

**SENSITIVE AREA DETERMINATION**

**CAERUS OIL AND GAS**

**PCU A27-197 CDP PAD**

**Prepared for:**

**Caerus Oil and Gas  
143 Diamond Avenue  
Parachute, CO 81635**

**Prepared by:**



**WestWater Engineering**

2516 FORESIGHT CIRCLE, #1  
GRAND JUNCTION, COLORADO 81505

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## INTRODUCTION

At the request of Caerus Oil and Gas (Caerus), WestWater Engineering prepared this Sensitive Area Determination for the proposed PCU A27-197 CDP Pad. The person responsible for completing the Sensitive Area Determination is provided below in Table 1.

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

<b>Name/Title</b>	<b>Date</b>
Dean Goebel, Hydrogeologist, WestWater Engineering	January 20, 2023

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 1/8 mile of a domestic water well, areas within 1/4 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 well pad 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**

<b>Sensitive Area Factors</b>	<b>Comments</b>
<b>Surface Water</b>	
Are there any surface water features (i.e. seeps, springs, wetlands, rivers, perennial or intermittent streams) or Surface Water Supply Areas (SWSAs) adjacent to or within 500 feet of the proposed or existing facility?	No; however, there is a dry ephemeral drainage located immediately downgradient of the proposed pad location.
Could a potential release from the facility reach surface water features?	No, site location mitigation measures and erosion control measures will keep potential water quality impacts from a pad release low.
<b>Groundwater</b>	
Depth to shallowest groundwater?	Depth to shallow groundwater greater than 6.7 feet per NRCS soil properties.
Will the facility be underlain by an unconfined aquifer or recharge zone?	No unconfined alluvial aquifer or signs of shallow groundwater associated with the ephemeral drainage near proposed pad.

Sensitive Area Factors	Comments
Is the facility located within 1/8 mile of domestic water well or 1/4 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?	No
<b>Sensitive Areas Determination</b>	<b>No</b>

Surface Water: Potential water quality impacts on surface water is low for this sensitive area determination. Although the nearest ephemeral drainage in the bottom of Lee Gulch is immediately downgradient of proposed pad, earthen berms, diversion structures, and other control measures will be used to eliminate depression-focused flow paths to this ephemeral drainage to decrease associated pollution potential in the event of a pad release from reaching downstream waterways. These Best Management Practices (BMPs) will be completed at the pad along the graded edge of fill slopes.

The Bear Gulch intermittent drainage, located 2,108 feet 25°NE of the pad, is separated topographically from the pad. Potential impacts from a pad release impacting the intermittent stream is not possible as it is higher in elevation than the pad. Perennial stream Piceance Creek, located 2,139 feet 293°NE of the pad is oriented cross gradient from the pad with a low impact potential from a pad release. A release from the pad would have to travel along the Lee Gulch ephemeral drainage over 1 mile to its confluence with Piceance Creek. In addition, Piceance Creek is separated from Lee Gulch and the pad site by County Road 5. Hydrologic features within 2,640 feet of the pad location are displayed on the attached map.

Groundwater: State Engineer's Office and USGS records were reviewed to gather additional information pertaining to the occurrence and depth of shallow groundwater. Permitted wells are not located within the 2,640 foot pad buffer. Shallow groundwater occurrence in alluvial aquifers are more prevalent when juxtaposed to perennial surface water rather than ephemeral drainages. Unconfined alluvial aquifers or recharge zones most likely do not occur adjacent to the ephemeral drainage in Lee Gulch where proposed pad will be located.

Based on the vegetative survey completed by WestWater biologists, vegetation communities present in the project vicinity include sagebrush shrublands intermixed with greasewood with an understory of grass and forb species. Hydrophytic vegetation indicative of shallow groundwater conditions was not identified at the site. 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 the mapped soil unit identified as Barcus channery loamy sand. Typical soil profile shows channery loamy sand overlying channery sand and stratified very channery sand to very channery loamy fine sand down to 60 inches. The saturated hydraulic conductivity of this soil is greater than  $1.0 \times 10^{-7}$  cm/sec.

The pad is not located within 1/8 mile of a domestic water well or within 1/2- mile of a public water supply withdrawing groundwater. Perennial and intermittent streams located downgradient of proposed well pad are not within 15 miles upstream of any Public Water System Intake. According to the COGCC's 100-year floodplain mapping the proposed pad location would not be located within a floodplain.

The site is not considered a Sensitive Area based on the information evaluated for the desktop analysis. Pad release pollution potential on local water resources in vicinity of the proposed pad is low due proposed BMP control measures for surface water bodies located within 500 feet of the pad. The potential for groundwater quality impacts are also deemed to be low as shallow groundwater occurrence was not observed in the vicinity of the ephemeral drainage reach near proposed well pad.

