

**CASCADE CREEK  
OIL AND GAS DEVELOPMENT PLAN  
CUMULATIVE IMPACTS PLAN**

**Prepared for:**



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**2516 FORESIGHT CIRCLE, #1  
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## SUMMARY

Based on WestWater Engineering's review of the proposed Cascade Creek Oil and Gas Development Plan (OGDP) no significant cumulative impacts are anticipated as a result of this project. The proposed OGDP would be located in rural Garfield County, Colorado on privately owned lands in the vicinity of existing oil and gas infrastructure. The project would involve the development of three well pad locations and a waste management facility to manage dried drill cuttings that would be produced during drilling activities of the three well pads. Sixty-five new wells would be drilled from the three well pads. The proposed project would create approximately 12.32 acres of new disturbance during construction of one new well pad, the expansion of three existing well pads, and construction of an associated pipeline alignment. After interim reclamation has occurred, a total of 7.3 acres would remain as working pad surface. During interim reclamation, the areas within the disturbance boundaries not needed for working surface would be reclaimed and seeded with an appropriate seed mix. The project area would be greater than 1-mile from any residential buildings, schools, or daycare centers. Laramie has committed to implementing and adhering to Best Management Practices to help mitigate potential impacts associated with this OGDP. They have also committed to implementing numerous plans to mitigate potential impacts during pre-production and production activities that will be submitted with the Form 2A's for each of the locations associated with this OGDP. These plans include, but are not limited to the following: noise, lighting, stormwater management, traffic, water, dust mitigation, and topsoil protection. Air emissions generated during pre-production and production activities would not cause Garfield County to reach non-attainment levels for criteria pollutants. Laramie will apply for an APEN permit with the Colorado Department of Health and Environment (CDPHE) for any pollutant source that exceeds APEN thresholds. Prior to drilling activities, Laramie will implement an air monitoring plan for compliance with CDPHE's Regulation 7. It is not anticipated that the Cascade Creek OGDP would impact surface/ground water resources and/or public water system intakes due to the distance of the project from these resources and with the implementation of appropriate spill prevention measures, stormwater management plans, and BMPs at each location. The proposed project features associated with this OGDP would not be located within High Priority Habitat for wildlife as mapped by Colorado Parks and Wildlife. Impacts to wildlife species would be short-term during pre-production activities. With the implementation of the operator committed Best Management Practices and plans associated with the Form 2A, it is anticipated that impacts would be mitigated or negligible at a population level for wildlife species with potential to occur.

## 1.0 INTRODUCTION

At the request of Laramie Energy, LLC (Laramie), WestWater Engineering (WestWater) has prepared this report to analyze the impacts of the proposed Cascade Creek Oil and Gas Development Plan (OGDP). This report was prepared to fulfill the requirements of the Colorado Oil and Gas Conservation Commission’s (COGCC) Rule 303.a.(5)B, 303.a.(5)C, and 303.a.(5)D.

The Cascade Creek OGDP includes three well pad locations (CC 0603-23-32, CC 0610-21-41, CC 0697-15-08) and one cuttings management facility (CC 0697-15-54 Annex Cuttings Facility). The well pad locations and cuttings management facility would be located in Garfield County, Colorado in Sections 3, 10, and 15, Township 6 South, Range 97 West (Figure 1). Permit applications (including Form 2A’s and 2B’s) will be submitted for each location included in this OGDP.

## 2.0 OVERVIEW OF OIL AND GAS DEVELOPMENT PLAN

The Cascade Creek OGDP will be operated by Laramie and located on privately owned surface on the Roan Plateau. The OGDP involves the construction and development of three well pad locations and one cuttings management facility. The following well pads are included in the OGDP: CC 0603-23-32, CC 0610-21-41, and CC 0697-15-08. The Annex Cuttings Management Facility would be constructed to manage cuttings from the three well pads.

The CC 0603-23-32 and CC 0610-21-41 well pads are existing locations. No additional construction would be required for the CC 0610-21-41. The CC 0603-23-32 well pad would require expansion of the existing well pad. The CC 0697-15-08 would be a newly constructed well pad. The Annex Cuttings Management Facility would be constructed on an existing well pad. The existing well pad will need to be expanded by approximately 2.95 acres to accommodate the cuttings management facility. The Annex Cuttings Management Facility expansion would occur on existing disturbance that has recently undergone interim reclamation. The total new surface disturbance associated with the locations is approximately 11.5 acres and 0.82 acres for the proposed pipeline associated with the CC 0603-23-32 pad. After interim reclamation has occurred, approximately 7.3 acres of working surface would remain for the planned locations. A description of surface disturbance associated with each location is described in Table 1.

**Table 1. Disturbance Associated with each Location in the Cascade Creek OGDP**

Location Name	*Acres of Existing Disturbance	Acres of New Disturbance	**Acres of Working Surface after Interim Reclamation
CC 0610-21-41	7.0	0	1.7
CC 0603-23-32	2.8	3.9	3.2
CC 0603-23-32 Adjoining Pipeline	0.74*	0.82	0
CC 0697-15-08	0	7.6	1.8
Annex Cuttings Management Facility	2.95	0	0.0**

Location Name	*Acres of Existing Disturbance	Acres of New Disturbance	**Acres of Working Surface after Interim Reclamation
Cascade Creek OGDP Total	13.49	12.32	7.3

*\*0.74 acres of the pipeline alignment is included within the 0603-23-32 working pad surface.*

*\*\* The Annex Cuttings Facility will not undergo interim reclamation. The lifespan of the facility is estimated at 3-5 years, at the end of the facility lifespan it will undergo final reclamation.*

Laramie will drill a total of 65 new wells and it will take approximately 434 days (62 weeks) to drill all the wells that are planned as part of this OGDG. There will be no simultaneous drilling or completions operations.

Laramie will use approximately 298,969 barrels (bbls.) of fresh water and 179,366 bbls. of recycled water during drilling operations for the 65 wells planned as part of this OGDG. An estimated 97,800 bbls. of fresh water will be used for dust abatement during construction and drilling activities associated with this OGDG. Fresh water will be sourced from ponds on Cascade Creek and the Savage pond which are all located on private surface. In the event that fresh water is not available at the ponds water will be purchased from Kobe Water Authority and Knowles Transportation Enterprises which will be sourced from the Colorado River. It is estimated that 5,850,000 bbls. recycled produced water would be used during completions operations. No fresh water will be used during completions.

As part of this OGDG, Laramie is requesting a variance for the Annex Cuttings Management Facility from the requirement for a 10-foot fire lane and fencing around the perimeter of the facility to prevent wildlife from accessing the site as stated in 908.b.5.D. under the Centralized E&P Waste Management Facility Siting Requirements in the 900 Series of the COGCC Rules. The variance requests for the Annex Cuttings Management Facility have been submitted with the OGDG for this project.

In order to reduce and/or avoid impacts to public health, the environment, and wildlife as a result of this OGDG, Laramie has committed to implementing Best Management Practices (BMPs) as outlined in Appendix A of this plan.

### **3.0 CUMULATIVE IMPACTS EVALUATION**

#### ***Rule 303.a.(5)B. Resource Impacts.***

#### **3.1 Air Resources**

##### **Existing Environment:**

The Cascade Creek OGDG would be located in Garfield County, Colorado in the vicinity of existing oil and gas well pads and associated infrastructure. The National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA) specify limits for criteria air pollutants. Criteria pollutants include carbon monoxide, particulate matter (PM 10 and PM 2.5), ozone, nitrogen oxides, sulfur dioxide, total suspended particulates, volatile organic compounds (VOCs), lead, fluorides, sulfuric acid mist,

hydrogen sulfide, and total reduced sulfur compounds. If the levels of a criteria pollutant in an area exceed the NAAQS, the airshed is designated as a nonattainment area. Areas that meet the NAAQS for criteria pollutants are designated as attainment areas. Garfield County currently meets NAAQS for criteria pollutants and is designated as an attainment area (EPA 2021).

**Cumulative Impact:**

A quantitative evaluation of the incremental increase for air pollutants listed by the COGCC for Rule 303.a.(5)B. are provided in Tables 2 and 3 below for pre-production and production equipment planned for the entire the Cascade Creek OGDG on an annual basis.

**Table 2. Annual Pre-Production Emissions (in tons) Estimates for the Cascade Creek OGDG (65 wells)**

Equipment	NOx	CO	VOCs	Methane	Ethane	CO2	N2O
Process Heaters or Boilers	0.19	0.16	0.01	0.00	0.00	228.37	0.00
Storage Tanks	0.00	0.00	1.34	0.98	0.56	0.13	0.00
Venting or Blowdowns	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combustion Control Devices	0.14	0.74	0.00	0.00	0.00	1058.05	0.00
Non-Road Internal Combustion Engines	12.59	7.24	0.86	24.83	3.53	1471.00	4.96
Drill Mud	0.00	0.00	0.89	5.33	0.76	0.59	0.00
Flowback or Completions	0.00	0.00	26.44	158.76	22.58	17.63	0.00
Loadout	0	0	0	0	0	0	0

**Table 3. Annual Production Equipment Emission (in tons) Estimates for the Cascade Creek OGDG**

Equipment	NOx	CO	VOCs	Methane	Ethane	CO2	N2O
Stationary Engines or Turbines	0	0	0	0	0	0	0
Process Heaters or Boilers	0.19	0.00	0.00	0.00	0.00	0.00	0.00
Storage Tanks	0.00	0.00	1.39	1.02	0.58	0.13	0.00
Dehydration Units	0	0	0	0	0	0	0
Pneumatic Pumps	0	0	0	0	0	0	0
Pneumatic Controllers	0	0	0	0	0	0	0
Separators	0	0	0	0	0	0	0

**Table 3. Annual Production Equipment Emission (in tons) Estimates for the Cascade Creek OGD**

Equipment	NOx	CO	VOCs	Methane	Ethane	CO2	N2O
Fugitives	0	0	0.15	0.67	0.13	0.00	0
Venting or Blowdowns	0	0	5.33	3.90	2.09	0.40	0
Combustion Control Devices	0.14	0.77	0.00	0.00	0.00	1097.25	0.00
Non-Road Internal Combustion Engines	0	0	0	0	0	0	0
Loadout	0.00	0.00	0.01	0.02	0.01	0.05	0.00
Well Bradenhead	0.00	0.00	0.29	1.76	0.25	0.20	0.00
Well Maintenance	0.00	0.00	2.35	14.11	2.01	1.57	0.00

The total diesel vehicle miles associated with the Cascade Creek OGD are presented in Table 4. All vehicles associated with the project will be industry standard and will comply with national and state engine and exhaust regulations.

**Table 4. Total Diesel Vehicle Miles associated with the Cascade Creek OGD.**

Activity	Miles
Construction	191.6
Drilling	22,685
Completions	9,613
Interim Reclamation	278.8
Production	0
Total	32,768.4

It should be noted that for the Annex Cuttings Management Facility (included with this OGD), there will be no pre-production or production equipment as described in Tables 2 and 3 on the location; therefore, no emissions were calculated for this location.

The emissions listed for pre-production equipment would only occur during drilling and completions operations of the wells planned with the Cascade Creek OGD. Once drilling and completions are completed, there would be an incremental increase in air pollutants as a result of production equipment located on each well pad as shown in Table 3. Laramie will apply for an APEN permit with the Colorado Department of Health and Environment (CDPHE) for any pollutant source that exceeds APEN thresholds. The incremental increase of criteria pollutants associated with this OGD are unlikely to cause Garfield County to reach non-attainment levels.

Laramie will comply with all the CDPHE Regulation 7, Part D, Section VI requirements “*Oil and Natural Gas Pre-production and Early Production Operations*”. Currently, Laramie is

developing an air monitoring plan to address Section VI requirements and will comply with the monitoring, record keeping, reporting, and emission reduction requirements of Section VI. Laramie will submit the air monitoring plan for the three proposed well pads to CDPHE and Garfield County at least 60 days prior to the commencement of air monitoring. Air monitoring will begin at least 10 days prior to drilling. Implementation of the Dust Mitigation Plans and Air Monitoring Plans associated with each well pad would help to avoid and/or minimize cumulative impacts to air quality as a result of this OGDG.

**Mitigation Measures:**

No cumulative adverse impacts to air resources are anticipated as a result of this project; therefore, no additional mitigation measures are proposed as part of this OGDG

**3.2 Public Health**

**Existing Environment:**

The proposed Cascade Creek OGDG would be located in Garfield County in the vicinity of existing oil and gas well pads and infrastructure. There are no residential buildings, day care centers, or schools within 1-mile of this OGDG. The Environmental Protection Agency under the Clean Air Act is required to regulate Hazardous Air Pollutants (HAPs). In order to comply with this regulation, the CDPHE Air Quality Control Commission requires all new sources of HAPs to comply with the standards, criteria, and requirements of the National Emission Standards for HAPs.

**Cumulative Impact:**

A quantitative evaluation of the incremental increase in total hazardous air pollutant emissions (HAP) as a result of the Cascade Creek OGDG are provided in Tables 5 and 6 for pre-production and production equipment on an annual basis.

It should be noted that for the Annex Cuttings Management Facility (included with this OGDG) there will be no pre-production or production equipment as described in Tables 5 and 6 present on the location; therefore, no emissions were calculated for this location. The number of vehicle trips on and off each location during pre-production and production activities are presented in Table 7.

**Table 5. Annual HAP Emissions (in pounds) for Pre-Production Equipment for the Cascade Creek OGD**

Equipment	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	2,2,4-Trimethylpentane (2,2,4-TMP)	Hydrogen sulfide (H <sub>2</sub> S)	Formaldehyde	Methanol	Total (HAP)
Process Heaters or Boilers	0.13	0.05	0.00	0.02	0.09	0.02	0.00	1.71	0.26	2.28
Storage Tanks	35.99	90.84	3.19	33.08	120.05	8.77	0.00	0.00	0.00	291.94
Venting or Blowdowns	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combustion Control Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Road Internal Combustion Engines	12.68	4.45	0.17	1.54	8.91	2.06	0.00	165.30	24.67	219.77
Drill Mud	12.68	29.12	1.32	12.64	46.79	0.12	0.00	0.00	0.59	103.25
Flowback or Completions	377.45	866.69	39.44	376.15	1392.69	3.51	0.00	0.00	17.61	3073.54
Loadout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 6. Annual HAP Emissions (in pounds) for Production Equipment for the Cascade Creek OGD**

Equipment	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	2,2,4-Trimethylpentane (2,2,4-TMP)	Hydrogen sulfide (H <sub>2</sub> S)	Formaldehyde	Methanol	Total (HAP)
Stationary Engines or Turbines	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 6. Annual HAP Emissions (in pounds) for Production Equipment for the Cascade Creek OGD**

Equipment	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	2,2,4-Trimethylpentane (2,2,4-TMP)	Hydrogen sulfide (H <sub>2</sub> S)	Formaldehyde	Methanol	Total (HAP)
Process Heaters or Boilers	0.13	0.05	0.00	0.02	0.09	0.02	0.00	1.71	0.26	2.28
Storage Tanks	37.32	94.21	3.31	34.31	124.50	9.10	0.00	0.00	0.00	302.75
Dehydration Units	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pneumatic Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pneumatic Controllers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Separators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitives	2.13	4.89	0.22	2.12	7.85	0.02	0.00	0.00	0.10	17.33
Venting or Blowdowns	87.06	279.64	9.15	132.55	372.54	26.71	0.00	0.00	0.01	907.66
Combustion Control Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Road Internal Combustion Engines	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loadout	0.25	0.29	0.01	0.07	0.42	0.03	0.00	0.00	0.01	1.08
Well Bradenhead	4.19	0.00	0.00	0.00	15.47	0.04	0.00	0.00	0.20	19.90
Well Maintenance	33.55	77.04	3.51	33.44	123.79	0.31	0.00	0.00	1.57	273.20

**Table 7. Total Number of Vehicle Trips associated with the Cascade Creek OGDG along Public Roads**

Activity	Number of Vehicle Trips
During Construction (monthly)	136
During Construction (annual)	136
During Drilling (monthly)	857
During Drilling (annual/total)	3,635
During Completions (monthly)	11,055
During Completions (annual/total)	19,866
During Interim Reclamation (annual/total)	85
During Production (monthly)	94.5
During Production (annual/total)	34,492.5

No proppant is planned to be used during completions activities; therefore, there will be no impacts to public health as a result of proppant use. It is anticipated that the initial phase of operation for each location will incur the most vehicular trips (initial grading, drilling, completions, and flowback activities). Once the locations are producing it is anticipated that vehicle trips will be greatly reduced. Daily vehicle trips during the production phase will range from 4 to 97.3 vehicles per day.

With the implementation of the Dust Mitigation Plans, Air Monitoring Plans, and Best Management Practices outlined in Appendix A for each location, the adverse cumulative impacts would be avoided and/or minimized. There are no residential buildings, day care centers, or schools within 1 mile of the OGDG. The project area is located in a remote part of Garfield County where short and long-term adverse impacts to public health as a result of pre-production and production HAPs emissions are unlikely.

**Mitigation Measures:**

No cumulative adverse effects are anticipated to Public Health as a result of this OGDG; therefore, no additional mitigation measures or offset measures are proposed with this OGDG.

**3.3 Water Resources**

**Existing Environment:**

The proposed Cascade Creek OGDG would be located on top of the Roan plateau in the vicinity of numerous intermittent drainages. The distance in feet to the nearest drainage for each location included in this OGDG is outlined in Table 8.

**Table 8. Nearest Surface Water Resource to Each Location**

Well Pad Name	Distance to Feature	Description
CC 0603-23-32	814 feet	Intermittent stream
CC 0610-21-41	1,084 feet	Intermittent stream
CC 0697-15-08	137 feet	Intermittent stream
CC 0697-15-08	1,311 feet	Spring in McKay Gulch
Annex Cuttings Management Facility	979 feet	McKay Gulch – intermittent stream

Well Pad Name	Distance to Feature	Description
Annex Cuttings Management Facility	2,310 feet	Spring in McKay Gulch

There are no known wetlands or riparian areas within 2,640 feet of any of the locations included in the Cascade Creek OGD. A spring is located in McKay Gulch approximately 2,310 feet from the Annex Cuttings Management Facility. The estimated depth to groundwater for each location is described in Table 9.

**Table 9. Estimated Depth to Ground Water for Each Location**

Well Pad Name	Estimated Depth (feet)
CC 0603-23-32	200
CC 0610-21-41	200
CC 0697-15-08	100
Annex Cuttings Management Facility	250

There are no public water system intakes within 5,280 feet of the locations included in this OGD. Hydrologic maps for each location included in the OGD are attached in Appendix B.

**Cumulative Impact:**

During the pre-production phase of the project, approximately 1,625 gallons of downhole scale inhibitor would be stored on the well pad locations. Each portable chemical storage unit is outfitted with a containment feature which is adequate for the size of the storage tank to prevent discharges. All chemical storage units will be inspected on a routine basis during drilling and completion activities. In the unlikely event of a release, the impacted soils on location will be cleaned up following State and Federal Regulations.

No stored fluids will be located on the cuttings management facility aside from the dry cuttings material that is to be managed at the facility. It is estimated that each well pad location will contain 1,600 bbls. of produced water and 1,600 bbls. of condensate for a total of 4,800 bbls. of produced water and 4,800 bbls. of condensate to be stored on-site as part of this OGD. There is potential for spills to occur on the locations and to migrate off-site to downstream waterways. A spring is located in McKay Gulch approximately 2,310 feet from the Annex Cuttings Management Facility and approximately 1,311 feet from the proposed CC 0603-15-08 well pad. A Sensitive Area Determination was completed for the Annex Cuttings Management Facility and it was determined that the project would not be located within a Sensitive Area for water resources. Several other intermittent channels are also located in the vicinity of the Cascade Creek OGD. An intermittent channel as indicated on USGS topographic maps is located approximately 137 feet northwest of the CC 0697-15-08 well pad; however, there is no defined channel and no ordinary high-water mark is present. A follow-up field visit and coordination with the Army Corps of Engineers will be conducted in the spring of 2022 to confirm that there is no ordinary high-water mark. There are no wetlands or riparian corridors within 2,640 feet of the well pad locations included in the Cascade Creek OGD. There are also no public water system intakes within 5,280 feet of the OGD.

It is not anticipated that the Cascade Creek OGDG would impact surface/ground water resources and/or public water system intakes due to the distance of the project from these resources and with the implementation of appropriate spill prevention measures, stormwater management plans, and BMPs at each location.

Laramie estimates that a total of 298,969 bbls. of fresh water will be used during drilling and 97,800 bbls. of fresh water will be used for dust abatement during drilling and construction activities within the Cascade Creek OGDG. Fresh water will be sourced from privately owned ponds. In the event that fresh water is unavailable at the ponds water would be purchased from private sources and sourced from the Colorado River. No groundwater will be used during drilling or completions operations. During completions operations, Laramie plans to use recycled produced water. An estimated 5,850,000 bbls. of recycled water use during completions activities. Approximately 93.8% of the water used for drilling and completions activities will be recycled water. Total water usage during pre-production and production activities associated with the Cascade Creek OGDG is described in Table 10.

**Table 10. Total Water Usage Associated with the Cascade Creek OGDG.**

Activity	Fresh Water (bbls.)	*Recycled Water (bbls.)	Total Water Usage
Dust Abatement	97,800	0	97,800
Drilling	298,969	179,366*	478,335
Completions	0	5,850,000*	5,850,000
Production	0	0	0
Total	396,769	6,029,366	6,426,135

*\*Recycled water is composed of recycled mud during drilling activities and produced water to be used during completions operations.*

With the implementation of the Water Plans Management, Leak Detection, and Stormwater Management Plans, and Best Management Practices (Appendix A) associated with each location, no adverse cumulative long-term or short-term impacts to water resources are anticipated as a result of this OGDG.

**Mitigation Measures:**

No adverse cumulative impacts are anticipated to Water Resources as a result of this project; therefore, no mitigation or offsets are proposed.

**3.4 Terrestrial and Aquatic Wildlife Resources and Ecosystems**

**Existing Environment:**

The Cascade Creek OGDG includes three well pad locations and one cuttings management facility which are located on the Roan Plateau on privately owned surface. Valuable wildlife habitat is present on the top of the Roan Plateau for mule deer, elk, Greater Sage-grouse, and various other migratory birds, raptors, and wildlife species. The Cascade Creek OGDG would be located in the vicinity of the following High Priority Habitat (HPH) areas (COGCC 2021): elk production area, aquatic sportfish management area, Greater Sage-grouse General Habitat Management Area, and Greater Sage-grouse Priority Habitat Management Area.

**Cumulative Impact:**

The Cascade Creek OGDG would create approximately 11.5 acres of new surface disturbance during well pad construction and expansion of existing locations and 0.82 acres of new disturbance associated with the pipeline for the CC 0603-23-32 pad. This would result in the incremental loss of vegetation that has the potential to provide forage and cover for wildlife species occurring in the project vicinity. Once the well pads have undergone interim reclamation and the pipeline has been installed and reclaimed, approximately 7.3 acres would remain unvegetated for the life of the wells. The current land use within the OGDG is rangeland. No other land use types designated by COGCC would be impacted as a result of this OGDG.

None of the locations included in the OGDG would be located within any areas identified as HPH (COGCC 2021). A table of the distance to each HPH area within 1-mile of the locations is included in Table 11.

**Table 11. HPH Areas Within 1-mile of Cascade Creek OGDG**

Location Name	HPH	Distance (feet)
CC 0603-23-32 CC 0603-23-32	Elk Production Area	4,105
	Greater Sage-grouse General Habitat Management Area	216
	Aquatic Sportfish Management Water	1,309
CC 0610-21-41	Elk Production Area	3,479
	Greater Sage-grouse General Habitat Management Area	776
	Aquatic Sportfish Management Water	3,012
CC 0697-15-08	Greater Sage-grouse General Habitat Management Area	438
	Greater Sage-grouse Priority Habitat Management Area	3,110
	Aquatic Sportfish Management Water	4,756
CC 697-15-54 Annex Cuttings Facility	Greater Sage-grouse Priority Habitat Management Area	1,558
	Greater Sage-grouse General Habitat Management Area	83
	Aquatic Sportfish Management Water	4,686

There is the potential for wildlife resources to be impacted during project construction, drilling, and completions operations for the locations included in the OGDG. Activities associated with development of the OGDG (noise, light, odors, and vehicle traffic) have the potential to impact wildlife resources by causing avoidance of forage, cover, disruption to nesting and brood rearing activities for Greater Sage-grouse and migratory birds, and direct mortality with vehicle collisions from truck traffic.

Laramie will comply with the Operating Requirements as outlined in Rule 1202 for the Protection of Wildlife Resources. The Cascade Creek OGDG would not be developed within any areas identified as HPH. Much of the OGDG consists of the expansion of existing well pad locations within the vicinity of existing well pads, pipeline rights-of-way (ROW), access roads, and other oil and gas infrastructure. Because of these existing landscape modifications and human activity, the effects of additional activity are likely to be minimal and temporary. Wildlife populations have become somewhat habituated to human activity in the area and indirect impacts from construction of this project would be low. Vehicle related mortality attributable to this project is unlikely given the current traffic volumes and generally low speed limits on the existing roads.

Laramie Energy is requesting a variance to Rule 907.b.(5).C, which requires that for a Centralized E&P Waste Facility that measures will be taken to prevent access to the facility by wildlife and domestic animals. After consultation with Colorado Parks and Wildlife, it was concluded that the Annex Cuttings Management Facility would not need to be fenced to prevent access by wildlife, because the facility does not pose a threat to wildlife due to its design. Nor, does the facility pose a threat to domestic animals that would be present in the vicinity. The facility will be three sided with the north end open for vehicles to drive in and out which will provide sufficient egress for animals should they enter the facility. No liquids, standing water, and hazardous materials will be stored or transported to the site. Only dried cuttings materials will be stored and treated at the facility.

**Mitigation Measures:**

No adverse cumulative impacts are anticipated to Wildlife Resources at a population level; therefore, no mitigation or offsets are proposed as part of this OGDG.

**3.5 Soil Resources**

**Existing Environment:**

Three soil types occur within the Cascade Creek OGDG and are described in Table 12 (NRCS 2021). The soils types present in the project area are derived from sandstone, shale and sedimentary rock. None of the soil types present are classified as prime farmland (NRCS 2021).

**Table 12. NRCS Mapped Soil Units within the Cascade Creek OGDG.**

Map Unit Symbol	Soil Type	Description
55	Parachute-Irigul complex, 5 to 30 percent slopes	This soil type occurs on mountain slopes and is well drained. The parent material is colluvium over residuum weathered from sandstone and shale.
52	Northwater-Adel complex, 5 to 50 percent slopes	This soil type occurs on mountain slopes and is well drained. The parent material is colluvium over residuum weathered from sedimentary rock.
56	Parachute-Irigul-Rhone association, 25 to 50 percent slopes	This soil type occurs on mountain slopes and is well drained. The parent material is colluvium over residuum weathered from sandstone and shale.

The OGDG would be situated in a rangeland land use type as defined by COGCC. There are three main vegetation community types present surrounding the Cascade Creek OGDG project area: mountain shrublands, sagebrush shrublands, and aspen woodlands. The mountain shrublands are composed primarily of Utah serviceberry (*Amelanchier utahensis*) intermixed with mountain snowberry (*Symphoricarpos oreophilus*), Gambel oak (*Quercus gambelii*), and Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). Sagebrush shrublands are composed primarily of mountain sagebrush and mountain snowberry with an understory of native perennial grasses and forbs. North-facing slopes in the surrounding area support patchy aspen woodlands composed of quaking aspen (*Populus tremuloides*), mountain snowberry, and chokecherry (*Prunus virginiana*).

#### **Cumulative Impact:**

The Cascade Creek OGDG would create approximately 12.32 acres of new disturbance in order to construct the locations and associated pipeline planned with this OGDG. Laramie has prepared a topsoil protection plan for each well pad location that will adhere to Rule 1002.c. and applicable rules for topsoil protection as required by the COGCC. For locations that will require new construction, topsoil would be stripped to a depth of 6 inches and segregated from subsoils. Topsoil will be stockpiled in an earthen berm surrounding the perimeter of the well pads. Topsoil will be seeded to prevent erosion and soil migration. With the implementation of the topsoil protection plans and stormwater management plans for each location, impacts to soils resources will be negligible.

Development of the OGDG would alter the composition of plant species, modify the vegetation structure, and there would be a temporary reduction of basal and aerial vegetative cover. Removal of vegetation also results in increased soil exposure, loss of wildlife habitat, reduced plant diversity, and loss of livestock/wildlife forage. Once drilling and completions have been completed, interim reclamation would occur on each of the locations. A combined total of approximately 7.3 acres of working surface would remain. Laramie will adhere to the Rule 1003 Interim Reclamation requirements. Waste and debris would be removed from the locations, and areas no longer in use would be reclaimed and seeded with an appropriate seed mix as outlined in the Topsoil Protection Plans for each location. Upon successful interim reclamation of the locations, alteration in vegetation composition and structure in comparison to the surrounding area would be negligible.

#### **Mitigation Measures:**

With the implementation of the Topsoil Protection Plans and Stormwater Management Plans adverse cumulative effects to soils will be avoided and/or minimized. No additional mitigation measures are proposed with this OGDG for Soil Resources.

### **3.6 Public Welfare**

#### **Existing Environment:**

The Cascade Creek OGDG project area would be located in rural western Colorado on the Roan Plateau. The nearest community is DeBeque, Colorado located approximately 16-miles from the project area. The project area lies within a DIC “Block Group % Minority>County % Minority”

category. This category encompasses all of western Garfield County, which is composed primarily of Resource Lands and Public Land Zone Districts.

**Cumulative Impacts:**

*Noise:* Laramie has prepared individual noise mitigation plans for each of the locations included in the Cascade Creek OGD. Laramie will adhere to Rule 423 of the 400 Series Regulations for noise mitigation during pre-production and production activities. There are no residential buildings, high occupancy buildings, child care centers, or schools within 1-mile of the project area that would be impacted by noise. The nearest adjacent landowner (Couey Family LLLP) accepts noise levels at the industrial level. Pre-production noise during drilling and completions activities has the potential to impact wildlife that occurs in the project vicinity; however, none of the locations included in the OGD are located within areas identified as HPH. Greater Sage-grouse general and priority habitat management areas are located within 2,000 feet of the proposed development plan. With the implementation of the Best Management Practices outlined in the noise mitigation plans, impacts to sage-grouse and other wildlife species should be mitigated.

No adverse (short-term or long-term) noise-related impacts to public health are expected as a result this project due to the distance of the development plan from members of the public and with the implementation Best Management Practices outlined in the noise mitigation plans.

*Lighting:* Laramie has prepared a lighting mitigation plan for each of the locations included in the Cascade Creek OGD. Laramie will adhere to Rule 424 of the 400 Series Regulations for lighting mitigation during pre-production and production activities. Lighting is anticipated to be used during pre-production activities. No lighting is planned to be used during production activities, in the event of an emergency where lighting is needed during the production phase, Laramie will adhere to Rule 424.d lighting standards.

There are no residential buildings, high occupancy buildings, child care centers, or schools within 1-mile of the project area that would be impacted by lighting during pre-production activities. The nearest adjacent landowner (Couey Family LLLP) accepts the lighting associated with the development plan. Pre-production lighting used during drilling and completions activities has the potential to impact wildlife that occurs in the project vicinity; however, none of the locations included in the OGD are located within areas identified as HPH. Greater Sage-grouse general and priority habitat management areas are located within 2,000 feet of the proposed development plan. Based on the proposed lighting diagrams, all pre-production lighting will shine inward onto the working pad surface. No light will shine outward towards the HPH areas. With the implementation of the Best Management Practices outlined in the lighting mitigation plans, impacts to sage-grouse and other wildlife species should be mitigated.

No adverse (short-term or long-term) lighting-related impacts to public health and the environment are expected as a result this project due to the distance of the development plan from members of the public and with the implementation Best Management Practices outlined in the lighting mitigation plans.

*Odor:* There are no residential buildings, high occupancy buildings, child care centers, or schools within 1-mile of the Cascade Creek OGD. The development plan would be located on private lands not accessible by the general public. There is the potential for odors generated during drilling and completions activities to impact wildlife species present in the area surrounding the well pad causing wildlife avoidance of forage and cover. Due to the short duration of pre-production activities and with the implementation of the wildlife BMPs, it is unlikely that odors associated with pre-production activities would impact wildlife species at a population level.

No adverse (short-term or long-term) odor-related impacts to public health and the environment are expected as a result of this project due to the distance of the development plan from communities, the short duration of odor causing activities, and with the implementation of Best Management Practices outlined in the wildlife protection plans.

*Dust:* Laramie has prepared a dust mitigation plan as required by COGCC Rule 304.c.(5) based on the requirements outlined in COGCC Rule 427. Fugitive dust is created during construction and from vehicular travel on dirt or gravel roads. Table 7 provides a list of estimated vehicle trips during construction and operations. Fugitive dust can also be propagated from disturbed areas during high wind events. Laramie will implement the Best Management Practices outlined in the dust mitigation plans for each of the locations associated with this development plan.

Adverse cumulative impacts from fugitive dust are not anticipated with the implementation of the proposed Best Management Practices listed in the dust mitigation plans.

*Recreation and Scenic Values.* No State Parks, State Trust Lands, or State Wildlife Areas exist within 1-mile of the Cascade Creek OGD. Additionally, there are no Designated Outdoor Activity Areas within 1-mile. The proposed development plan would be located on private lands with private access. There is no public access permitted within the area of proposed development.

Due to the location of the proposed development plan (private land) there will be no impacts to recreation and scenic values as a result of this OGD.

#### **Mitigation Measures:**

Due to the distance from residential buildings, high occupancy buildings, child care centers, and schools, and with the implementation of the lighting, noise, and dust mitigation plans, there will be no cumulative adverse effects to Public Health as a result of this OGD; therefore, no additional mitigation or offsets are proposed as part of this OGD.

## **4.0 SURROUNDING OIL AND GAS IMPACTS**

### ***303.a.(5).C***

The Cascade Creek OGD would be located in the vicinity of existing oil and gas infrastructure. Table 13 provides the active, permitted, and proposed oil and gas locations within 1-mile of the locations included in the Cascade Creek OGD (COGCC 2021). Based on aerial photography

and a file search on the COGCC database, the estimated acres of active and proposed locations present within a 1-mile radius of the locations included within this OGDG are shown in Table 13.

**Table 13. Total Number of Permitted, Active, and Proposed Locations within 1-mile of the Cascade Creek OGDG**

Location	Total Number of Active, Permitted, and Proposed Locations within 1-mile Radius	Total Acreage of Active and Proposed Locations within 1-mile Radius
CC 0603-23-32	8	19.75
CC 0610-21-41	15	29.83
CC 0697-15-08	15	53.4
CC 697-15-54 Annex Cuttings Facility	14	46.2

The total number of oil and gas wells within a 1-mile radius of each location included in the Cascade Creek OGDG is provided in Table 14.

**Table 14. Oil and Gas Wells within 1-mile Radius of each location included in the Cascade Creek OGDG**

Location	Total Number of Active Wells within 1-mile Radius	Total Number of Permitted but not Drilled Wells	Total Number of Proposed Wells	Total Number of Plugged and Abandoned Wells
CC 0603-23-32	37	44	0	1
CC 0610-21-41	55	29	0	1
CC 0697-15-08	44	0	0	3
CC 697-15-54 Annex Cuttings Facility	60	0	0	3

The total permitted on-location storage (pits and tanks) of the active and proposed oil and gas locations within 1-mile of the Cascade Creek OGDG locations are provided in Table 15. On-site storage capacity was determined based on aerial photography and an online file search through the COGCC database.

**Table 15. On-Site Storage Capacity for Active and Proposed Locations within 1-mile of the Cascade Creek OGDG**

Location	Total Number Oil Tanks	Total Number Water Tanks	Total Number Condensate Tanks	Total Number Pits
CC 0603-23-32	0	5	7	2
CC 0610-21-41	0	0	8	2

CC 0697-15-08	0	22	15	3
CC 697-15-54 Annex Cuttings Facility	0	22	15	2

## 5.0 OTHER INDUSTRIAL IMPACTS

### 303.a.(5).C

Aside from oil and gas infrastructure, there are no other industrial facilities present within a 1-mile radius of the locations included in the Cascade Creek OGDG.

## 6.0 BENEFICIAL IMPACTS

The Cascade Creek OGDG does not include any proposed direct incremental beneficial impacts associated with the development and operation of the proposed OGDG, as summarized in Table 16, Beneficial Impacts List (Form 2B). However, there are indirect beneficial impacts associated with the development, which include broader benefits to the community and the environment. A qualitative evaluation of beneficial impacts to the local community and to the environment is provided below.

Total number of existing wells that are planned to be plugged and abandoned as part of this Oil and Gas Development Plan (OGDP).	0	Estimated number of truck trips that are planned to be avoided from the above-mentioned facility closures and equipment upgrades (on an annual basis).	0
Total number of existing locations that are planned to be closed and undergo final reclamation as part of this OGDG.	0	Total number of <b>Oil Tanks</b> planned to be removed from existing locations through the approval of this OGDG.	0
Total number of acres that are planned to be reclaimed through the closing of existing locations.	0	Total number of <b>Condensate Tanks</b> planned to be removed from existing locations through the approval of this OGDG.	0
Total number of existing pits that are planned to be closed and undergo final reclamation as part of this OGDG.	0	Total number of <b>Produced Water Tanks</b> planned to be removed from existing locations through the approval of this OGDG.	0

### **Beneficial Impact to Surrounding Community**

Approval of Laramie Energy’s OGDG is a crucial piece to the economic vitality of the Western Slope. According to the 2019 study “Economic Contribution of the Oil and Gas Industry in the Piceance Basin” by Nathan Perry, the total economic contribution of the Oil and Gas Industry to Western Colorado (Garfield, Mesa, Rio Blanco, Delta, Gunnison and Moffat Counties) is 9.2% of Gross Regional Product, totaling \$1,083,361,743. The Oil and Gas Industry of the Piceance Basin is responsible for the employment of 10,959 people both directly and indirectly. Indirect employment includes jobs supported by the payment of severance taxes, federal mineral lease royalties, ad valorem property taxes, and royalties. Approval of the Laramie Energy 2021

Cascade Creek OGDG will allow Laramie Energy to bring a drill rig to the Piceance Basin, generating economic growth and jobs. The study indicates each additional drilling rig creates 208 direct jobs.

### **Beneficial Impact to Surrounding Wildlife and Ecosystems**

In order to reduce impacts to wildlife and ecosystems present on the Roan Plateau, Laramie has selected well pad locations that are either existing or are in the vicinity of existing oil and gas infrastructure. Laramie will use existing infrastructure to the greatest extent possible during development of this OGDG. Well pads were selected to maximize directional drilling practices for both current and future gas production. During drilling operations, produced water will be recycled which will reduce truck traffic and impacts to wildlife in the project vicinity. Laramie will also adhere to CPW's big game winter timing stipulations and avoid vegetation removal during the nesting season for migratory birds. During interim reclamation, the locations will be reseeded using a BLM approved seed mix that promotes healthy range conditions for wildlife.

## **7.0 REFERENCES**

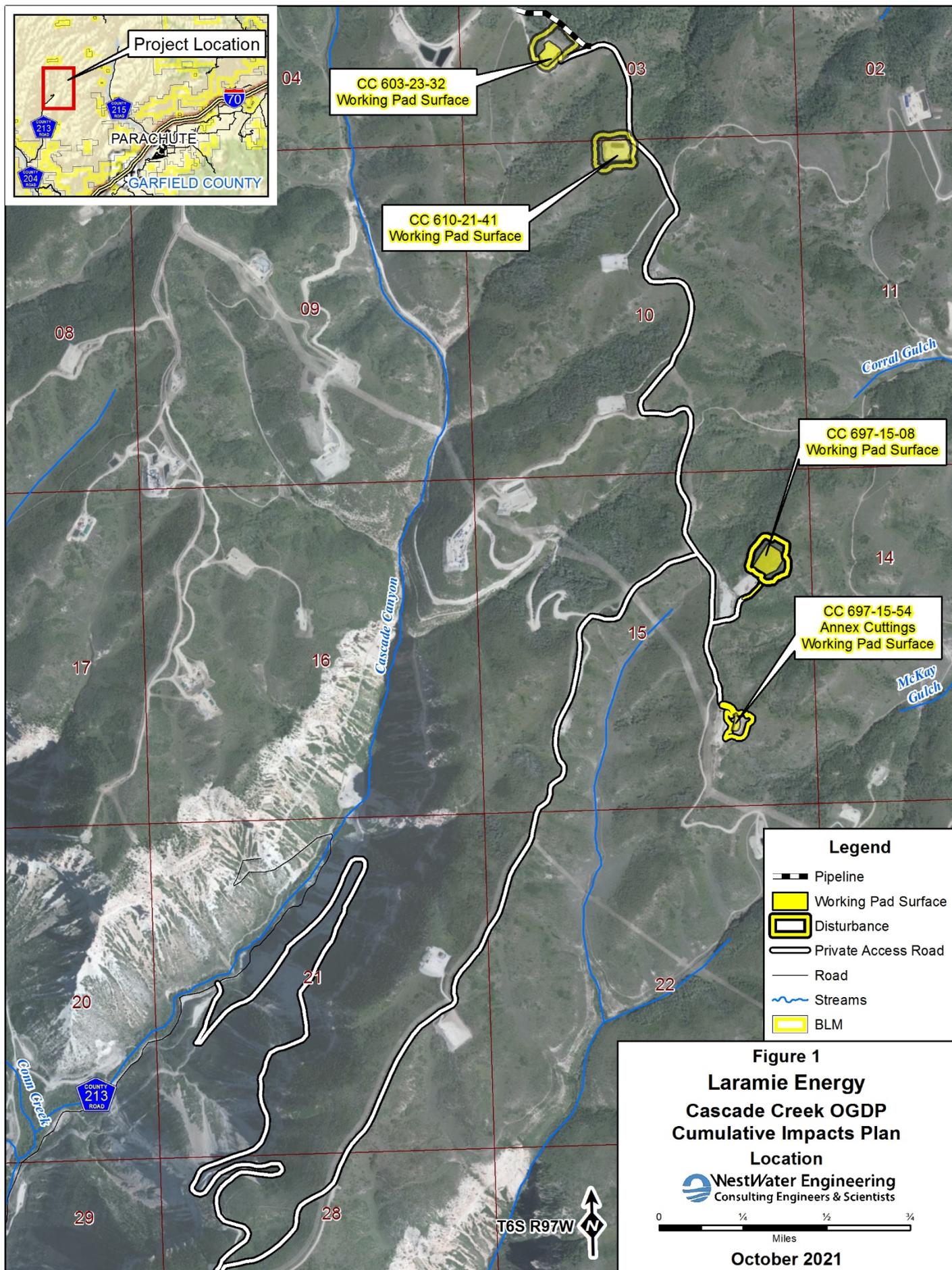
COGCC. 2021. COGCC ArcGIS available online at:  
[http://cogccmap.state.co.us/cogcc\\_gis\\_online](http://cogccmap.state.co.us/cogcc_gis_online).

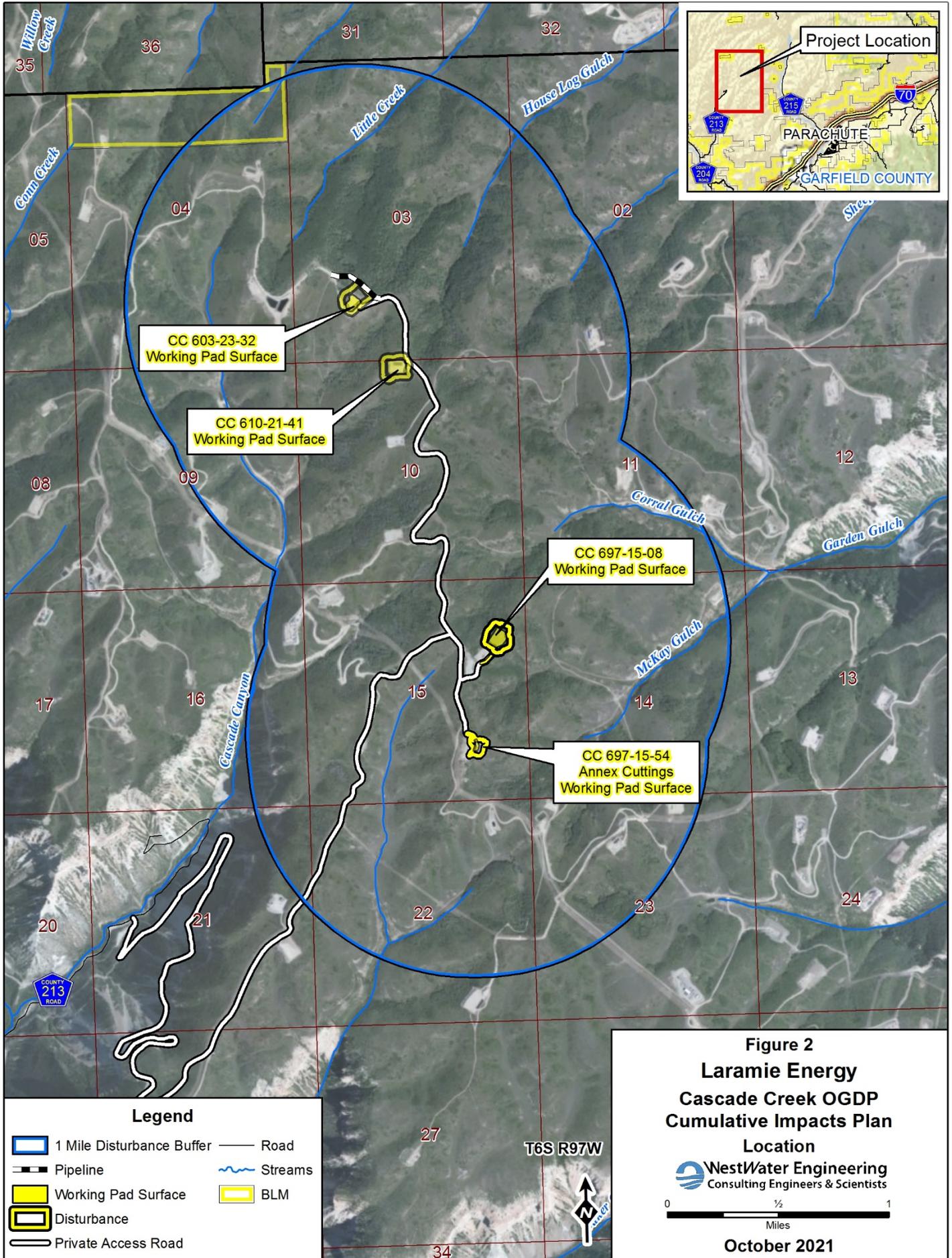
Entrada. 2020. Cascade Creek #697-15-54 Annex Historical Narrative. Entrada Consulting Group. Grand Junction, CO.

EPA. 2021. Environmental Protection Agency. Colorado Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants available online at:  
[https://www3.epa.gov/airquality/greenbook/anayo\\_co.html](https://www3.epa.gov/airquality/greenbook/anayo_co.html).

NRCS. 2021. Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>.

Perry, Nathan. 2019. Economic Contribution of the Oil and Gas Industry in the Piceance Basin. Colorado Mesa University, Grand Junction, Colorado.





**APPENDIX A**  
**BEST MANAGEMENT PRACTICES**

## **Operator Proposed BMPs – Cascade Creek (CC) 0697-15-08, CC 0603-23-32, and 0610-21-41**

### **AIR**

- 1) Odor mitigation: Operator will ensure that all drilling fluid is removed from pipes before storage.
- 2) Odor mitigation: operator will use a squeegee or other device to remove drilling fluids from pipes as they exit the wellbore.
- 3) Odor mitigation: Operator will use bentonitic fresh water-based drilling fluid with zero oil.
- 4) Operator will implement ambient air quality monitoring on site.
- 5) Operator will properly maintain vehicles and equipment.
- 6) Operator will use non-emitting pneumatic controllers.
- 7) Pipelines: Operator will have adequate and committed pipeline take away capacity for all produced gas.
- 8) Pipelines: Operator will shut in the facility to reduce the need for flaring if the pipeline is unavailable.
- 9) Pipelines: Operator will use pipelines to transport water for hydraulic fracturing to and from location.
- 10) Venting/Flaring: Operator will control emergency flaring with an enclosed combustor with a destruction efficiency of 98% or better.
- 11) Venting/Flaring: Operator will not flare or vent gas during completion or flowback, except in upset or emergency conditions, or with prior written approval from the Director for necessary maintenance operations.

### **NOISE BMPs**

- 1) Exhaust mufflers will be installed on engines to reduce noise impacts.
- 2) Mufflers or vent tanks will be used for sound suppression when bypassing air injection on connections when drilling with aerated fluid.
- 3) Major surface pipe handling operations will be limited to daylight hours as much as possible.
- 4) Solids control equipment and shale shakers will be maintained to ensure proper function and noise mitigation.

### **DUST BMPs**

- 1) Vehicles will not travel at speeds over 25 mph on unpaved roads.
- 2) During dry conditions or when dust is visible, vehicular speeds will be reduced.
- 3) Restrictions of land disturbance construction activity during high-wind days.

- 4) Water trucks will be utilized to wet roadways, as needed, when natural moisture is insufficient to prevent airborne dust.
- 5) Field employees will notify operations if dust is observed.
- 6) Water trucks will be utilized to wet the roadways, as needed, when natural moisture is insufficient to prevent airborne dust.
- 7) Water trucks will apply magnesium chloride or fresh water to roadways depending on location.
- 8) Drop heights from excavators and loaders shall be minimized to a distance of no more than 5 feet.
- 9) Construction activities that occur on unpaved surfaces shall be discontinued during periods when activities are causing visible dust plumes that cannot be avoided by approved dust suppression methods.
- 10) Contractor shall conduct a visual inspection of the vehicle wheels and the wheels of the equipment loaded upon each vehicle to assess the presence of dirt.

### **WATER BMPs**

- 1) COGCC permit will incorporate other agency water quality protection plans by reference as applicable (e.g. stormwater management plan).
- 2) Documentation / stormwater management plan: If it is infeasible to install or repair a control measure immediately after discovering a deficiency, operator will document and keep on record in the stormwater management plan: (a) a description of why it is infeasible to initiate the installation or repair immediately; and (b) a schedule for installing or repairing the control measure and returning it to an effective operating condition as soon as possible.
- 3) Dust suppression: Operator will not use produced water or other process fluids for dust suppression.
- 4) Operator will recycle or beneficially reuse flowback and produced water for use downhole.
- 5) Outfall locations: Outlet protection should be used when a conveyance discharges onto a disturbed area where there is potential for accelerated erosion due to concentrated flow. Outlet protection should be provided where the velocity at the culvert outlet exceeds the maximum permissible velocity of the material in the receiving channel.
- 6) Stream crossing and Road Construction: Operator will ensure that control measures are designed, installed and adequately sized in accordance with good engineering, hydrologic and pollution control practices.
- 7) Vehicle fueling: Operator will ensure that a fueling contractor is present during the entire fueling process to prevent overfilling, leaks and drips from improper connections.

## **WASTE BMPs**

- 1) Operator will properly characterize and dispose of all waste (i.e. the specific landfill/waste disposal location allows for acceptance of the waste stream).

### **Target Species: Black Bear**

#### **BMP Type: Wildlife – Avoidance**

- 1) The operator agrees to prohibit food and trash in sleeping quarters.
- 2) The operator agrees to report bear conflicts immediately to CPW staff.

### **Target Species: Mule Deer and Elk**

#### **BMP Type: Wildlife – Avoidance**

1. The operator agrees to reclaim mule deer and elk habitats with CPW-identified native shrubs, grasses, and forbs appropriate to the ecological site disturbed.

**Operator Proposed BMPs  
Annex Cuttings Facility**

**WATER BMPs**

- 1) COGCC permit will incorporate other agency water quality protection plans by reference as applicable (e.g. stormwater management plan).
- 2) Documentation / stormwater management plan: If it is infeasible to install or repair a control measure immediately after discovering a deficiency, operator will document and keep on record in the stormwater management plan: (a) a description of why it is infeasible to initiate the installation or repair immediately; and (b) a schedule for installing or repairing the control measure and returning it to an effective operating condition as soon as possible.
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**BMP Type: Wildlife – Avoidance**

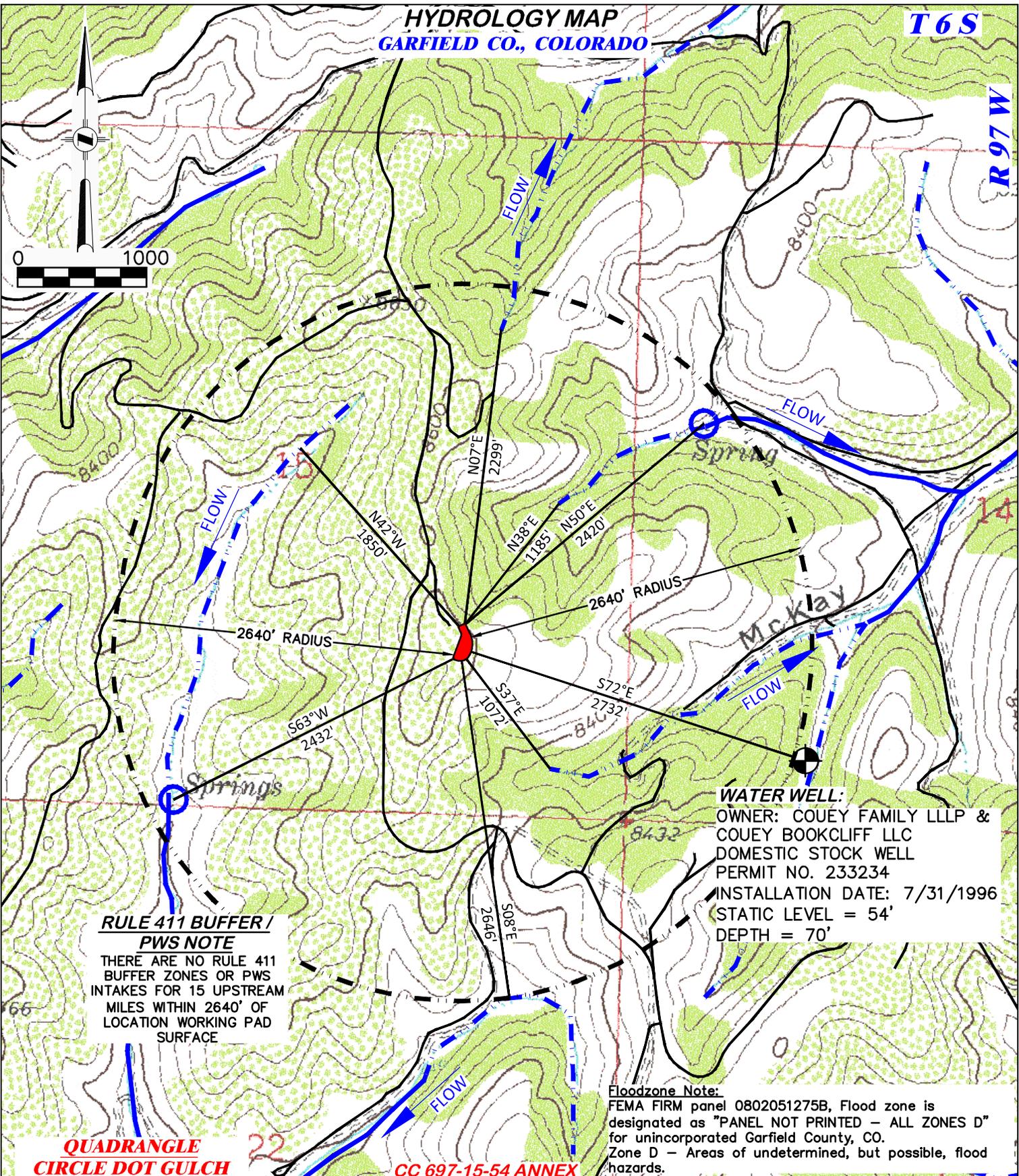
1. The operator agrees to reclaim mule deer and elk habitats with CPW-identified native shrubs, grasses, and forbs appropriate to the ecological site disturbed.

**APPENDIX B**  
**HYDROLOGY MAPS**

**HYDROLOGY MAP  
GARFIELD CO., COLORADO**

**T 6 S**

**R 97 W**



**RULE 411 BUFFER / PWS NOTE**  
THERE ARE NO RULE 411 BUFFER ZONES OR PWS INTAKES FOR 15 UPSTREAM MILES WITHIN 2640' OF LOCATION WORKING PAD SURFACE

**WATER WELL:**  
OWNER: COUEY FAMILY LLLP & COUEY BOOKCLIFF LLC  
DOMESTIC STOCK WELL  
PERMIT NO. 233234  
INSTALLATION DATE: 7/31/1996  
STATIC LEVEL = 54'  
DEPTH = 70'

**Floodzone Note:**  
FEMA FIRM panel 0802051275B, Flood zone is designated as "PANEL NOT PRINTED - ALL ZONES D" for unincorporated Garfield County, CO. Zone D - Areas of undetermined, but possible, flood hazards.

**QUADRANGLE CIRCLE DOT GULCH**

**CC 697-15-54 ANNEX**

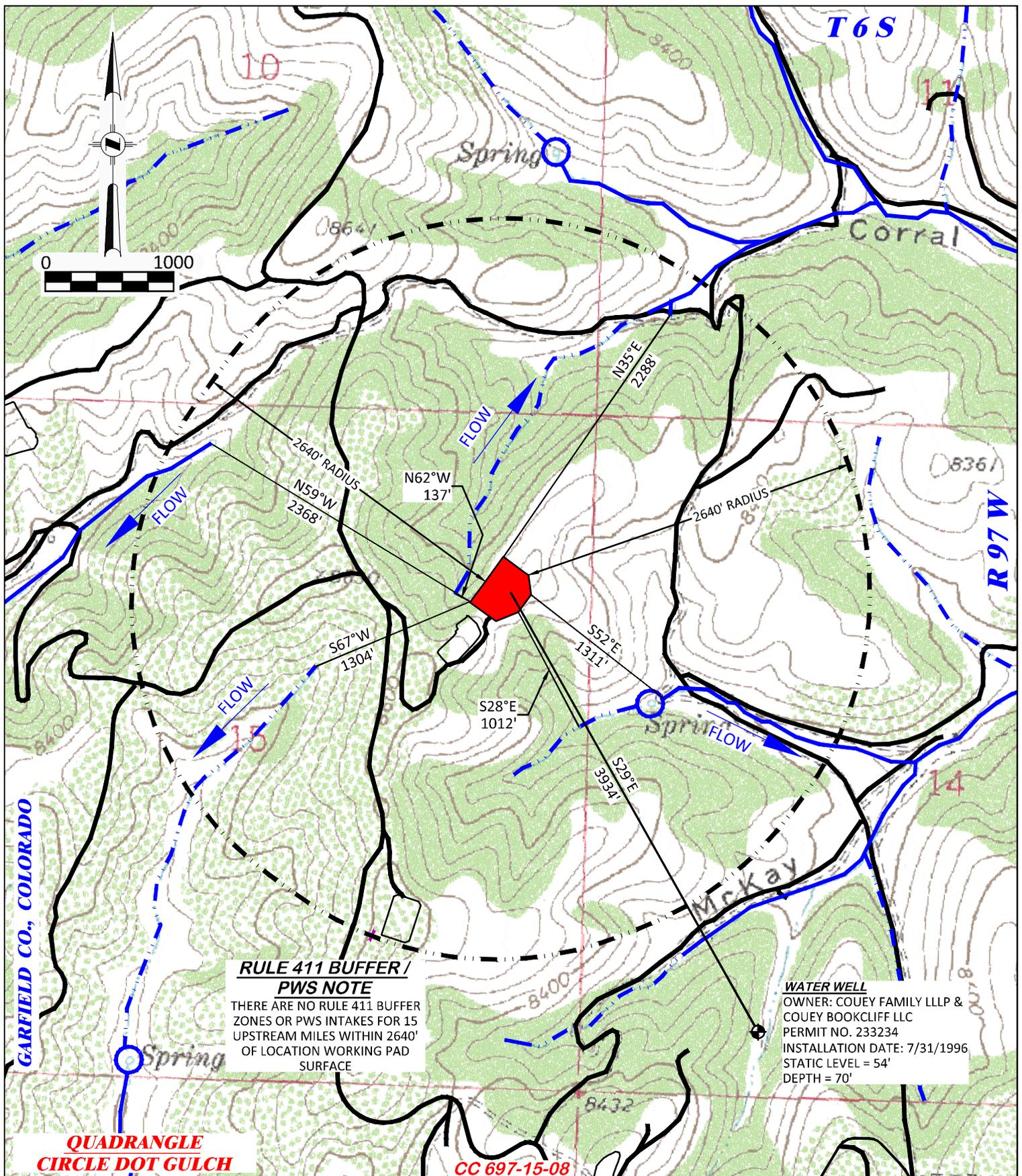
**DRG RIFFIN & ASSOCIATES, INC.**  
(307) 362-5028 1414 ELK ST., ROCK SPRINGS, WY 82901

DRAWN: 6/2/2021 - DEH	SCALE: 1" = 1000'
REVISED: 10/12/2021 - DEH	DRG JOB No. 21379
MISCELLANEOUS EDITS	304b(7)E HYDRO

**HYDROLOGY MAP  
LARAMIE ENERGY, LLC.  
CC 697-15-54 ANNEX  
SESE, SECTION 15, T. 6 S., R. 97 W., 6th P.M.,  
GARFIELD COUNTY, COLORADO**

**PROPOSED WORKING PAD SURFACE**

<b>HISTORIC SPRING</b>	<b>PERENNIAL FLOW</b>
<b>INTERMITTENT FLOW</b>	<b>EXISTING ROAD</b>

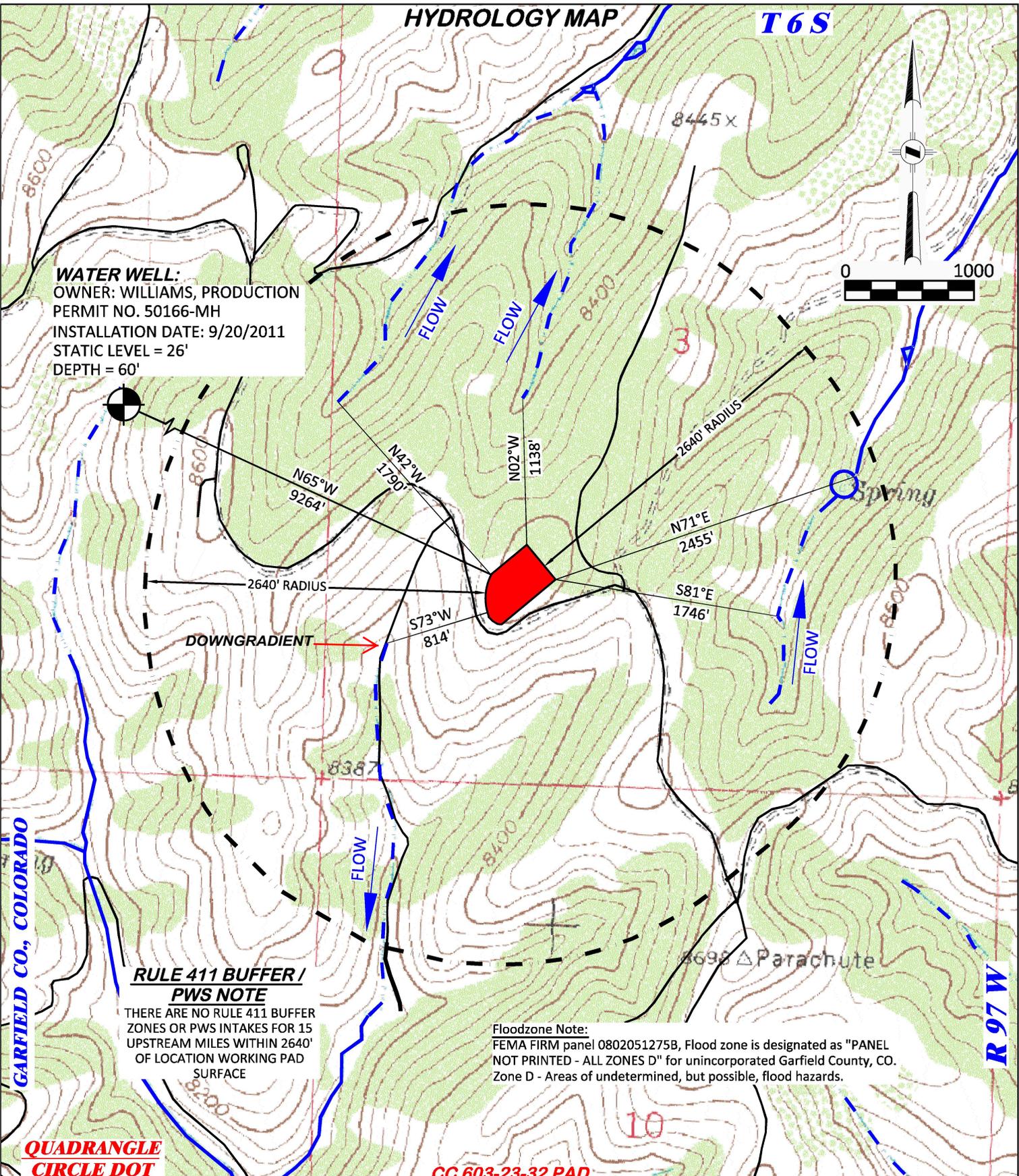
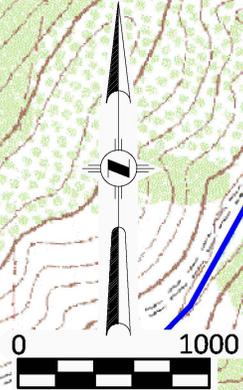


<b>DRG RIFFIN &amp; ASSOCIATES, INC.</b> (307) 362-5028 1414 ELK ST., ROCK SPRINGS, WY 82901		<b>HYDROLOGY MAP</b>	
		<b>LARAMIE ENERGY, LLC. CC 697-15-08</b> <b>SENE, SECTION 15, T. 6 S., R. 97 W., 6th P.M.,</b> <b>GARFIELD COUNTY, COLORADO</b>	
DRAWN: 12/8/2020 - DEH	SCALE: 1" = 1000'	PROPOSED WORKING PAD SURFACE	
REVISED: 10/4/2021 - DEH	DRG JOB No. 22026	HISTORIC SPRING	PERENNIAL FLOW
COGCC RULE REVISIONS	304B(7)E HYDRO	INTERMITTENT FLOW	EXISTING ROAD

# HYDROLOGY MAP

**T 6 S**

**WATER WELL:**  
 OWNER: WILLIAMS, PRODUCTION  
 PERMIT NO. 50166-MH  
 INSTALLATION DATE: 9/20/2011  
 STATIC LEVEL = 26'  
 DEPTH = 60'



DOWNGRADIENT →

**RULE 411 BUFFER / PWS NOTE**

THERE ARE NO RULE 411 BUFFER ZONES OR PWS INTAKES FOR 15 UPSTREAM MILES WITHIN 2640' OF LOCATION WORKING PAD SURFACE

**Floodzone Note:**  
 FEMA FIRM panel 0802051275B, Flood zone is designated as "PANEL NOT PRINTED - ALL ZONES D" for unincorporated Garfield County, CO. Zone D - Areas of undetermined, but possible, flood hazards.

**QUADRANGLE CIRCLE DOT**

**CC 603-23-32 PAD**

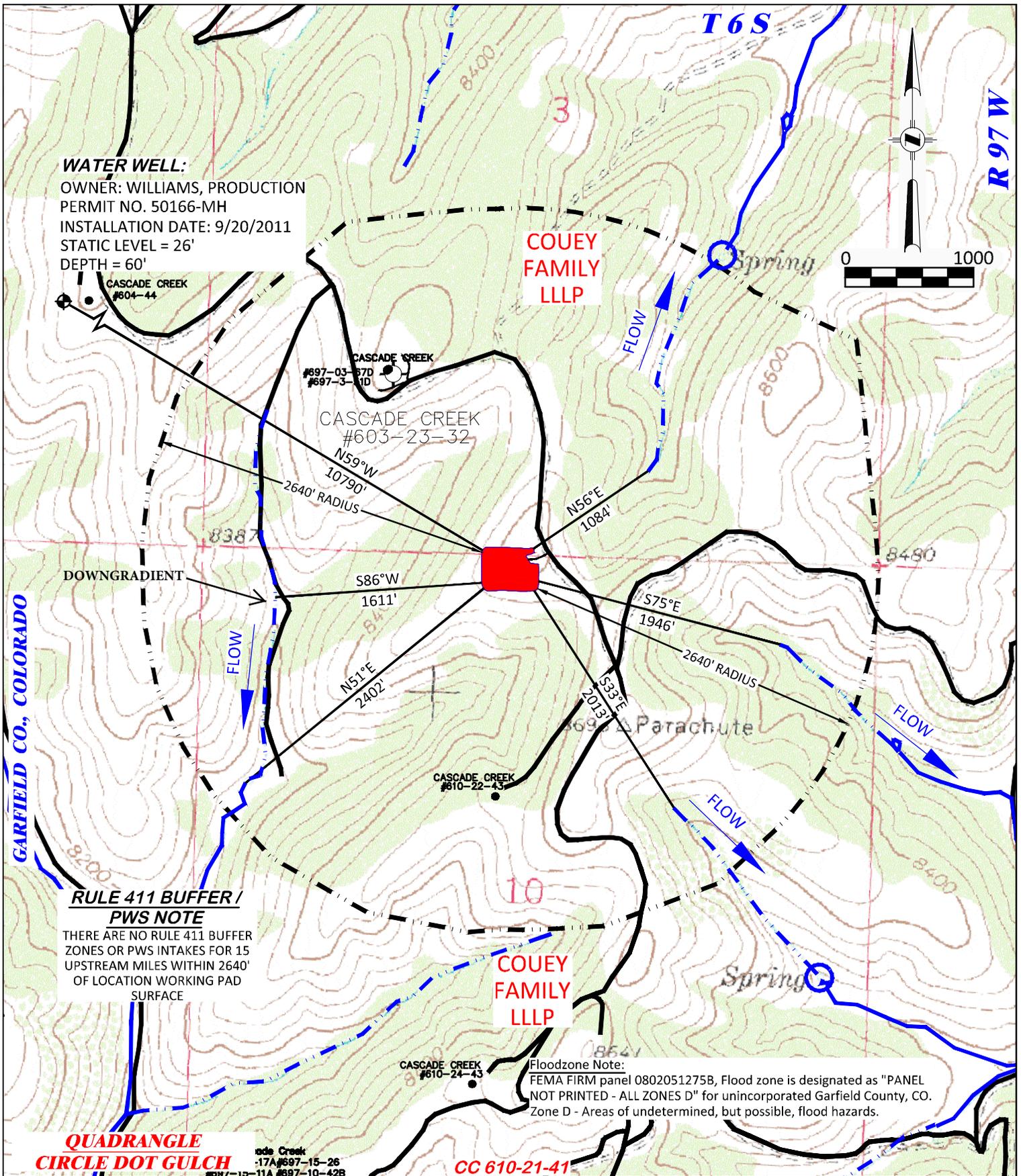
**DRG RIFFIN & ASSOCIATES, INC.**  
 (307) 362-5028 1414 ELK ST., ROCK SPRINGS, WY 82901

DRAWN: 6/21/2017 - TCM	SCALE: 1" = 1000'
REVISED: N/A	DRG JOB No. 21294
	304b(7)E HYDRO

**HYDROLOGY MAP**  
 LARAMIE ENERGY, LLC.  
 CC 603-23-32 PAD  
 NESW, SECTION 3, T. 6 S., R. 97 W., 6th P.M.,  
 GARFIELD COUNTY, COLORADO

**WORKING PAD SURFACE**

<b>HISTORIC SPRING</b>	<b>PERENNIAL FLOW</b>
<b>INTERMITTENT FLOW</b>	<b>EXISTING ROAD</b>



**WATER WELL:**  
 OWNER: WILLIAMS, PRODUCTION  
 PERMIT NO. 50166-MH  
 INSTALLATION DATE: 9/20/2011  
 STATIC LEVEL = 26'  
 DEPTH = 60'

**COUEY FAMILY LLLP**

CASCADE CREEK #604-44  
 CASCADE CREEK #697-03-67D #697-3-11D  
 CASCADE CREEK #603-23-32  
 N59°W 10790'  
 2640' RADIUS

DOWNGRADIENT

S86°W 1611'

N56°E 1084'

S75°E 1946'

N51°E 2402'

S33°E 2013'

2640' RADIUS

CASCADE CREEK #610-22-43

**COUEY FAMILY LLLP**

CASCADE CREEK #610-24-43

**Floodzone Note:**  
 FEMA FIRM panel 0802051275B, Flood zone is designated as "PANEL NOT PRINTED - ALL ZONES D" for unincorporated Garfield County, CO. Zone D - Areas of undetermined, but possible, flood hazards.

**QUADRANGLE CIRCLE DOT GULCH**  
 side Creek #17A #697-15-26 #697-12-11A #697-10-42B

**CC 610-21-41**

**DRG RIFFIN & ASSOCIATES, INC.**  
 (307) 362-5028 1414 ELK ST., ROCK SPRINGS, WY 82901

**HYDROLOGY MAP**  
 LARAMIE ENERGY, LLC  
 CC 610-21-41  
 NEWW, SECTION 10, T. 6 S., R. 97 W, 6th P.M.,  
 GARFIELD COUNTY, COLORADO

DRAWN: 10/30/20201 - DEH	SCALE: 1" = 1000'	EXISTING WORKING PAD SURFACE	
REVISED: N/A	DRG JOB No. 21293	HISTORIC SPRING	PERENNIAL FLOW
	304B(7)E HYDRO	INTERMITTENT FLOW	EXISTING ROAD