

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural  
Resources Department  
Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-141  
Revised August 24, 2018  
Submit to appropriate OCD District office

Incident ID	nAPP2209041864
District RP	
Facility ID	
Application ID	694798

## Site Assessment/Characterization

*This information must be provided to the appropriate district office no later than 90 days after the release discovery date.*

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>&gt;51</u> (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas <b>not</b> on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

**Characterization Report Checklist:** *Each of the following items must be included in the report.*

- Scaled site map showing impacted area, surface features, subsurface features
- Field data
- Data table of soil contaminant concentration data
- Depth to water determination
- Determination of water sources and significant watercourses within 1/2-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- Topographic/Aerial maps
- Laboratory data including chain of custody

State of New Mexico  
Oil Conservation Division

Incident ID	nAPP2326550561
District RP	
Facility ID	
Application ID	268262

This section is being submitted to provide the characterization information provided above. As discussed with Robert Hamlet on October 2, 2023, a soil assessment will not be completed. Remediation of affected soil has started. Notifications have been provided to NMOCD and the BLM on September 25, 2023.

Groundwater near the Site was not encountered at 51 feet below ground surface based on soil boring installation and logging. The NMOCD requested the above information be submitted to validate the use of less stringent Closure Criteria in soils below four (4) feet below natural ground surface.

It is currently estimated approximately 50-100 barrels of produced water liquids were released, which is below the 200 barrel threshold.

A general remediation plan has also been attached providing an out line of remedial activities and sampling protocol. **Novo/Earthstone is seeking formal approval for the use of the less stringent Closure Criteria in soils below 4 feet.**

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Kevin Hart Title: Senior HSE Advisor

Signature:  Date: October 2, 2023

email: khart@earthstoneenergy.com Telephone: 432-212-2081

**OCD Only**

Received by: \_\_\_\_\_ Date: \_\_\_\_\_

Incident ID	nAPP2326550561
District RP	
Facility ID	
Application ID	268262

## Remediation Plan

**Remediation Plan Checklist:** *Each of the following items must be included in the plan.*

- Detailed description of proposed remediation technique
- Scaled sitemap with GPS coordinates showing delineation points
- Estimated volume of material to be remediated
- Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

**Deferral Requests Only:** *Each of the following items must be confirmed as part of any request for deferral of remediation.*

- Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- Extents of contamination must be fully delineated.
- Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Kevin Hart Title: Senior HSE Advisor

Signature:  Date: October 2, 2023

email: khart@earthstoneenergy.com Telephone: 432-212-2081

**OCD Only**

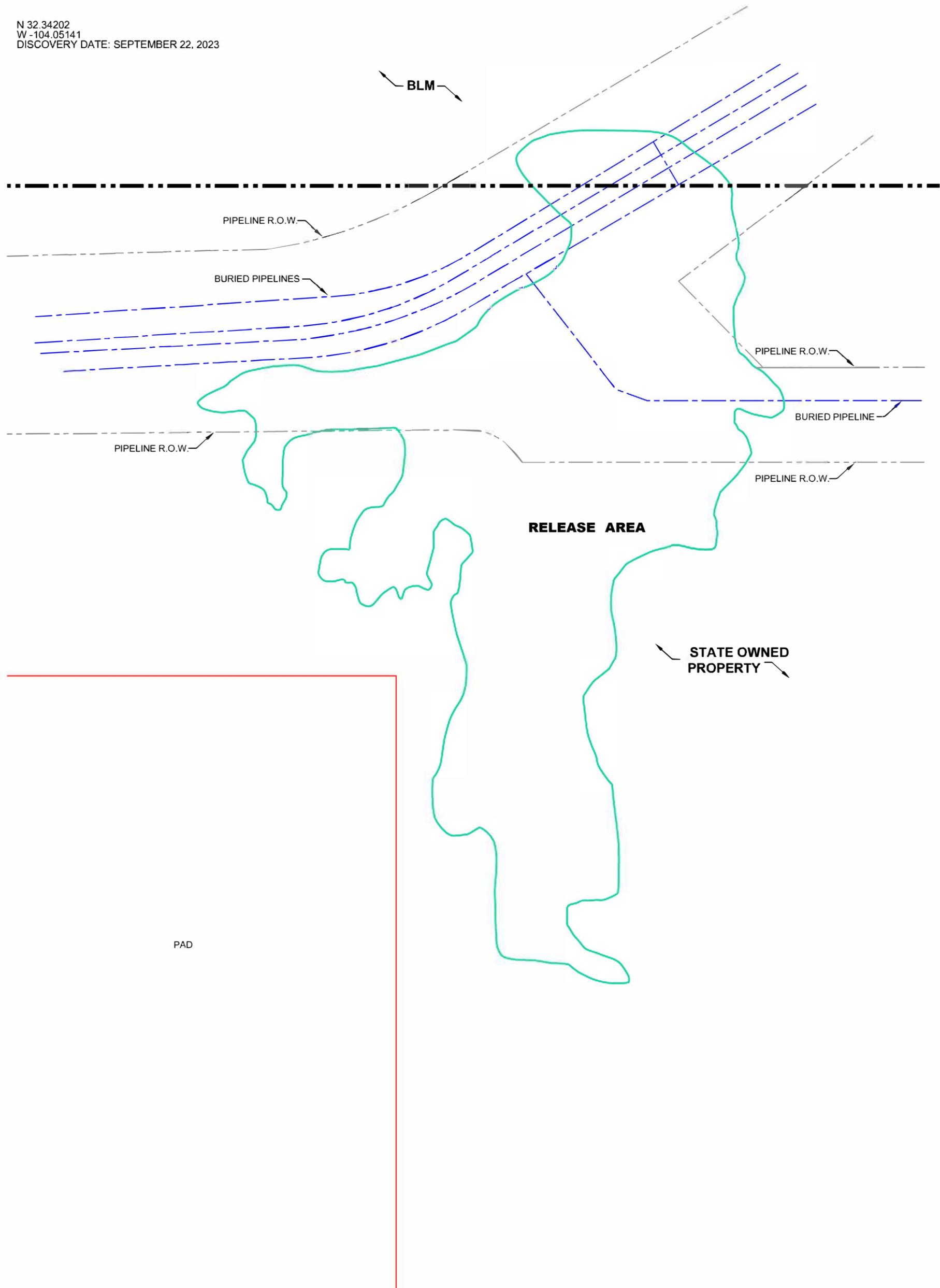
Received by: \_\_\_\_\_ Date: \_\_\_\_\_

- Approved
  Approved with Attached Conditions of Approval
  Denied
  Deferral Approved

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

CITY:(Reqd) DIV:(GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) Lyr:(Opt)ON=":OFF="REF"  
P:\Earthstone Energy\Rana Salada Produced Water Release\Figures-Maps\XXXXXXXX - RANA SALADA PAD J.dwg LAYOUT: FIGURE X (2) SAVED: 9/27/2023 1:51 PM ACADVER: 24.3S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 9/27/2023 1:52 PM BY: AARON LOZANO

N 32.34202  
W -104.05141  
DISCOVERY DATE: SEPTEMBER 22, 2023



Approximate Scale  
50'

EARTHSTONE ENERGY RANA SALADA - PRODUCED WATER RELEASE nAPP2326550561 EDDY COUNTY, NEW MEXICO	
<b>SITE MAP</b>	
 <b>ALTAMIRA</b>	FIGURE <b>1</b>



**Re: Rana Salada Produced Water Release (9/22/2023)  
Novo Oil & Gas (Earthstone Energy, Inc.)  
Incident ID: nAPP2326550561  
Proposed Soil Remediation Plan**

## **NOTIFICATION**

A release of produced water liquids occurred on September 22, 2023 from a threaded connection on a pipeline riser. Based on the quantity of produced water released (estimated 50-100 barrels) being greater than 25 barrels, the release was determined to be a major release per 19.15.29.7.A NMAC. Immediate notification was provided to the NMOCD and BLM on September 22, 2023. The initial online release notification C-141 was submitted to the New Mexico Oil Conservation District (NMOCD) on September 22, 2023. The OCD issued incident ID# nAPP2326550561 and approval dated September 22, 2023. The formal C-141 Notification Form and BLM Major Undesirable Event Report were submitted to both agencies on September 25, 2023.

The Site Characterization portion of the C-141 has been completed and will be submitted along with the Remediation Plan. Based on a walking receptor survey and online search, there does not appear to be any conflicts with NMOCD requested receptors.

## **Project Objectives**

The project objectives are: 1) conduct soil remediation for TPH, BTEX and chlorides and 2) complete restoration and reclamation of site area.

## **Regulatory Framework**

The Site is subject to environmental regulatory oversight by the NMOCD and regulations set forth in Title 19, Chapter 15, Part 29. A portion of the release occurred on property owned and managed by the BLM. Remediation, Restoration, and Reclamation activities will be conducted in accordance with guidelines outlined in 19.15.29 NMAC and confirmed with the BLM.

## **Depth to Water Determination**

Altamira installed soil boring SB-11 in April 2022 to determine depth to groundwater. Results indicate depth to groundwater near the Site is greater than 51 feet below ground surface. I have attached the soil boring log (**Attachment 1**) and a figure showing the Site in relation to soil boring SB-11 (**Figure 2**).

The purpose of advancing soil boring SB-11 to 51-feet was to determine if groundwater was present below 51-feet. During boring advancement, variations of dry unconsolidated soil and rock were observed. During advancement of soil boring SB-11, groundwater (saturation) was not encountered. The borehole was advanced to 51 feet below ground surface and allowed to stay open for a period of time. The non-presence of groundwater was verified with an electronic water level probe.



Based on the lines of evidence provided above, groundwater is not present from the surface to 51-feet below ground surface in the area of the release. Based on this site specific groundwater data, analytical data results will be compared to Closure Criteria for groundwater encountered at depths greater than 51 feet below ground surface.

**REMEDIATION PLAN**

Remediation of shallow soils within the general release area is necessary due to the release of produced water liquids to the ground surface. Affected soil in the flow path areas will be excavated and removed at various depths based on confirmation soil sample results (Figure 1).

Earthstone and Altamira will provide verbal and written notification to the OCD district office and BLM prior to start of field activities and two business days prior to confirmation soil sampling. Notification of initial spill response soil excavation has been completed.

As part of the initial cleanup and response, the affected soil area has been excavated to an approximate depth of 12-inches below ground surface where safe to do so to remove the greater mass of chloride affected soil.

Earthstone and Altamira have worked with the NMOCD and BLM to develop final approved Closure Criteria based on depth to groundwater greater than 51 feet near the Site. The NMOCD has acknowledged depth to water greater than 51 feet below ground surface; however, have requested further site characterization and a remediation plan. The BLM has indicated the Site is located over a medium karst area.

**Cleanup Criteria Scenarios**

If the NMOCD and BLM approve the less stringent Closure Criteria for soils below four feet (based on depth to water greater than 51 feet below ground surface), Closure Criteria would be as follows:

<b><u>Soil (0-4')</u></b>	<b><u>Soil (&gt;4')</u></b>
Chlorides – 600 mg/kg	Chlorides – 10,000 mg/kg
Benzene – 10 mg/kg	Benzene – 10 mg/kg
BTEX – 50 mg/kg	BTEX – 50 mg/kg
TPH – 100 mg/kg	TPH – 2,500 mg/kg (GRO+DRO – 1,000 mg/kg)

This assumes the NMOCD and BLM allow these Closure Criteria considering the medium karst and TDS of produced water assumed at >10,000 mg/L.

**Estimated Affected Soil Area**

The estimated affected soil volume is currently based on release dimensions documented using survey grade GPS. The approximate area (irregular shaped) measures 500' x 400'. If the NMOCD and BLM approved the Closure Criteria for soils greater than four feet in depth (based on depth to water being greater than 51 feet below ground surface), cleanup would generally terminate at four feet below ground surface pending final analytical data results.



### **Remediation Methodology**

Altamira and contracted personnel will mobilize equipment and personnel to the site to excavate affect soil within the release area. Soil will be either temporarily stockpiled and or direct loaded to 20-yard trucks for transport to Lea Land, LLC disposal facility located west of Hobbs, NM.

Prior to site work and subsurface digging, Altamira and subcontractors will conduct a New Mexico utility locate within 72 hours prior to site work. Altamira and subcontractor will track and document utility and pipeline companies and arrange for a meeting onsite to document utility/pipeline locations and understand potential safety requirements for excavation.

Soil outside of the pipeline ROW will be excavated to depth using a backhoe or long-arm excavator. Soil is planned to be direct loaded to 20-yard trucks and may be temporarily stockpiled as necessary ahead of loading. Affected soil within the active pipeline ROW will be excavated using hydro-excavation methods. Hydro-excavated soil/water will be placed within a bermed/lined area to allow the soil to dry prior to load and haul to the disposal facility.

Each truck load of soil loaded and transported for disposal will be accompanied with a manifest or bill of laden document so that the soil is tracked and documented for final disposal at the facility. Soil will be disposed of at the Lea Land, LLC facility located at Mile Marker 64, US Highway 62/180 East, Carlsbad, NM 88220.

### **Post Excavation Confirmation Native Soil Sampling Methodology**

Following excavation of each area to 1-2 feet below ground surface, confirmation soil sampling of the "native soil" will be conducted per 19.15.29.12 (D)(1). A sample grid system will be established using survey grade GPS. The grids will be established no greater than 200 square feet of soil area. A five-point composite soil sample will be collected every 200 square feet for each sidewall and floor of the excavation. Representative soil from each of the five points (per composite) will be mixed and placed into laboratory provided containers, labeled, and maintained on ice in an insulated cooler. Confirmation soil samples will be submitted to Cardinal Laboratories for analysis of chloride using EPA Method 300.0, TPH using Method 8015M, and BTEX/Benzene using Method 8021B or 8260B.

If confirmation soil sample results indicate the concentration of each chemical constituent are below the established and approved Closure Criteria, the grid area will be considered complete. If confirmation soil sample results indicate the concentration of a particular chemical constituent exceeds the established and approved Closure Criteria, the grid will be further excavated and resampled for that specific chemical constituent only. This methodology will occur until all Closure Criteria have been achieved. Note the Closure Criteria will be discussed and approved by the NMOCD and BLM prior to extensive soil excavation.

### **Backfill Activities**

Prior to use of backfill soil material, representative soil samples will be collected from the borrow area to confirm the chloride concentration of the borrow material is less than 600 mg/kg and



TPH/BTEX are below applicable Cleanup Criteria. Following completion of soil excavation activities and post excavation confirmation soil sampling, the area will be backfilled using native soils from the surrounding area. Backfill will occur in approximate 2-foot lifts and compacted.

## **RESTORATION, RECLAMATION & RE-VEGETATION**

Following completion of affected soil remediation and confirmation soil sampling, Earthstone will restore the excavated areas to the condition that existed prior to the release. This will include the replacement of removed soil, reclamation to original grade, and re-vegetation with native species. Final soil cover will be placed to match the sites existing grade to prevent ponding of water and erosion. Site personnel will inspect the area on a weekly basis to monitoring the final cover/grade.

Currently, pre-disturbed areas within the immediate area consists of spars vegetation including weeds and low brush forming plants. Approximately 70-75% of the ground surface consists of native soil and broken rock.

Following placement of the top layer, native seed mixtures will be spread and watered to support growth. Per NMOCD 19.15.29.13 (D)(3) reclamation of disturbed areas will be considered complete when the uniform vegetation cover has been established that reflects a life-form ratio of plus or minus fifty percent of pre-disturbed levels and a total percent plant cover of at least seventy percent of pre-disturbed levels. This results in an approximate established re-growth of 25-30% of the ground surface (based on best estimate of site observations).

Earthstone will notify the NMOCD and BLM when reclamation and re-vegetation is complete and submit the final closure report and request final site closure.

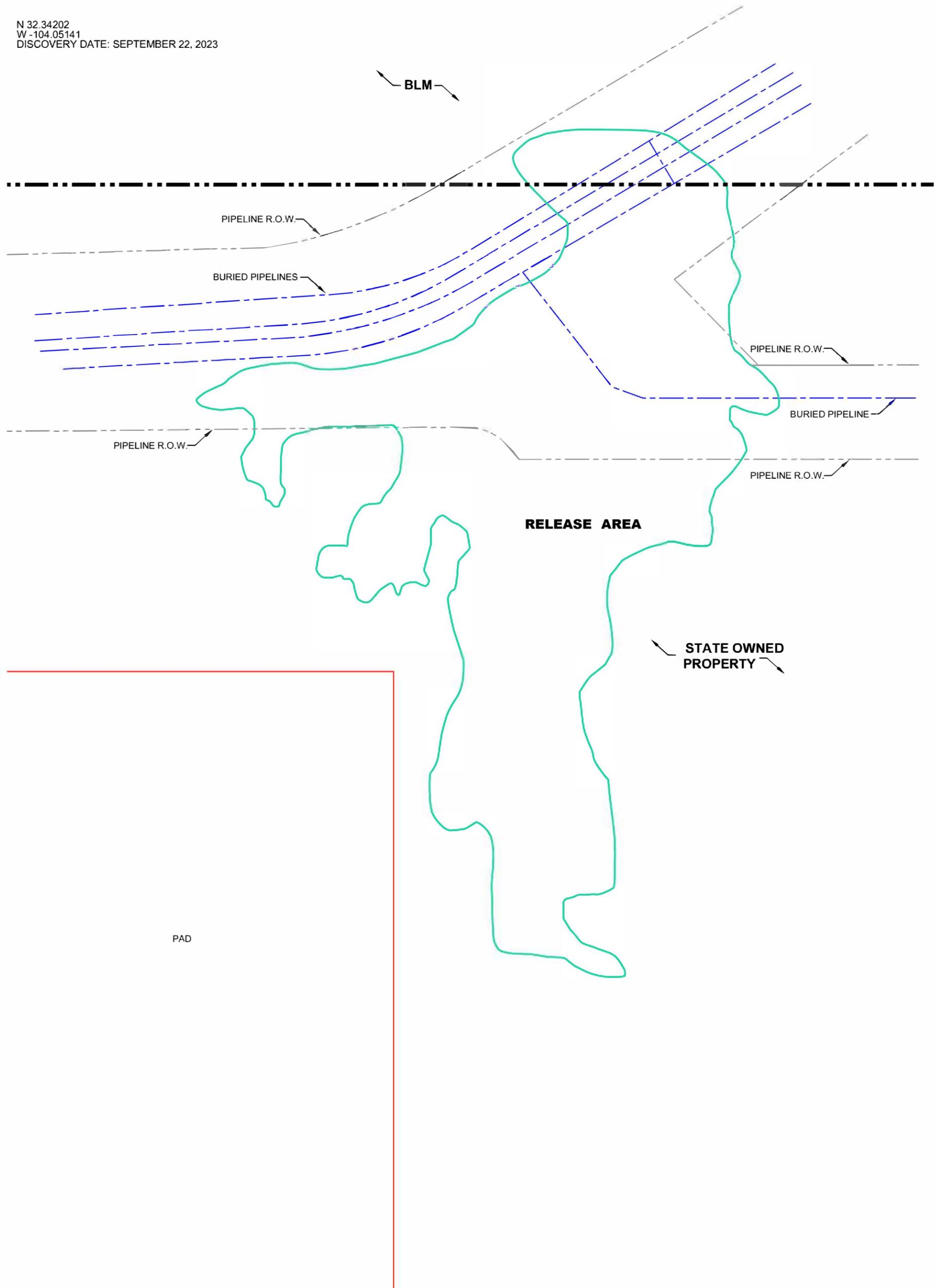
**Figure 1 – Site Map**

**Figure 2 – Aerial Map – SB-11 Location to Site**

**Attachment 1 – Soil Boring Log SB-11**

CITY:(Reqd) DIV:(GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) Lyr:(Opt)ON=":OFF="REF"  
P:\Earthstone Energy\Rana Salada Produced Water Release\Figures-Maps\XXXXXXXX - RANA SALADA PAD J.dwg LAYOUT: FIGURE X (2) SAVED: 9/27/2023 1:51 PM ACADVER: 24.3S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 9/27/2023 1:52 PM BY: AARON LOZANO

N 32.34202  
W -104.05141  
DISCOVERY DATE: SEPTEMBER 22, 2023



Approximate Scale  
50'

EARTHSTONE ENERGY RANA SALADA - PRODUCED WATER RELEASE nAPP2326550561 EDDY COUNTY, NEW MEXICO	
<b>SITE MAP</b>	
 <b>ALTAMIRA</b>	FIGURE <b>1</b>

# Rana Salada Produced Water Release

Site to Soil Boring SB-11 - DTW Greater Than 51 Feet Below Ground Surface

**Legend**

-  32.34202, -104.05141
-  Produced Water Release Point

Produced Water Release Point   
 32.34202, -104.05141

Pad J

NOVO

Soil Boring SB-11

Google Earth



BORING RECORD								
GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE			REMARKS
					NUMBER	QVM READING	RECOVERY	
		N 32.34047 W -104.04576						GROUND SURFACE: 0
	0	CO-6.5 Reddish Brown fine sand + silt Dry loose			0.0		X	
					0.0		X	
					0.0		X	
					0.0		X	
	5	(6.5-12.5) Tan Fine sand + silt Intermittent pea gravel pebbles < 0.25" Dry			0.0		X	
					0.0		X	
					0.0		X	
					0.0		X	
	10	(12.25-35) Loose fine sand with caliche light tan Dry soil harder more compacted with depth			0.0		X	
					0.0		X	
					0.0		X	
	15	(35-48) caliche + fine sand DRY trace silt loose			0.0		X	
					0.0		X	
					0.0		X	
	20	(48-51) Greenish Brown clay med plasticity moist, Groundwater not encountered at 51'			0.0		X	
					0.0		X	
	25	TD=51' BGS 5 Auger tests			0.0		X	
		0-1 0926						
		1-2 0927						
		2-3 0928						
		3-4 0729			0.0		X	
	30	5-6 0932						
		7-8 0933						
		9-10 0934						
		11-12 0936						
		14-15 0937			0.0		X	
	35	19-20 0952						

 CME CONTINUOUS AUGER SAMPLER  
 STANDARD PENETRATION TEST  
 UNDISTURBED SAMPLE  
 WATER TABLE (24 HOURS)

 WATER TABLE (TIME OF BORING)  
 LABORATORY TEST LOCATION  
 PENETROMETER (TONS/SQ. FT.)  
 NR: NO RECOVERY

PROJECT NAME  
NOVO Oil & Gas - Hades North Loop Produced Water Release

PROJECT NUMBER  
NVONM2202

BORING NUMBER  
SB-11

DATE DRILLED: 4/26/2022

DRILLING METHOD: Direct Push/Air Rotary

DRILLED BY: Envirotech Drilling

LOGGED BY: [Signature]

CHECKED BY: [Signature]

DRAWN BY: [Signature]

PAGE 1 OF 2



3700 West Robinson St., Suite 200 • Norman, Oklahoma 73072 • 405-701-5058  
www.altamira-us.com

BORING RECORD								
GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE			REMARKS
					NUMBER	OWN READING	RECOVERY	
		N 32.34047 W -104.04576						BACKGROUND OVM READING: SOIL: 0.0 PPM AIR: 0.0 PPM
	35	GROUND SURFACE:						35
	45				0.0		X	45
	50				0.0 0.0		X	50
	55	TD = 51' BGS NO WATER OBSERVED						55
	20							20
	25							25
	30							30
	35							35

<table style="width:100%;"> <tr> <td> CME CONTINUOUS AUGER SAMPLER</td> <td> WATER TABLE (TIME OF BORING)</td> </tr> <tr> <td> STANDARD PENETRATION TEST</td> <td> LABORATORY TEST LOCATION</td> </tr> <tr> <td> UNDISTURBED SAMPLE</td> <td> PENETROMETER (TONS/SQ. FT.)</td> </tr> <tr> <td> WATER TABLE (24 HOURS)</td> <td>NR: NO RECOVERY</td> </tr> </table>	CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)	STANDARD PENETRATION TEST	LABORATORY TEST LOCATION	UNDISTURBED SAMPLE	PENETROMETER (TONS/SQ. FT.)	WATER TABLE (24 HOURS)	NR: NO RECOVERY	PROJECT NAME Novo Oil & Gas - Hades North Loop Produced Water Release
CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)								
STANDARD PENETRATION TEST	LABORATORY TEST LOCATION								
UNDISTURBED SAMPLE	PENETROMETER (TONS/SQ. FT.)								
WATER TABLE (24 HOURS)	NR: NO RECOVERY								
	PROJECT NUMBER NVONM2202								
	BORING NUMBER SB-11								
	DATE DRILLED: 4/26/2022								
3700 West Robinson St, Suite 200 • Norman, Oklahoma 73072 • 405-701-5058 www.altamira-us.com	DRILLING METHOD: Direct Push/Air Rotary Rotary								
	DRILLED BY: Envirocore Drilling								
	LOGGED BY: OG								
	CHECKED BY: _____								
	DRAWN BY: _____								
	DRAWING NO.: _____ PAGE 2 OF 2								

**District I**  
 1625 N. French Dr., Hobbs, NM 88240  
 Phone:(575) 393-6161 Fax:(575) 393-0720  
**District II**  
 811 S. First St., Artesia, NM 88210  
 Phone:(575) 748-1283 Fax:(575) 748-9720  
**District III**  
 1000 Rio Brazos Rd., Aztec, NM 87410  
 Phone:(505) 334-6178 Fax:(505) 334-6170  
**District IV**  
 1220 S. St Francis Dr., Santa Fe, NM 87505  
 Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 271524

**CONDITIONS**

Operator: NOVO OIL & GAS NORTHERN DELAWARE, LLC 300 N. Marienfeld St Ste 1000 Midland, TX 79701	OGRID: 372920
	Action Number: 271524
	Action Type: [C-141] Release Corrective Action (C-141)

**CONDITIONS**

Created By	Condition	Condition Date
crystal.walker	Proposed Soil Remediation Plan Approved. Please ensure proper Sampling Notification pursuant to 19.15.29.12.D.(1).(a) NMAC is accomplished. Failure to provide proper sampling notice is a compliance issue and OCD may pursue compliance actions pursuant to 19.15.5 NMAC. Operator shall ensure future compliance with 19.15.29.12.D.(1).(a) NMAC	3/11/2024