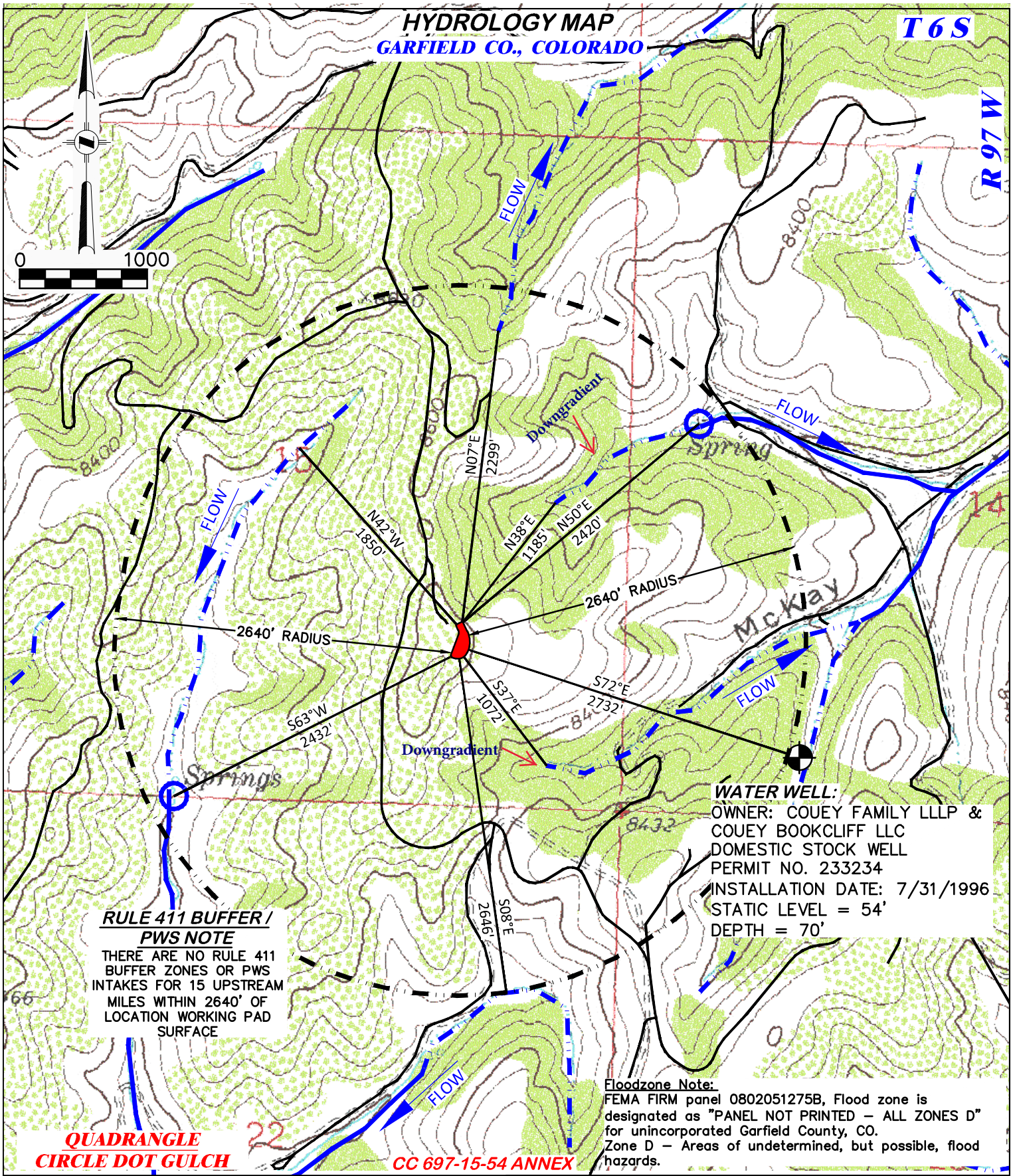
Annex Cuttings Facility

Rule 304.b.(7).E. Hydrology Map

Laramie Energy, LLC
760 Horizon Drive, Suite 101
Grand Junction, CO 81506



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

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

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

HISTORIC SPRING	PERENNIAL FLOW
INTERMITTENT FLOW	EXISTING ROAD

Rule 304.b.(7).E. Hydrology Map.

A topographic map showing the horizontal distance and approximate bearing from the Oil and Gas Location to:

- **Rule 304.b.(7).E.*i.*** *All surface Waters of the State within 2,640 feet of the proposed Working Pad Surface. The map will indicate which surface water features are downgradient;*
- **Rule 304.b.(7).E.*ii.*** *All Water Sources within 2,640 feet of the proposed Working Pad Surface;*
- **Rule 304.b.(7).E.*iii.*** *Any Public Water System facilities, including intakes, wells, storage facilities, recharge areas, and treatments plants within 2,640 feet of the Working Pad Surface*
- **Rule 304.b.(7).E.*iv.*** *Rule 411 buffer zones within 2,640 feet of the Working Pad Surface*
- **Rule 304.b.(7).E.*v.*** *Any surface waters within 2,640 feet of the Working Pad Surface that are 15 stream miles upstream of a Public Water System intake.*

The ACF Surface Hydrology Map identifies surface water within a 2640-foot radius of the site. Two intermittent flow streams are located downgradient from the ACF WPS The nearest downgradient surface water drainage is an intermittent flow stream 1072 feet to the southeast of the Working Pad Surface (WPS). This intermittent flow stream flows towards the east into McKay Gulch. The second intermittent flow stream is located 1185 feet to the northeast from the WPS. This intermittent flow streams flows towards a spring. The spring is located 2420 feet to the northeast from the WPS. Downgradient of the spring, the stream has perennial flow.

The two streams stated above, flow into drainages which later terminate into Parachute Creek roughly 4 miles northwest of the town of Parachute. Parachute Creek flows southeast and becomes a tributary of the Colorado River near the town of Parachute. The ACF is not located upgradient within 15 streams miles of a Public Water System intake. The nearest Public Water System intake is located in Parachute, Colorado. Parachute's intake is located on the Colorado River, upgradient of Parachute Creek.

Based on the COGCC mapping database for "Public Water System (PWS) Protection" and "Draft SB 19_181 Rule 411" layers, the ACF meets the setbacks stated in COGCC Rule 304.b.(2).B.vi.aa. and Rule 304.b.(2).B.vi.bb. The ACF is not located within surface water supply area as defined in Rule 411.a.(1). The ACF is located greater than 2,640 feet distance of a Public Water System supply well that is completed in a Type III Aquifer or is a groundwater under the direct influence of surface water well as defined in Rule 411.b.(1).

SENSITIVE AREA DETERMINATION

LARAMIE ENERGY

CC 0697-15-54 ANNEX CUTTINGS MANAGEMENT FACILITY

Prepared for:

Laramie Energy, LLC

760 Horizon Drive, Suite 101

Grand Junction, CO 81506

Prepared by:

WestWater Engineering
2516 FORESIGHT CIRCLE, #1
GRAND JUNCTION, COLORADO 81505

October 2021

INTRODUCTION

At the request of Laramie Energy, LLC (Laramie), WestWater Engineering prepared this Sensitive Area Determination for the proposed CC 0697-15-54 Annex Cuttings Management Facility (ACF). The person responsible for completing the Sensitive Area Determination is provided below in Table 1.

Table 1. Person (s) Conducting Field/Desktop Inspection

Name/Title	Date
Dean Goebel, Hydrogeologist, WestWater Engineering	July 19, 2021 and Updated October 13, 2021

Sensitive Area: A sensitive area is an area vulnerable to potential significant adverse groundwater impacts, due to factors such as the presences of shallow groundwater or pathways for communication with deeper groundwater; proximity to surface water, including lakes, rivers, perennial or intermittent stream creeks, irrigation canals, and wetlands. Additionally, areas classified for domestic use by the Water Quality Control Commission, Local (water supply) wellhead protection areas, areas within ⅛ mile of a domestic water well, areas within ¼ mile of a public water supply well, ground water basins designated by the Colorado Ground Water Commission, and source water supply areas are sensitive areas.

SENSITIVE AREA DETERMINATION

A desktop analysis was completed for this project to determine if the proposed facility would be located within a Sensitive Area as defined above. Factors considered to make this determination are presented below in Table 2.

Table 2. Sensitive Area Determination Factors

Sensitive Area Factors	Comments
Surface Water	
Are there any surface water features (i.e. wetlands, rivers, intermittent streams, seeps, springs) within ¼ mile of the project?	Two intermittent streams are located within ¼ mile. One in McKay Gulch and the other discharges into the McKay Gulch drainage. One intermittent stream is located 1,073 feet S38º E of proposed facility in McKay Gulch and the other is located 1,185 feet N28ºE.
Could a potential release from the facility reach surface water features?	No, the potential for impacts to surface water from a facility release is low.
Will the facility have any liquids stored on-site which contain hydrocarbons and chlorides or other E&P wastes?	No, the facility will manage dry drill cuttings. No liquids will be stored at the facility.
Groundwater	

Sensitive Area Factors	Comments
Will the facility be underlain by an unconfined aquifer or recharge zone?	No
Is the facility located within 1/8 mile of domestic water well or ¼ mile of a public water supply well which would use the same aquifer?	No
Is the facility within 100-year floodplain	No
In the event of a release could the facility potentially impact groundwater?	The potential for a release from the facility to impact groundwater is low.
Sensitive Areas Determination	**Not considered a Sensitive Area based on desktop analysis.**

Surface Water: The potential for impacts on surface water quality is low for this sensitive area determination. The nearest intermittent stream is located 1,073 feet S38ºE of the proposed drill cuttings management facility in McKay Gulch. There are two springs supplying base flow to the intermittent drainages located within a ½ mile of the site. The nearest spring, located 2,414 feet N46ºE of the proposed facility, is also very unlikely to be impacted. The other spring, located 2,432 feet S63ºW, is physically isolated from proposed facility in a separate watershed due to a topographic divide to the east.

The facility will handle drill cuttings from three other proposed surrounding well pads. The potential for releases from the stabilized cuttings is low as long as the cuttings remain solid without exposure to water sources capable of creating a slurry. Best Management Practices (BMPs) during facility construction will further diminish the release potential along the graded edge of fill slopes in the form of perimeter soil berms, diversion ditches, and other control measures. Monitoring and maintenance of proposed BMPs and mass wasting control measures will provide additional safety containment protocols in the event of a potential release.

Groundwater: State Engineer's Office and USGS records were reviewed to gather additional information pertaining to the occurrence and depth of shallow groundwater. The closest permitted water well (permit no. 233234) is 2,732 feet S72ºE from the proposed facility. Three monitoring wells, locations ranging from 844 to 1,388 feet southeast of proposed facility, have been abandoned, thus are no longer relevant to this sensitive area determination. Shallow groundwater occurrence is limited to alluvial aquifers adjacent to surface water and is not representative of the thick sequence of hard rock hydrogeology of the proposed site. The facility is not underlain by an unconfined aquifer or recharge zone. Visual observations of the site based on aerial photography indicates mountain shrubland vegetation and sagebrush shrublands. Depth to shallow groundwater residing in the local flow system is greater than 80 inches (6.67 feet) based on NRCS soil properties and qualities for mapped soil units identified as Northwater-Adel complex and Parachute-Irigul-Rhone association soils. Typical soil profiles for these soils indicate bedrock subcrops 25 to 60 inches below ground surface.

The proposed facility would not be located within 1/8 mile of a domestic water well nor would it be located within ¼ mile of a public water supply which would use the same aquifer. The facility would not be located within 100-year floodplain.

Based on the information evaluated for the desktop analysis, the release potential of the proposed facility is very low due to the solid nature of stabilized drill cuttings managed at the site. Therefore, by COGCC rule, the facility should not be classified as sensitive area for water resources.

T6S

R97W

0 2000

CASCADE CREEK

GARFIELD CO., COLORADO

1855'
1185'
2414'
2432'
1073'

2 MILES

CC 697-15-54 ANNEX

QUADRANGLE
CIRCLE DOT GULCH
LONG POINT
MOUNT BLAINE
RED PINNACLE
DEBEQUE
WAGON TRACK RIDGE

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MISCELLANEOUS EDITS	SURF HYDRO

SURFACE HYDROLOGY MAP
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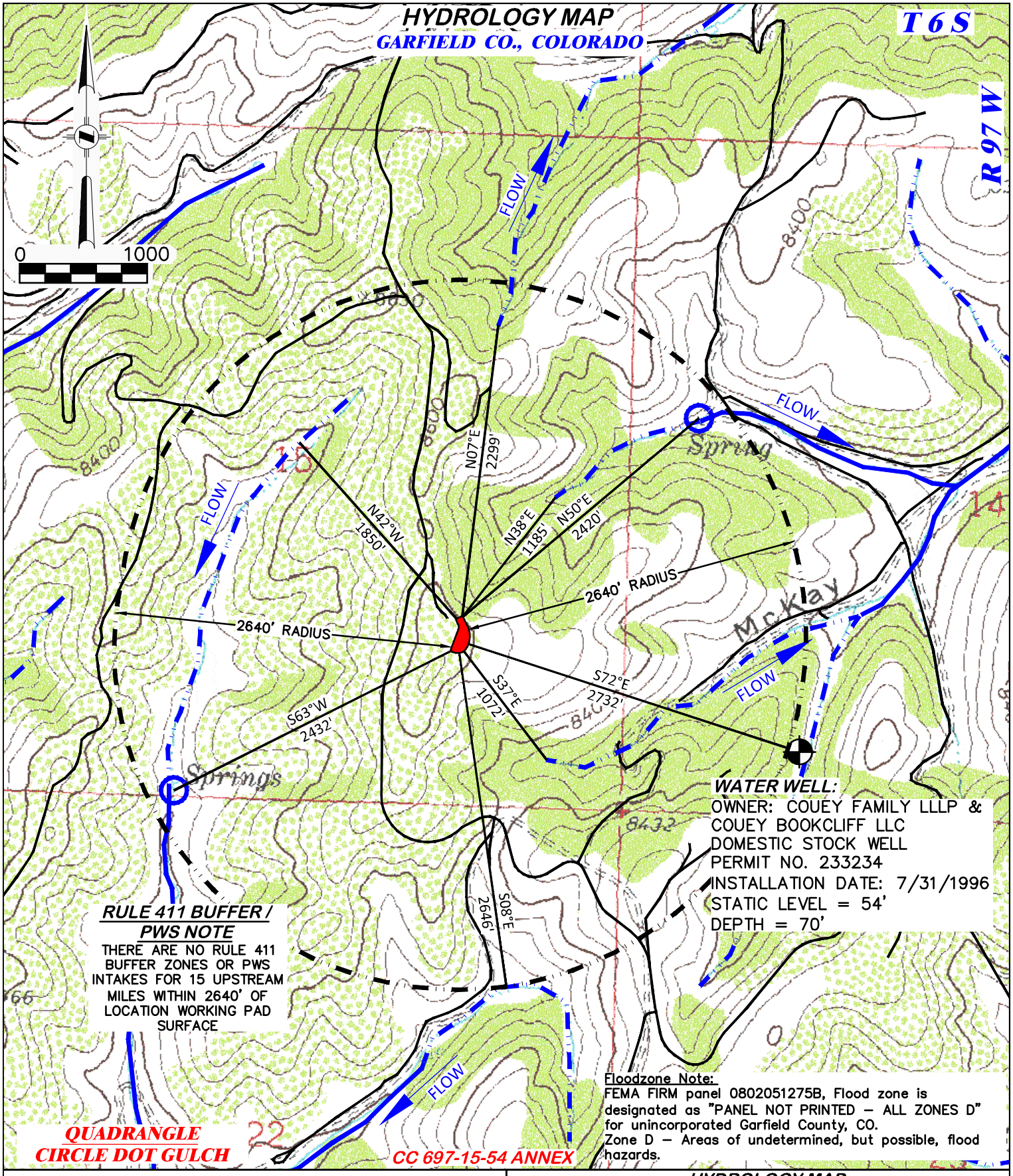
INTERMITTENT FLOW	WORKING PAD SURFACE



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