hanke
13. Kari Hebert
14. Bill Hohs
15. Suzanne Johnson
16. Marty Lagae
17. Robert Landrey
18. Michele Martinez
19. Randy Matsushima
20. William McGehee
21. Lisa McGehee
22. Kristin Mercer
23. D Okada
24. Ellen & Gary Pakel
25. Kristin Peart
26. Debra Pierce
27. Dave Rossiter
28. Cody Scott
29. Pat Seifert
30. Paul Seyler
31. Jeannette Sisario
32. Randal Smith
33. Crystal Soderman
34. Bret & Amy Ward
35. Susan Whittaker

Agency Attendees:

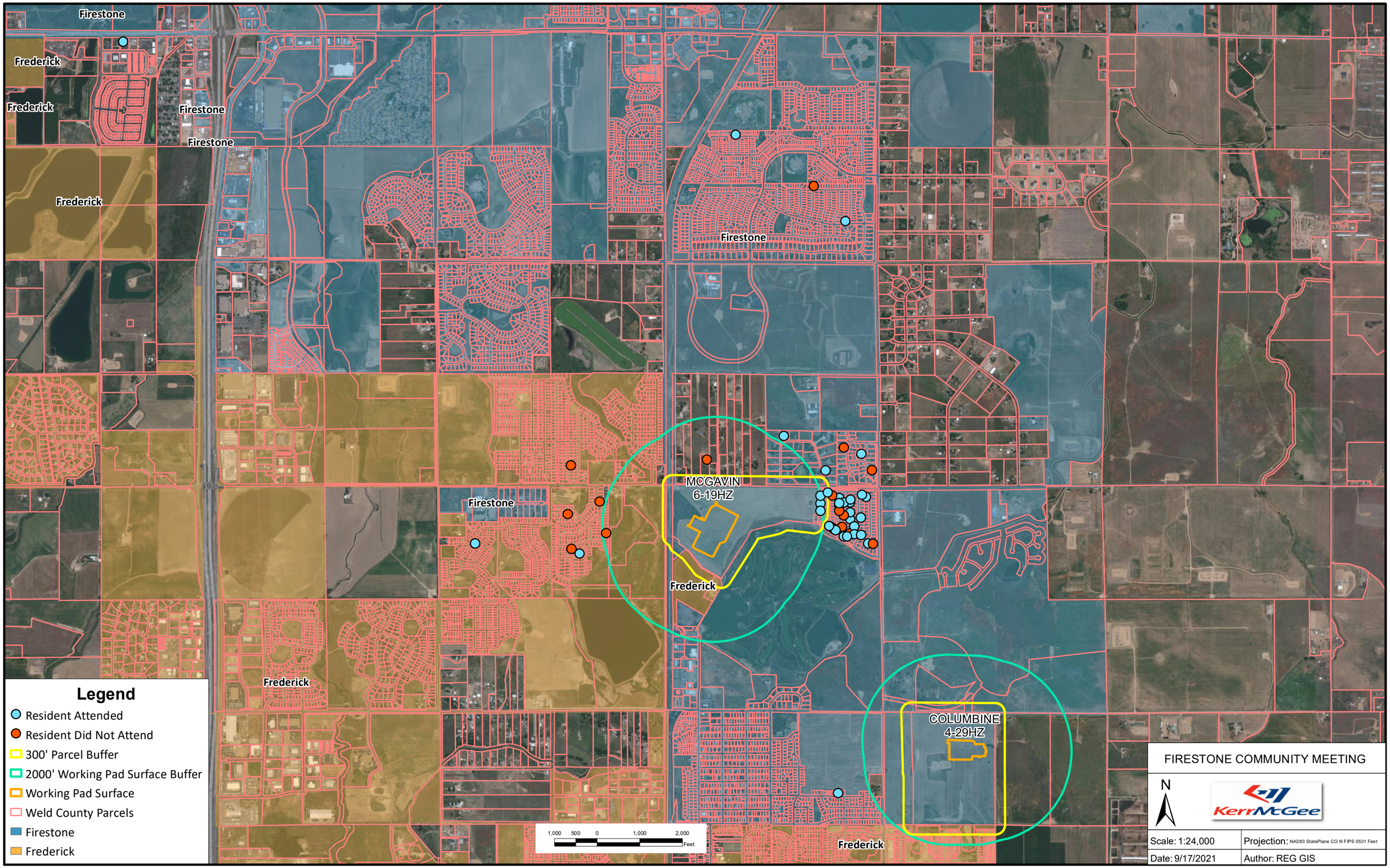
36. Weld County
37. Firestone
38. COGCC
39. Frederick

Other Attendees:
Four additional attendees called in on cell phones

KMOG Panelists:

1. Andy Lytle
2. Anthony Rader
3. Beth Bosworth
4. Chad Schlichtemeier
5. Dani Piernot

6. Jay Bridgeman
7. Jennifer Brice
8. Justin Nelson
9. Lisa Denk
10. Moe Felman
11. Rob Mathes
12. Shaye Marshall
13. Stephanie Madrid
14. Tom Crouch



Depicted information is subjective and its accuracy has not been verified. Attendee locations may not be accurate or extend beyond map extent.

Firestone Neighborhood Meeting

August 2021

Welcome

- Please submit your questions anytime using the Q&A button in the control panel at the bottom of your screen
- If you have questions or would like to provide feedback, please reach out to a member of our Stakeholder Relations team at coloradostakeholder@oxy.com or at 1.866.248.9577
- Also visit us at OxyColoradoStakeholder.com for additional information and resources



About Occidental - Commitment to Safety



- Oxy has a 100-year history of operating oil and gas assets in a variety of unique communities
- Our highest priority is the health, safety and welfare of communities, our employees, and the environment
- We are committed to listening, proactively addressing community concerns, and incorporating your feedback into our plans and operations

McGavin 6-19HZ Pad



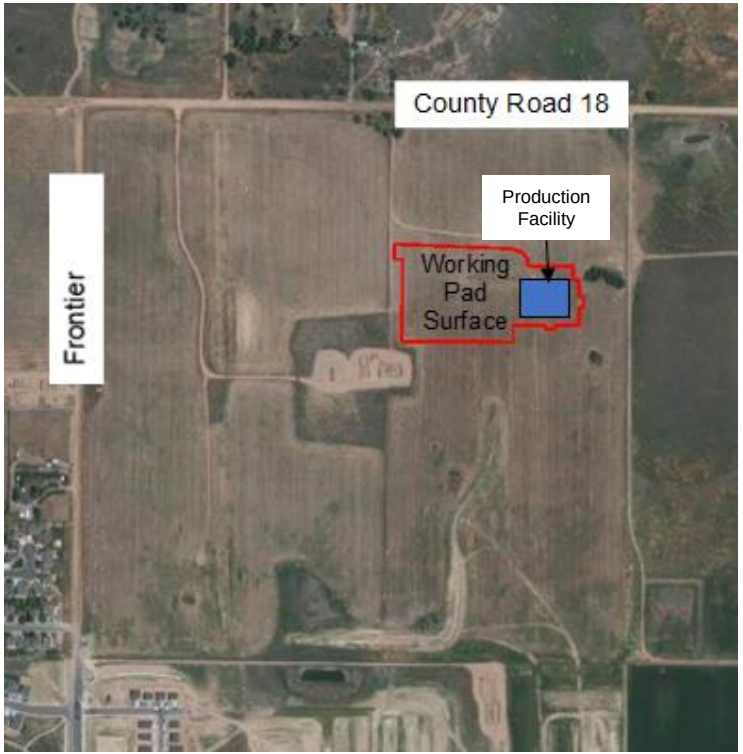
Work Activity	Estimated Timeline
Pad Construction	May 2022 – June 2022
Surface Drilling	June 2022 – July 2022
Horizontal Drilling	August 2022 – January 2023
Well Completions	March 2023 – June 2023
Production Facility	December 2022 – March 2023
Reclamation	November 2023 – December 2023

*For up-to-date timelines
OxyColoradoStakeholder.com

Columbine 4-29HZ Pad

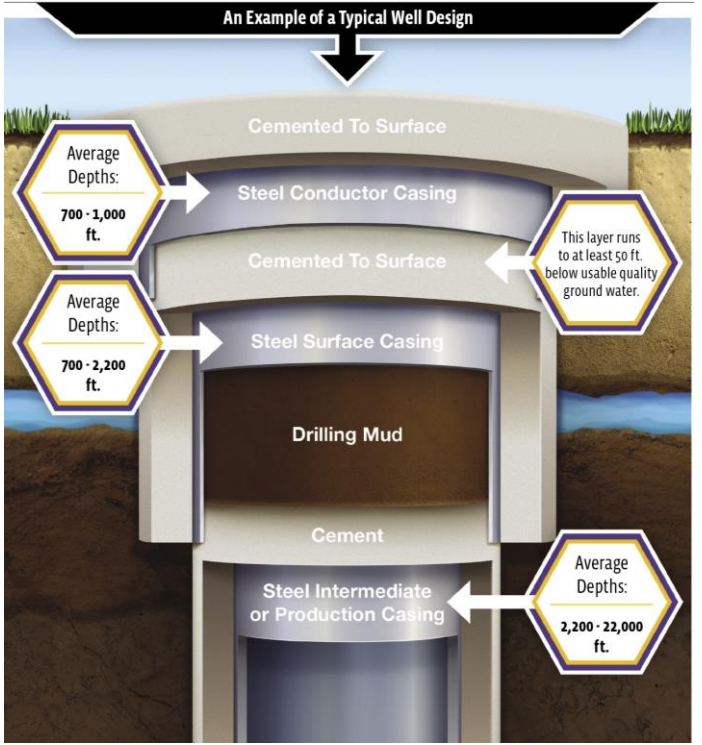
Work Activity	Estimated Timeline
Pad Construction	July 2022 – August 2022
Surface Drilling	August 2022
Horizontal Drilling	September 2022 – November 2022
Well Completions	February 2023 – April 2023
Production Facility	December 2022 – February 2023
Reclamation	June 2023 – August 2023

*For up-to-date timelines
OxyColoradoStakeholder.com



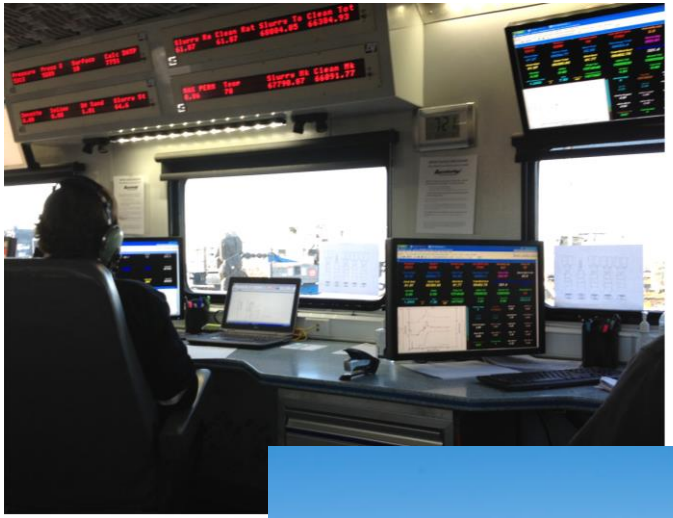
Drilling

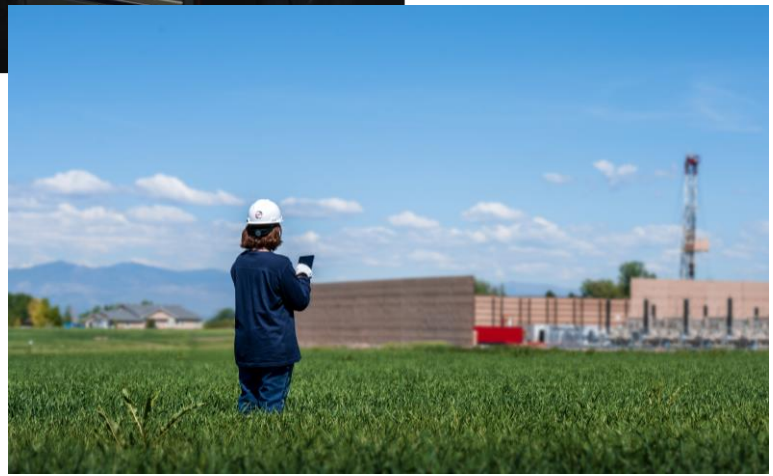


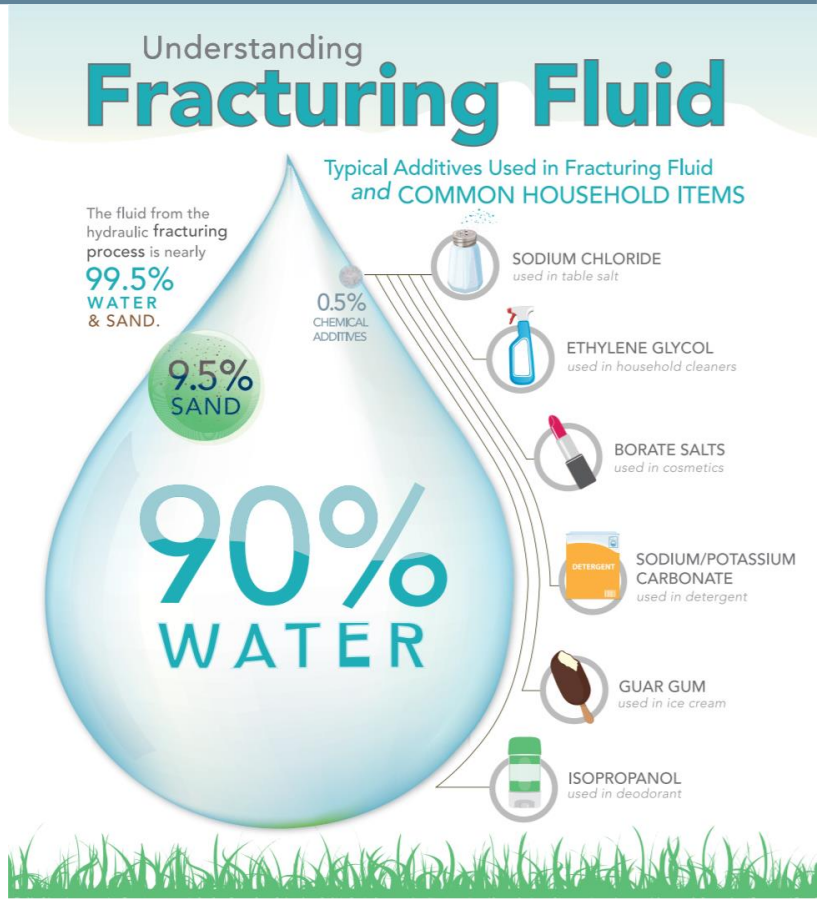


- Surface drilling – Installing casing to protect groundwater
- Horizontal Drilling – Drilling to depth of ~7,000 feet and then horizontally up to 2 miles
- Low emission drilling engines upgraded with noise reducing features

Well Completions







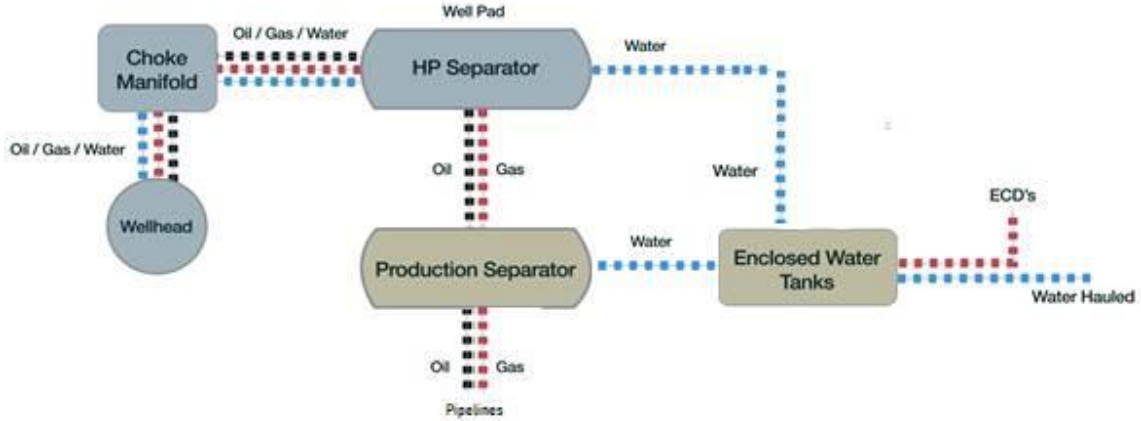
Source: Groundwater Protection Council, API, Energy and Communities (2017)

Production

- Zero routine flaring
- Tankless design, no hydrocarbons stored on-site
- 24-hour monitoring
- Reclaimed to match existing landscape

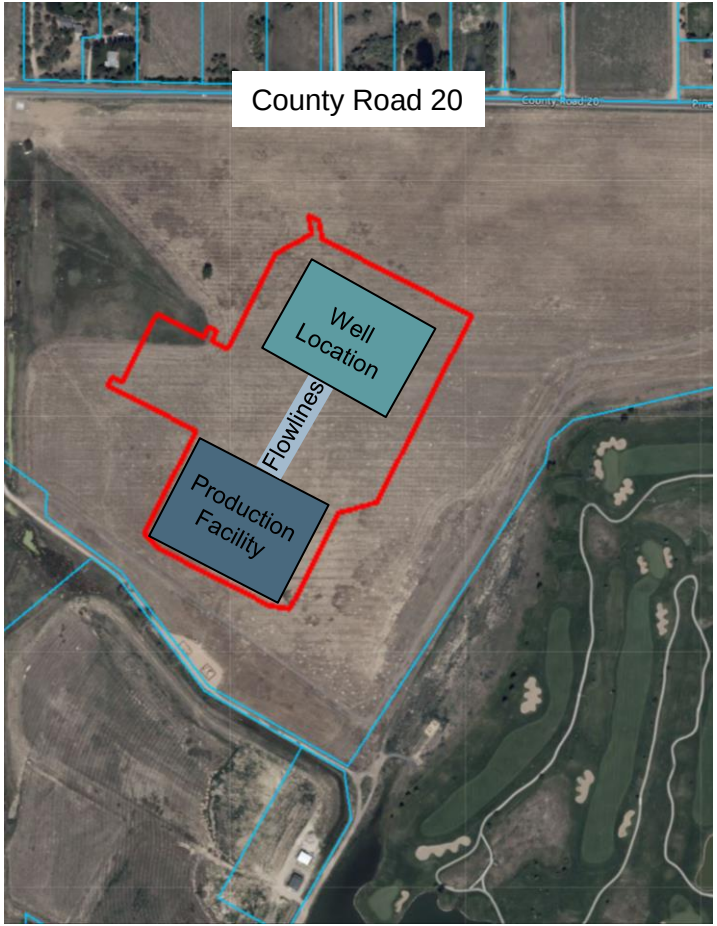


Production facility



Flowlines and Pipelines

- Oil and gas flow from the well heads to the production facility
- Each well has one, 2” steel flowline pipe
- Flowlines are continuously monitored by our Integrated Operations Center and undergo yearly pressure tests
- Exact pipeline locations are still under review and will be owned and operated by Western Midstream (WES)



Reclamation





- When development work is completed, the well pad footprints will be reduced
  - McGavin from 25.63 acres to 7.08 acres
  - Columbine from 12.66 acres to 2.76 acres
- To screen the locations, we plan to install berms and black steel fences around the facilities and wells
- We are evaluating 39 wells for potential retirement near the development area
  - Approximately 1.5 acres are restored and revegetated per well that is retired

Good Neighbor Commitment – Noise, Light, Odor



Noise: State of the art sound walls and continuous sound monitors will be installed

Light: LED lights strategically oriented downward and away from nearby homes

Odor: Odor neutralizer used as part of Oxy's standard drilling system

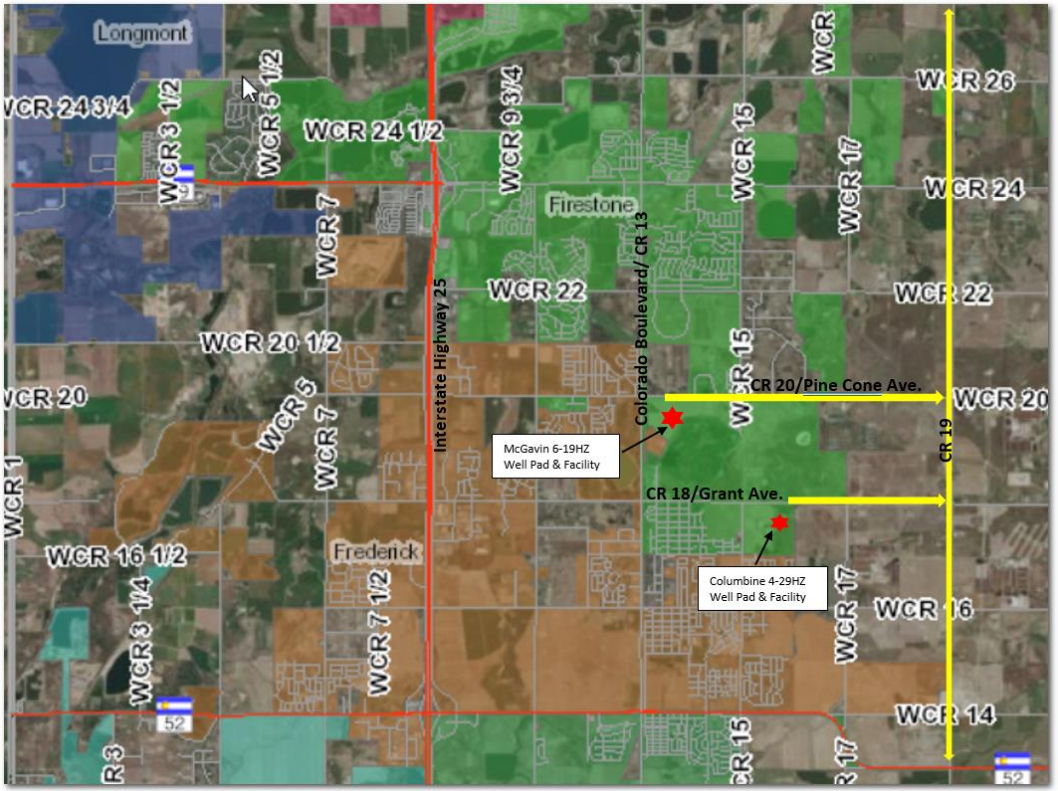
Good Neighbor Commitment – Air Quality

- Continuous air monitoring during drilling and completion activities
- Air monitoring data will be available at OxyColoradoStakeholder.com
- Low emission drilling and completion equipment
- Zero routine flaring
- Tankless design



Good Neighbor Commitment – Traffic

- Comprehensive Traffic Management Plan
  - Plan includes pre/post road studies
- Water-on-demand system, consisting of over 180 miles of underground pipelines, will be utilized to source and transport water
  - This system eliminates more than 2,000 truck trips per day
  - The traffic reduction greatly reduced noise, dust and emissions



State and Local Permitting Process

Permitting milestones
Cooperative Development Agreement - **Completed**
Submit Local Permits - **Submitted**
Submit State Permits - **Submitted**
Planning Commission Hearing
Board of Trustees Hearing
State Public Comment Period
State Public Hearing Date

*For up-to-date timelines
OxyColoradoStakeholder.com

Contacts





Stakeholder Relations Team
1099 18th Street, 7th floor
Denver, CO 80202
866.248.9577
ColoradoStakeholder@oxy.com
OxyColoradoStakeholder.com

Integrated Operations Center (IOC)
970.515.1500

- Real-time monitoring of wells, water tanks, and production facilities
- 24 hours a day, 365 days a year

Q&A

- Please submit your questions using the Q&A button
- We will send you a survey via email and welcome your feedback and questions



www.oxycoloradostakeholder.com

Thank you for joining!



From: Colin Baldwin <colininboulder@gmail.com>
Sent: Saturday, August 21, 2021 11:29 AM
To: Marty Ostholthoff
Subject: Gavin Well Pad

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

We are writing out of concern about the proposed Gavin Well Pad at Pine Cone and Colorado. This is in the heart of the town, near the trail we take often to Safeway and by the golf course, and next to the Firestone trail. This is a poor location, surrounded in all 4 directions by homes, and we would ask the Town consider our opposition to the proposal.

Please advise what we can do to formally register our opposition.

Thank you for your consideration,
Colin and Brandi Baldwin
9077 Foxfire St, Firestone, CO 80504

From: Donna <donnadollarhide@gmail.com>
Sent: Saturday, August 21, 2021 1:13 PM
To: Marty Ostholthoff
Subject: Drilling of pine cone and colorado

<table style="width: 891px; border-color: black; margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="width: 891px; text-align: center;"><hr /><big>CAUTION:</big> <big>This email originated from outside of the Town of Firestone.</big>
<big>Do not click links or open attachments unless you can confirm the sender and know the content is safe</big><hr /></td> </tr> </tbody> </table>   Good afternoon Marty,

My family and I live in the Falcon point neighborhood and we are concerned with the Drilling that is happening. We were under the impression that it had not been yet. Is this not the case? Your help is greatly appreciated.

Nurse Donna D
Nurses are the heart of healthcare.

Sent from my iPhone=

From: Jennifer Shackleton <jshackleton1@yahoo.com>
Sent: Tuesday, August 24, 2021 1:44 PM
To: Marty Ostholthoff
Subject: Re: Proposed oil drilling Kerr/McGee (Oxy) in Firestone/Jennifer Shackleton 9179 Ferncrest St. Firestone

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Dear Mr. Osthlehoff,

I am writing to you regarding a flyer I received alerting me to a proposal for an oil drilling site on the corner of Colorado and Pine Cone Ave. in Firestone.

I bought my house on in Firestone almost exactly one year ago on August 31st of 2020. I had just been divorced and used the small settlement I received as a down payment on my home. I was only able to qualify for the house because of the settlement and I do not work because of severe auto-immune disease and my age (I am a senior).

I moved to Firestone after owning a small house in Superior for 20 years. I wanted to escape the overwhelming growth and loss of quality of living that occurred in Superior with all of the growth and after viewing the house in Firestone I fell in love with the small town feel of the area. I looked Firestone up on www,citydata.com and was happy to see that the crime rate was low, the quality of living was high, and people loved living here. I was also drawn to the area because of the golf courses and trails. How unpleasant would it be to play golf within in the midst of oil well equipment, noise, and smells? The site proposed is within plain site of anyone driving to Firestone/Frederick and the homes in this community

I had planned on retiring here in a house that is large enough for my grandkids to come and visit for days or weeks. I planned on the equity in the house being available as I age to allow me to live my final years of retirement in relative comfort. I cannot qualify to buy another home because of the fact that I have no income due to my health and age. I was also looking around this area for more members of my family to move to Firestone because I love it so much. Even though I am older and do not have children, I love that many families with children surround my home. The health consequences of oil drilling to all of us cannot be underestimated. Those who are able to leave definitely will. The rest of us will be stuck here unable to ever escape an environment that would destroy our health and well-being. I was seeking a clean, natural environment when I moved here, as I'm sure everyone who lives here can say!

Aside from health issues, the proposed oil facility will ruin feel the community permanently. Even in places where 30 years from now the oil is capped and covered, ongoing methane issues are an issue (as mentioned in an article below) as with the home that exploded in Firestone a few years ago(and in as with issues in Broomfield and other locations). A huge influx of workers who are not from our area will bring in temporary low quality homes for them to live in, which will be abandoned later when the work is complete. It will change the comparables and property values that are taken into account when an appraisal is done. This has happened in other drilling areas. The increase in crime cannot be underestimated (see links below). As I mentioned above, if I lose value in my home I can't come up with the cash to sell. The house would not appraise for enough for me to refinance or take a reverse mortgage as I had planned in order to

supplement my income as I age. This house is where I hold my retirement dreams and where many here hold their wealth in hoped for future equity or at least the ability to retrieve cash invested in the home.

Please see the articles I have attached below.

I appeal to you and the other member of the Planning and Zoning Commission to please not allow the drilling to move in.

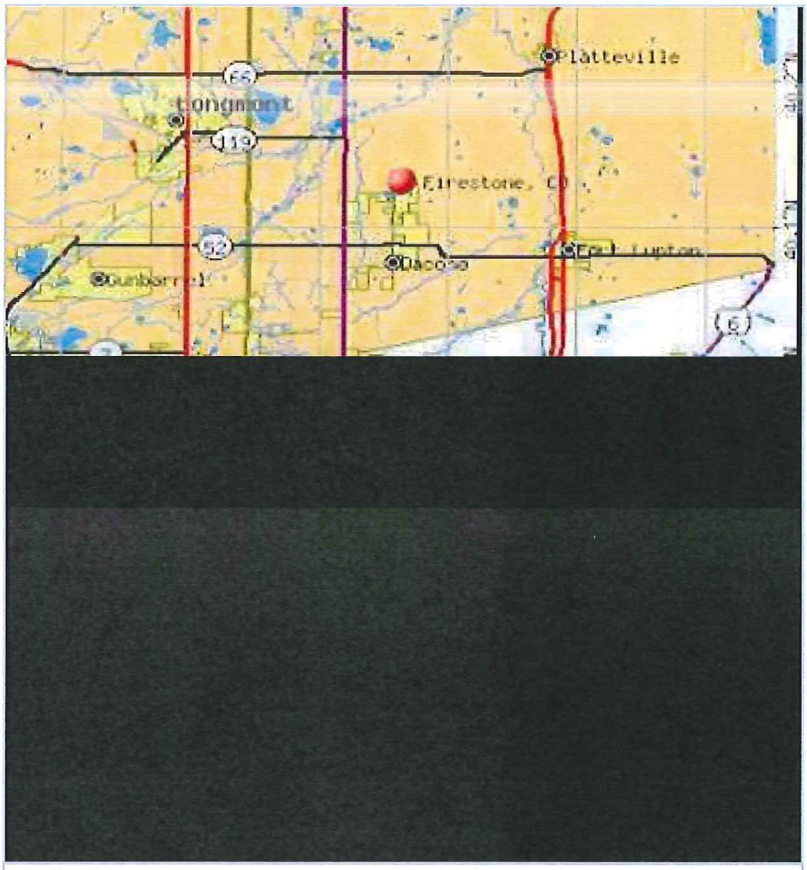
Thank you so much for giving my appeal your consideration!

I just did research on living near gas/oil production facilities which I'm sure you have also done. (I searched "how are property values affected when oil drilling moves nearby" and "what are effects of oil drilling in Weld County", among others). I got many results. Here are just a few critical findings...

Already Firestone is discussing water conservation. As we know lack of water is happening everywhere:

https://www.firestoneco.gov/196/Water-Conservation-Programs

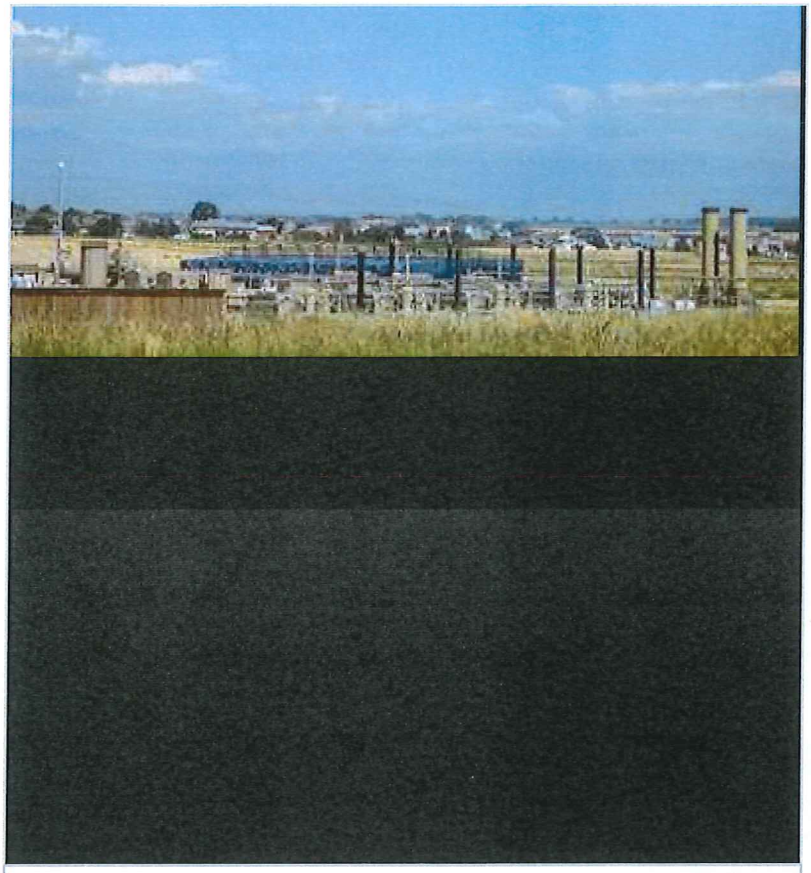
Firestone, Colorado (CO 80520) profile: population, maps, real estate, averages, homes, statistics, relocation, travel, jobs, hospitals, schools, crime, moving, houses, news, sex offenders



Firestone, Colorado (CO 80520) profile: population, maps, real estate, a...

Firestone, Colorado detailed profile

Weld County energy, part 3: Homeowners criticize residential oil, gas development



Weld County energy, part 3: Homeowners criticize residential oil, gas de...

Note: This is Part Three in a series about energy-related issues in Weld County. The remaining parts will be pub...

An ongoing study from Anschutz Medical Campus at the University of Colorado indicates children ages 5 to 24 who develop acute lymphocytic leukemia are four times more likely to live in an area with a large number of oil and gas developments.
The Centers for Disease Control and Prevention and Environmental Protection Agency warn that benzene, a common VOC, can cause drowsiness, dizziness, changes in heart rhythm, headaches, confusion and death when inhaled in at high levels. Long-term exposure to high levels of benzene is linked to leukemia, anemia and issues with menstrual cycle

From a researchgate.net publication:

Drilling causes a depletion of water resources including drinking water. Firestone is already worried about water resources based on a recent document posted on the Town of Firestone website.

https://oilandgasbmps.org/docs/bennett_loomis_fracking_property_values_society_natural_resources.pdf

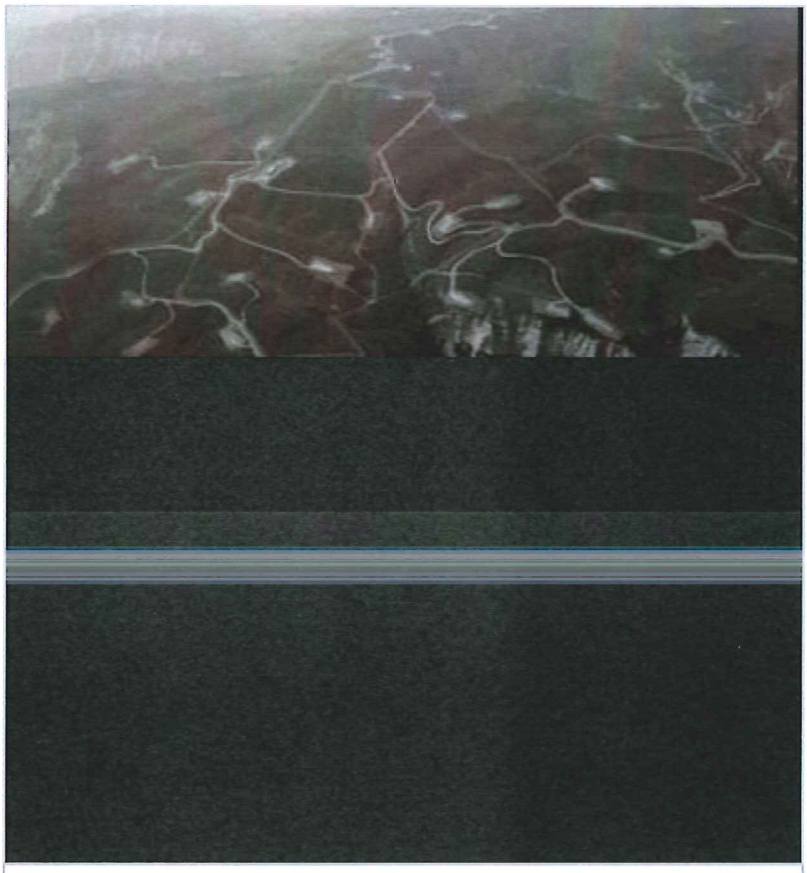
https://www.greeleytribune.com/2021/08/17/weld-county-oil-spills-for-aug-18/

From Boulder Weekly:

In a recent interview, Throupe told *BW* that in a county such as Boulder, where the apprehension over fracking is quite high, it is likely that homes near drilling operations could easily lose as much as 20 percent of their value. And he also pointed out that it isn't just the homes adjacent to drilling that are being impacted. For instance, if a well is being drilled and fracked on the edge of a housing addition or within a town, the homes located in close proximity to

the well and/or production platform will decrease in value, but so will all the homes within the addition or within a certain distance to the well. This loss in real estate value to homes that can't even be seen from a well site is due to the comparable sales process used during the appraisal process.

Energy companies have left Colorado with billions of dollars in oil and gas cleanup

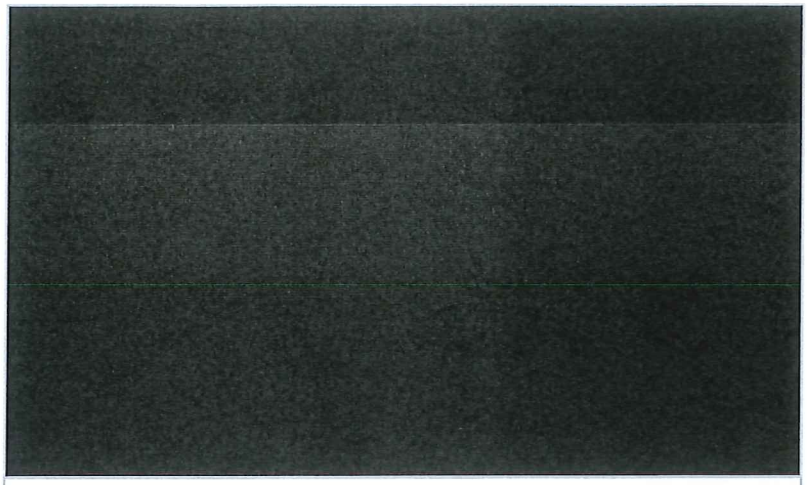


Energy companies have left Colorado with billions of dollars in oil and ...

As the state tries to reform its relationship to drilling, an expensive task awaits.

Drilling, dollars & debt: Colorado's oil and gas industry is leveraged to the hilt. What does that mean for the future?

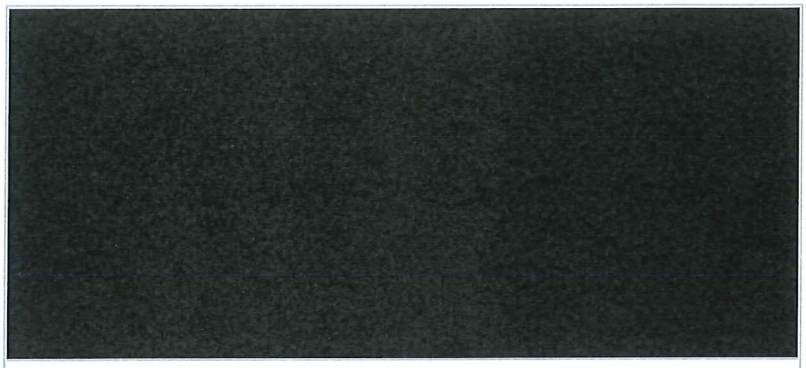




Drilling, dollars & debt: Colorado's oil and gas industry is leveraged t...

A new and more severe ruler is on the throne in oil and gas country, and the state's petroleum producers are ben...

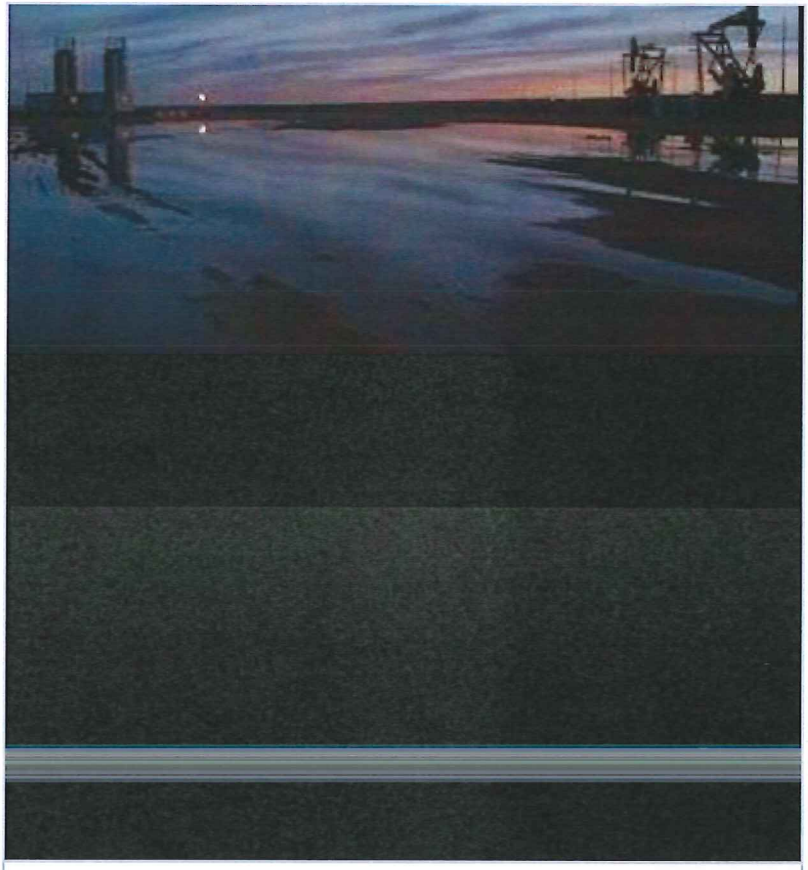
The fracking/real estate conundrum - Boulder Weekly



The fracking/real estate conundrum - Boulder Weekly

The New York State Bar Association calls it the "perfect storm begging for immediate attention." For homeowners ...

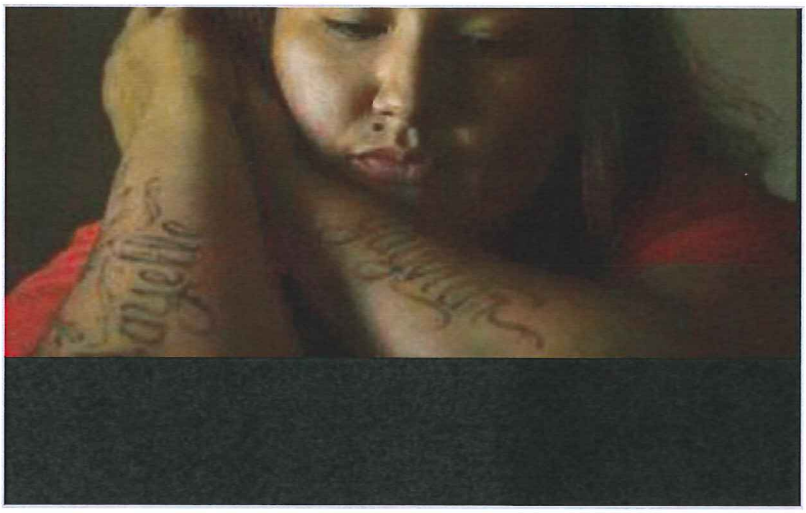
A New Film Examines Sexual Violence as a Feature of the Bakken Oil Boom



A New Film Examines Sexual Violence as a Feature of the Bakken Oil Boom

"Nuuca" looks at attributes of the boom that go beyond emissions and oil spills: rising rates of sexual violence...

Dark side of the boom



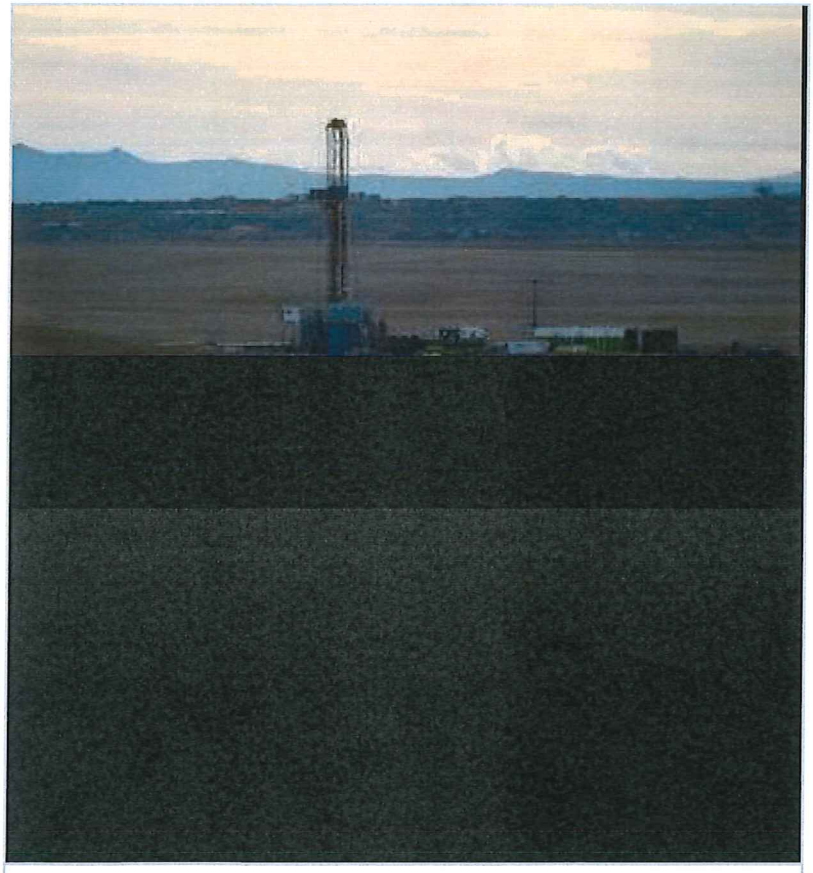


Dark side of the boom

North Dakota's oil boom could bring in hundreds of millions to one reservation, but at a steep social cost. http...

https://www.sciencedaily.com/releases/2018/04/180409103920.htm

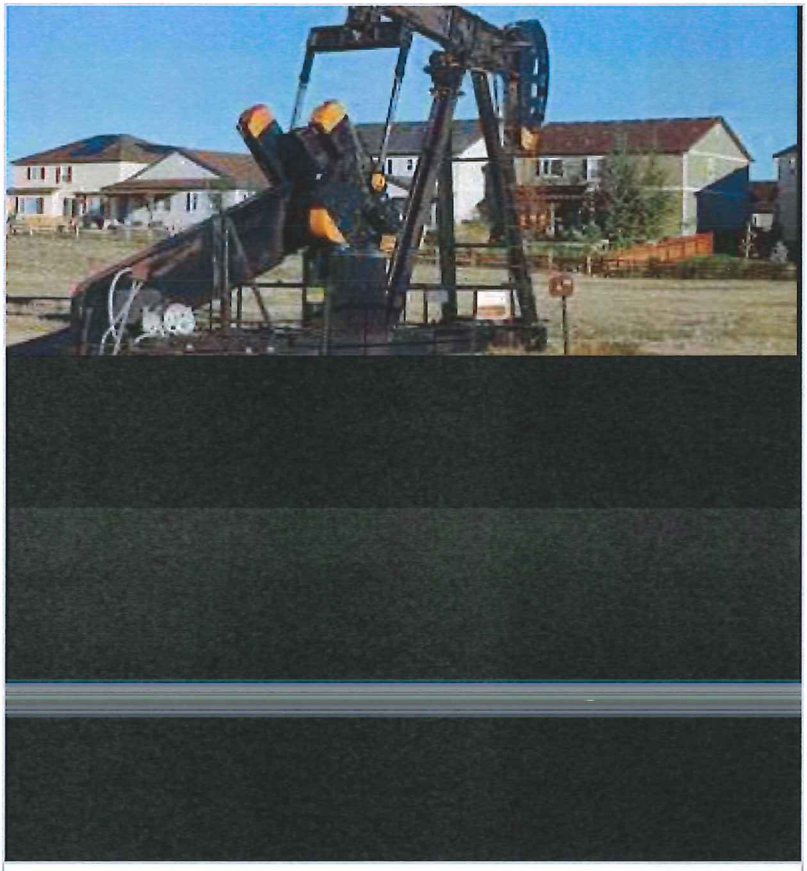
Does living near an oil and gas well increase your risk of cancer? A new Colorado study says yes.



Does living near an oil and gas well increase your risk of cancer? A new...

A new study from the Colorado School of Public Health found that people living next door to oil and gas wells ar...

Colorado homes near oil wells face lower values, new study finds

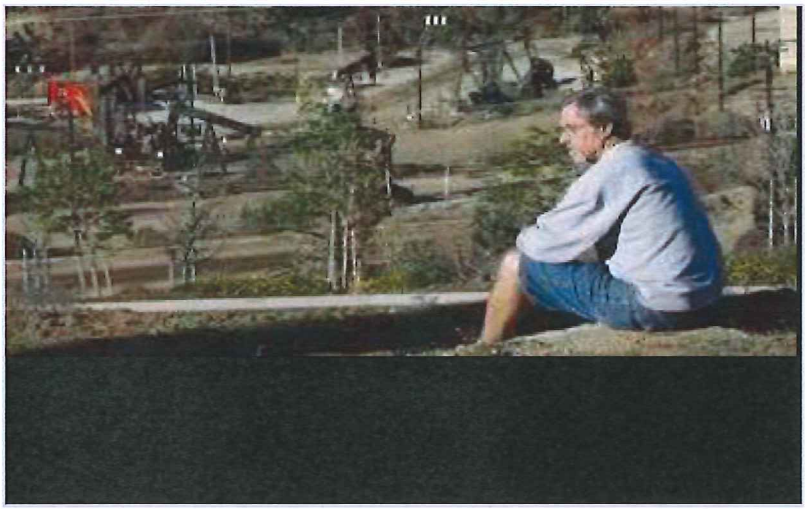


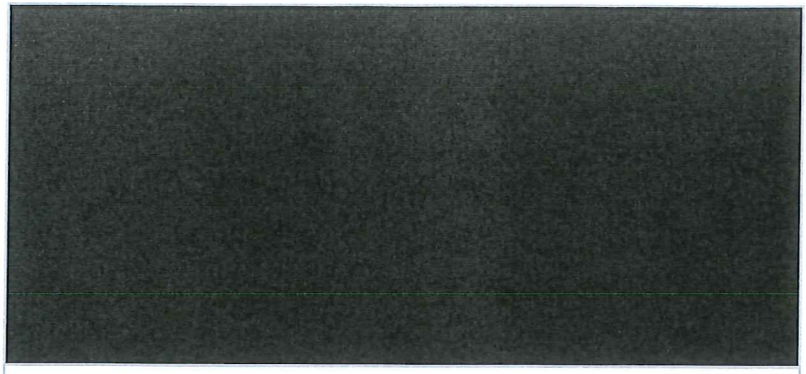
Colorado homes near oil wells face lower values, new study finds

Colorado's most active oil and gas drilling is happening near land that is also hosting some of the fastest hous...

https://grist.org/climate-energy/living-next-to-natural-gas-wells-is-no-fun/

Gas Drilling Is Killing Property Values For Some Americans



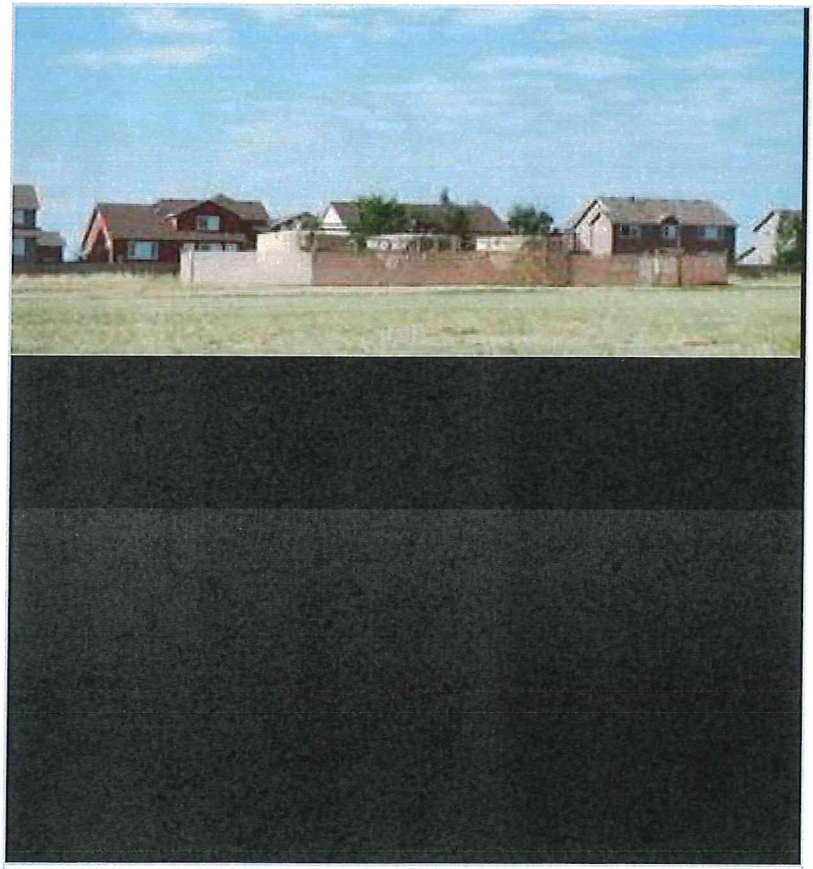


Gas Drilling Is Killing Property Values For Some Americans

Michelle Conlin

Fracking is opening the way for industrial activity in middle and upper-middle class neighborhoods.

For example, the oil and gas boom in Colorado makes headlines often. If oil rigs were to dot the landscape in Longmont, Colorado — a community of 88,000 people — homeowners would see an estimated 15 percent reduction in property values, which would equal a loss of $1.2 billion based on a 2013 estimate.



The fracking/real estate conundrum - Boulder Weekly

> The New York State Bar Association calls it the "perfect storm begging for immediate attention." For homeowners ...

https://www.slb.com/-/media/files/oilfield-review/p04-18

From: Leslie & Steve Walker <sjlrwalker@gmail.com>
Sent: Tuesday, August 24, 2021 11:57 AM
To: Marty Ostholthoff
Subject: Against Kerr/McGee (Oxy) at Corner of Colorado/Pine Cone Firestone

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Marty Osthlehoff,

PLEASE do not allow Kerr/McGee (Oxy) to drill for oil and then leave a permanent oil production facility on the land area at the crossroads of Colorado and Pine Cone roads or anywhere around that area. I vote NO on Kerr/McGee or any other company petitioning to do that.
I have signed the petition to stop this.

Firestone is a lovely town:

1. It does not make sense to put this between two beautiful golf courses. One golf course is with the City of Firestone and would surely reduce use and revenue.

2. This site would have unseen air pollutants that would adversely affect people living in the neighborhoods or walking on the Historic Firestone Trails and potentially cause respiratory, heart and other diseases.

3. The City of Firestone previously approved lovely neighborhoods of homes to be built around this area, and the drilling and especially the production site would substantially decrease home values (and tax values) in these neighborhoods.

4. Surely any oil company can find land OUTSIDE of Firestone to drill and place their production site. For safety, and for the beautiful continued expansion of Firestone, it should be away from any neighborhoods.

Respectfully yours, Leslie Walker

From: Garold Bell <garold.bell@gmail.com>
Sent: Wednesday, August 25, 2021 5:44 PM
To: Marty Ostholthoff
Subject: Article about explosion of a gas pipeline and its damage near Alex, OK
Attachments: scan (1).pdf

CAUTION: This email originated from outside of the Town of Firestone.
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Attached is an article about a gas pipeline explosion in Oklahoma in 2008. We were 11 miles from it at 3 am and it lit the sky like it was day time. Damage was significant and it was not near housing developments and businesses.

Garold Bell
8937 Ferncrest St.
Firestone, CO 80504
402-709-8191

Natural gas pipeline explosion destroys homes near Alex

WWW.NPMS.PHMSA.DOT.GOV BY JENNIFER GRISWOLD AND BRIAN SARGENT - STAFF WRITERS
Published: Fri, November 14, 2008 12:00 AM | Updated: Fri, November 14, 2008 5:45 PM

A 20-inch round line exploded less than 50 yards north of State Highway 19, two miles east of Alex. The highway between Alex and Bradley was closed for about eight hours, a state Transportation Department spokeswoman said.

"The immediate threat is over. Everyone has been accounted for," Grady County sheriff's Capt. Robert Jolley said.

Two mobile homes and a rock house within one-fourth of a mile of each other caught fire and were destroyed, said Gil Broyles, spokesman for the pipeline's operator Enogex. There were no other houses in the area and no cause for further evacuation. The explosion, which could be heard for a couple of miles, caused a grass fire, Jolley said.

A man and woman in a mobile home were hurt, Broyles said.

The man's identity and the extent of his injuries isn't known. He was taken to Grady Memorial Hospital in Chickasha. Mildred Hull was in good condition at the Integris Baptist Medical Center burn unit, a hospital spokeswoman said. She has second- and third-degree burns on nearly 17 percent of her body.

Alex School Superintendent Norvel Heston said one of their students and his mother lost their mobile home.

"They lost everything and their house burned to the ground," Heston said. "We've already got clothes sizes and there will be help that way. But of course you can never replace everything."

The rock house was unoccupied.

A section of pipe about 16 to 18 feet long blew, causing a crater 30 to 40 feet wide, Broyles said.

"When the pressure drop was noted, we manually closed valves on either end of the leak," Broyles said.

The explosion's cause isn't known. Enogex and Oklahoma Corporation Commission inspectors have been sent to the scene.

Grady County Fire Chief Perry Wenzel lives 20 miles from the explosion site. He said he could see flames from his house.

"They (the victims) are very lucky to be alive," Wenzel said.

About the pipeline

The pipeline, built in 1975, transports natural gas from wells northwest of Thomas in Custer County to a production plant south of Alex.

No problems were found when its integrity was inspected last year and when a routine maintenance operation was performed within the last week, Broyles said.

There was no construction in the area, Broyles said.

CONTRIBUTING: STAFF WRITER BRYAN PAINTER

VIEW NATIONAL PIPELINE MAPPING SYSTEM ONE COUNTY AT A TIME

From: The Pearts <thepeartfamily@gmail.com>
Sent: Wednesday, August 25, 2021 11:42 AM
To: Marty Ostholthoff
Subject: Kerr/McGee Proposal

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Good afternoon,

I'm writing to you today to voice my concerns about the proposed oil drilling and production site on the corner of Colorado Blvd. and Pine Cone Ave. Please do not approve this proposal. This is not an appropriate location for this project. Not only will it disrupt the beauty of the oft-used Firestone Trail, it will be an eyesore at the Saddleback and Bella Rosa Golf Courses. We moved to this area because of its beauty, small-town feel, and family-friendly neighborhoods. This project would permanently reduce home values by industrializing this area.

Thank you for your consideration to keep Firestone beautiful and family-friendly!

Kristin Peart
Firestone Resident
in Saddleback neighborhood
850-865-2939

From: Leigh Koldeway <leighkoldeway@yahoo.com>
Sent: Monday, August 30, 2021 9:01 AM
To: Marty Ostholthoff
Subject: Proposed Oil Production

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Dear Marty Osthlehoff,
I am writing to you as a concerned Firestone citizen. The oil production facility proposed by Kerr/McGee on the corner of Colorado Blvd and Pine Cone Ave will be a definite detriment to the town. Not only will our property values suffer but is this eyesore really what you would want people to see when entering our town? Our proposed park on Frontier has already been ruined by the oil production facility that was allowed to be built there. The site Kerr/McGee is wanting is in between two lovely golf courses and will ruin those lovely views. The truck traffic is already very heavy on Pine Cone and this will increase it to intolerable levels.

This proposal is not complimentary to the surroundings of this corner - lovely homes, golf courses, and the Firestone Trail. This will not add quality of life to the citizens of this community. Please do not allow this to be approved.

Thank you,
Leigh Koldeway
9030 Foxfire St.
Firestone

From: Debra Pierce <debra.l.pierce@gmail.com>
Sent: Tuesday, August 31, 2021 6:55 AM
To: Marty Ostholthoff
Subject: New natural gas drilling on corner of Pinecone Ave and Colorado Blvd

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Do not click links or open attachments unless you can confirm the sender and know the cont

I would like to let you know that my husband and I live at Falcon point at Saddleback. We just moved into the Neighborhood in December and when we moved, we expected to have other neighborhoods in the area in question. That is what the builder told us. I am very against Fracking as I feel it is quite dangerous to the environment. I think it could reduce air quality and also affect the vegetation in the surrounding area. I am an organic gardener. I worry about what that means for myself and my family living so close to a fracking facility. I know they say that they are going to have safeguards in place, but if they do hit a big methane pocket or something of the likes, what can they do to stop it? It is too late at that point and the environment and everyone around it suffers the consequences. It is also well known that drilling and fracking in the immediate area lowers property value. That is a shame for all of us who just moved in and were told something else was going into the surrounding area. It will also be an eyesore to the beauty that they have created for the Firestone/Frederick/Dacono area who have worked hard to beautify the area along Colorado Blvd and surrounding areas.
Please consider these things and do not let this Fracking/Drilling company come into this area. Lets keep the Town Beautiful and family friendly.
Sincerely,
Debra Pierce and Michael Pierce
Debra.L.Pierce@gmail.com
720-334-0776

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 30, 2021 3:18 PM
To: Marty Ostholthoff
Subject: Re: Request for Cooperative Development Agreement

CAUTION: This email originated from outside of the Town of Firestone.
Do not click links or open attachments unless you can confirm the sender and know the conte

Hello Marty,

Thanks so much for sending this link over. I was able to find the documents pursuant to the April 14, 2021 meeting on the Town's website. The CDPA and the resolution are however not signed by the Town. Was this agreement indeed adopted? If so, is the signed copy only available via the public documents request?

Thank you for finding out the number of attendees.

Thanks, Suzanne Johnson

Keep Firestone Beautiful!

On Mon, Aug 30, 2021 at 7:46 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> To get a copy of the Oxy CDPA please use the following link and fill out the Public Information Request form and we will get it over to you. Also, the CDPA will outline the terms for the Town to receive the 78 acres. This Town does NOT control the 78 acres today.
>
> https://co-firestone2.civicplus.com/FormCenter/Open-Records-Request-7/Open-Records-Request-42
>
> I will be speaking with Oxy today and will get the number of attendees for the Neighborhood Meeting from last Wednesday.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

Please Note: Firestone Town Hall is moving soon! New address starting on Tuesday, September 7, 2021: 9950 Park Ave., Firestone, CO 80504

firestoneco.gov | Twitter | Facebook



From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Thursday, August 26, 2021 2:41 PM
To: Marty Ostholthoff
Subject: Request for Cooperative Development Agreement

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---

Hello Marty,

The Oxy people said that the above agreement was signed in April 2021 with the Town of Firestone. May I please have a copy of this?

They also mentioned that they gave the Town of Firestone 78 acres of land. When was this done and where is it?

Do you know how many people attended the online meeting that they held last night?

Thank you!

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 30, 2021 4:50 PM
To: Marty Ostholthoff
Subject: Re: Request for Cooperative Development Agreement

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Thank you!

Keep Firestone Beautiful!

On Mon, Aug 30, 2021 at 4:49 PM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> Yes, the CDPA was adopted by the Board of Trustees. To get a fully executed copy of the CDPA you will need to fill out the public information request.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager
>
> **P** 303.531.6275
>
> 151 Grant Avenue, Firestone, CO 80520
>
> Mail: P.O. Box 100, Firestone, CO 80520
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> mostholthoff@firestoneco.gov
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> **Please Note:** Firestone Town Hall is moving soon! New address starting on Tuesday, September 7, 2021: 9950 Park Ave., Firestone, CO 80504
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> I will be speaking with Oxy today and will get the number of attendees for the Neighborhood Meeting from last Wednesday.
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mostholthoff@firestoneco.gov

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Sent: Thursday, August 26, 2021 2:41 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Subject: Request for Cooperative Development Agreement

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Thank you!

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 23, 2021 3:16 PM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; Joelpriest37@yahoo.com; jdubbs2023@yahoo.com; Ronald Alper; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; Dot Priest; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; Ned redenbarger; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
Subject: Re: Colorado and Pine Cone - drilling rig on property

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Thank you for clarifying this. Most appreciated!

Keep Firestone Beautiful!

On Mon, Aug 23, 2021 at 7:07 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> The rig currently operating near the southeast corner of Pine Cone Avenue and Colorado Boulevard is a maintenance rig that is working on the plugging and abandonment of an existing well that was drilled in 1992. More information can be found by this link:
>
> https://www.firestoneco.gov/DocumentCenter/View/7608/ROCKY-MOUNTAIN-FUEL-19-4N---Start-of-Plugging-Operations---08132021
>
> Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

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From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Saturday, August 21, 2021 11:33 AM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; JoelP@idealfencingcorp.com; jdubbs2023@yahoo.com; Ronald Alper <alperrd@gmail.com>; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; dschlegel2963@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce <debra.l.pierce@gmail.com>; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; dot@mykeyinsurance.com; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; nedred8@gmail.com; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
Subject: Colorado and Pine Cone - drilling rig on property

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---

Hello Marty,

We wanted to first thank you for fielding all of our questions and for keeping a file of our concerns/questions/feedback to the Gavin well pad proposal.

We have communicated to the homeowners at Falcon Point at Saddleback that the proposal has not been approved so we were all confused when we saw the activity on the site and a drilling rig.

Can you please share with us what is happening so we are informed?

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Monday, August 23, 2021 3:17 PM
To: Marty Ostholthoff
Subject: Re: Gavin well pad proposal - Filing with State of CO

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Thank you Marty. We will do that.

Keep Firestone Beautiful!

On Mon, Aug 23, 2021 at 7:10 AM Marty Ostholthoff <MOstholthoff@firestoneco.gov> wrote:

> Hi Suzanne,
>
> I'm pretty sure Oxy has filed their permits with the State. I suggest that you contact Oxy or the COGCC to find out about the state's process/timeline.
>
> Thanks
>
> **R. MARTIN OSTHOLTHOFF**
>
> Town of Firestone | Planning Manager
>
> **P** 303.531.6275
>
> 151 Grant Avenue, Firestone, CO 80520
>
> Mail: P.O. Box 100, Firestone, CO 80520
>
> mostholthoff@firestoneco.gov

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From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Sunday, August 22, 2021 3:06 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Cc: keepfirestonebeautiful@gmail.com
Subject: Gavin well pad proposal - Filing with State of CO

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---

Hello Marty,

Unsure of this process, when does the applicant file the permit with the State of CO? I was unable to locate anything on this proposal with the COGCC.

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <keepfirestonebeautiful@gmail.com>
Sent: Saturday, August 21, 2021 11:33 AM
To: Marty Ostholthoff
Cc: MLarson@bouldercc.org; garold.bell@gmail.com; JoelP@idealfencingcorp.com; jdubbs2023@yahoo.com; Ronald Alper; annslusher@gmail.com; tdansdill@yahoo.com; bethafaller@hotmail.com; bretlward@gmail.com; cmadock.dmv@gmail.com; csmccrain@gmail.com; crscott86@gmail.com; crystalsoderman@gmail.com; dschlegel2963@gmail.com; zimm74@live.com; dec8327@gmail.com; Debra Pierce; dmcorden@yahoo.com; amyeward7@gmail.com; don.iselin@gmail.com; donnadollarhide@hotmail.com; doemort43@yahoo.com; dot@mykeyinsurance.com; GJJ52@att.net; gfuentesv@me.com; jaco737@gmail.com; jkwyatt17@gmail.com; biggitybakes@gmail.com; jeffakahn16@gmail.com; walkersmountain@msn.com; espinoza298@gmail.com; clsanderson19@msn.com; lmcgehee68@gmail.com; troutbum.mh1126@gmail.com; mikeandlindaray@gmail.com; mikeross38@hotmail.com; nedred8@gmail.com; bradschlegel1@gmail.com; rc8899@icloud.com; scott.1.anderson@uspsector.com; scolvin@bitstream.net; salper49@gmail.com; terrihogan12@msn.com; happyvrv@yahoo.com; billhohs1@comcast.net; william.f.mcgehee@gmail.com; ssisario@gmail.com; jsmith4384@gmail.com; tasmith428@gmail.com
Subject: Colorado and Pine Cone - drilling rig on property

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Hello Marty,

We wanted to first thank you for fielding all of our questions and for keeping a file of our concerns/questions/feedback to the Gavin well pad proposal.

We have communicated to the homeowners at Falcon Point at Saddleback that the proposal has not been approved so we were all confused when we saw the activity on the site and a drilling rig.

Can you please share with us what is happening so we are informed?

Thank you, Suzanne Johnson

Keep Firestone Beautiful!

From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Friday, August 20, 2021 6:05 AM
To: Marty Ostholthoff
Subject: Fwd: Re: Contact Info

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Hello Marty,

Per our phone call yesterday, please find the questions I have asked Julie Coleman at Oxy. I will forward you her replies.

Thank you!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

Live simply. Love generously. Care deeply. Speak kindly. Leave the rest to God.

---------- Original Message ----------
From: Suzanne Johnson
To: "Coleman, Julie"
Cc: Colorado Stakeholder , Suzanne Johnson
Date: 08/19/2021 8:48 AM
Subject: Re: Contact Info

Hello Julie,

Thanks so much for reaching our earlier in the week; I appreciate this very much.

I have the following questions for you or your team:

1. What is the value of the equipment that will be on the 25 acreas during the drilling phase?
2. What is the value of the equipment that will by on the permanent 7.08 acres?
3. How long is the drilling phase?

4. How long do you plan to keep your equipment on the permanent footprint?
5. How long will it take to reduce the disturbance area from 25 acres to 7.08 acres?
6. Will the permanent location of 7.08 acres be landspaced around the equipment? If so, what will that consist of?
7. What did McKee/Oxy/Anadarko pay in property tax on the land for 2020 (tax year 2019.)
8. What did McKee/Oxy/Anadarko pay in property tax for the land in 2021 (tax year 2020.)
9. What does McKee/Oxy/Anadarko expect to pay in personal property tax on the equipment? During drilling and for the permanent equipment?
10. Is there plans to build anything else on the approx 100 acres?
11. Is there plans to sell off any of the 100 acres?
12. Is there plans to submit additional Special Review Use permits on any other sections of the land?
13. Will drilling take place 24 hours a day, 7 days a week?
14. Can you please provide photographs (aerial and street level,) of another one of your 7 acre permanent production facilities that is exactly or similar in nature to the equipment you are proposing for this site?
15. Will the equipment on the permanment site be "tankless?"
16. What type of oil are you seeking to extract?
17. Is the product trucked out or piped out or both?
18. What is the circle of exposure? What does circle of exposure mean?
19. Were other sites, not adjacent to homes, recreation areas, and retail considered to access this oil?
20. Are any of the mineral rights owned by residents of Firestone, CO? Any who neighbor, or are in close proximity to the site in question?
21. On Page 12 of the Special Review Use Proposal dated June 2021, there is a "Typical Drilling Payout." Does that cover the 25 acres or the 7.08 acres?
22. There was a Raptor survey that appears to have not been completed. Will it be?
23. What does the 1/2 mile buffer refer to?
24. Are any berms in the plan for the area surrounding the permanent site?

I really appreciate you taking the time to gather the information requested and I will look forward to receiving a reply to this email with the information hopefully by close today.

Thanks so much, Suzanne Johnson

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

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On 08/16/2021 6:39 PM Coleman, Julie wrote:

Suzanne,

It was great talking to you tonight. Attached is a fact sheet about our team and the project in your neighborhood. We look forward to meeting with you at your convenience to answer your questions, get your feedback and share additional resources. Also, if there are specific topics or questions you'd like us to discuss in the community meeting, please let us know.

It does not appear that you've registered for the community meeting yet. Would you like us to register you? If not, you can sign up here.

We look forward to meeting with you. Have a great night.

Julie W. Coleman | Stakeholder Relations Manager
720.929.4572 office – 303.667.9343 cell



From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Thursday, August 19, 2021 9:12 AM
To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

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Hi Marty,

I received a call from Julie Coleman/Oxy and have since sent her a list of questions.

I have a couple for you:

1. Do you know how many cars/trucks trips are made going South to North on Colorado at or around Pine Cone?
2. Can you send me the link for the Town of Firestone's mission?
3. Do you know what the resorviour in Frederick is used for?
4. Do you have how many car/truck trips are made daily on Pine Cone from Colorado to CR 19?

You explained the process of the planning commission make a recommedation to the trustees and then they vote on it based upon all the evidence for and against the use permit. When and where is the public comment/assembly to express thoughts on this use permit?

Thank you!

Choosing joy and hope,

Suzanne W. Johnson
swjjohnson@comcast.net
720 839 8220

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On 08/16/2021 4:54 PM Marty Ostholthoff wrote:

No problem...please call me back if you have any additional questions. Thanks

R. MARTIN OSTHOLTHOFF

Town of Firestone | Planning Manager

P 303.531.6275

151 Grant Avenue, Firestone, CO 80520

Mail: P.O. Box 100, Firestone, CO 80520

mostholthoff@firestoneco.gov

firestoneco.gov | Twitter | Facebook



From: Suzanne Johnson
Sent: Monday, August 16, 2021 3:21 PM
To: Marty Ostholthoff
Subject: RE: Gavin well head proposal - questions

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Thank you Marty. I really appreciate this!

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> On 08/16/2021 2:59 PM Marty Ostholthoff <mostholthoff@firestoneco.gov> wrote:
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From: Suzanne Johnson <swjjohnson@comcast.net>
Sent: Sunday, August 15, 2021 2:30 PM
To: Marty Ostholthoff <MOstholthoff@FirestoneCO.gov>
Subject: Gavin well head proposal - questions

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1. What does the City of Firestone gain from having an oil/gas production facility on land within the city limits?

2. Can the City refuse to approve this special use permit proposal? If so, what is needed to do this?

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9. Should we be expressing our concerns to the City Council?

It is obvious that I am very concerned about this proposal as are many, many of the other residents. The beautiful property if flanked by two wonderful golf courses, the Firestone Trail, lovely, brand new homes, and large ranchettes. An oil and gas operation just does not seem synergistic with the surroundings; and a 7 acre permanent one to boot.

We want to protect the beauty of this town we have all begun to love. It is obvious from the amazing library to the modern, relevant architecture of our police and municipal building that this city is it being very careful with its image and its services to the citizens. As residents of this town, we too want to be part of sensible, thoughtful growth and planning.

I look forward to hearing from you and if hopping on a call would be better, I'd be happy to do this too.

Thanks so much, Suzanne Johnson

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Hi Marty,

Some folks have asking who they address their feedback and concerns to at the Town of Firestone about this proposal. Is there name and email of someone who this feedback should go to?

Thank you!

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