October 2020

C- 141 Site Characterization Package
Culwin Queen Lateral Release

NRM2020635561

Google Earth image illustrating the proximity of the Culwin Queen release (red outline in northern portion of map) and a potash tailings pile (southern portion of the map).

Prepared for:
Ray Westall Operating
PO Box 4
Loco Hills, NM 88255-0004

Prepared by:
R.T. Hicks Consultants, Ltd.
901 Rio Grande NW, Ste F-142
Albuquerque, New Mexico 87104

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

October 12, 2020

NMOCD - District 2
Mr. Mike Bratcher
811 S. First St.
Artesia, NM 88210

RE: Culwin Queen Lateral Release, NRM2020635561
UL "K", Sec. 3; T19S. R30E. 32.686984, -103.96099 (NAD83)

Dear Mr. Bratcher:

On behalf of Ray Westall Operating (RWO), R.T. Hicks is pleased to submit the attached C-141. The submission attached is the site characterization for the Culwin Queen Lateral Release and the Remediation Plan is forthcoming.

R.T. Hicks Consultants performed two site visits: one on June 19, 2020 and one on September 11, 2020. During the site visit in June, we conducted an EM survey and collected soil samples. R.T. Hicks was unable to take samples deeper than 36 inches below the surface with our hand auger as a result of the presence of caliche close to the surface in the pasture and packed gravel beneath the surface on the pad. Due to COVID, R.T. Hicks was unable to return to for additional sampling with appropriate equipment (see Field Data Appendix) until September 11, 2020.

The data are summarized below

- Laboratory analyses did not detect regulated hydrocarbons above Rule 29 closure criteria
- We estimate the release volume is less than 100 barrels on the production pad surrounding the tank battery and perhaps about the same volume of release escaped the pad and flowed in two small recent erosion channels formed by runoff from the former pad.
- The surface area of the release on the pad is approximately 773 square yards and about 1013 square yards within the channels.
- The United States owns the impacted surface
- Data from nearby water wells, the on-site oil well, the New Mexico Geologic Map and our field examination of the geology of the area permit two conclusions that exhibit a high degree of scientific certainty:
  - No perched groundwater zone exists beneath the release site
  - The uppermost water-bearing unit exhibits a potentiometric surface that is about 215 feet below land surface

The forthcoming remediation plan will provide more detail regarding the our conclusions on the impact that the proposed remedy has on environmental considerations, such as ground instability, natural watercourses, etc.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks
Principal
Copy –
Jim Amos, BLM Carlsbad
Apache Corporation – Sorina Flores 303 Veterans Airpark Lane, Suite 3000, Midland, TX, 79705
Ray Westall Operating

C - 141

State of New Mexico
Oil Conservation Division

Incident ID	NRM2020635561
District RP	
Facility ID	
Application ID	

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? (*Figure 3 and 3a)*	215 (ft bgs)
Did this release impact groundwater or surface water? (*Figures 2, 3, 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse? (*Figure 5)*	☐ Yes ☒ 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)? (*Figure 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church? (*Figure 6)*	☐ Yes ☒ 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? (*Figure 4)*	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring? (*Figure 5, 2)*	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field? (*Figure 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland? ((*Figure 7)*	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine? (*Figure 8)*	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology? (*Figure 9)*	☒ Yes ☐ No
Are the lateral extents of the release within a 100-year floodplain? (*Figure 10)*	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site? (*Figure 1)*	☒ Yes ☐ 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, delineation points, and monitoring wells.
☒ Field data
☒ Data table of soil contaminant concentration data
☒ Depth to water determination
☒ Determination of water sources and significant watercourses within ½-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

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.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	NRM2020635561
District RP	
Facility ID	
Application ID	

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: Donnie Mathews Title: General Manager

Signature: Donnie Mathews Date: 10/13/20

email: _____ Telephone: 575-677-2370

OCD Only

Received by: _____ Date: _____

There are figures included in this package that are not referenced in the text. Some figures are referenced in the forthcoming Remediation Plan.

Characterization Report

☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.

Figure 1
This figure shows the spill footprint (brown-dashed line) as surveyed in the field by R.T. Hicks. Surface ownership is presented in this image as well as our calculation of the surface area in square yards. The red points indicate the locations where soil samples were taken on June 19, 2020 and September 11, 2020.

☒ Field data

Field data from the Hicks Consultants site visit and sampling program is presented in *Appendix R.T. Hicks Field Data.*

The important observations as shown in the photographs and the Google Earth images in the Appendix are:

1. The release is confined to the south and west portions of the pad surrounding the Culwin Queen Tank Battery and two channels that extend from the pad, consistent with Figure 1.
2. These two drainage channels are not natural
3. An EM Survey and site observations demonstrated that the release was contained wholly in the channels.
4. Site observations confirm the published map: the geologic unit at the surface in the area surrounding the Culwin Queen is the Quartermaster.
5. The northern edge of a 400-acre potash mine tailings pile lies about 2000 feet due south of the release site. The top of the tailing pile/pond is about 3450 feet asl and the elevation of the release source is about 3400 feet.

☒ ***Data table of soil contaminant concentration data***

Tables 1 and 2 the chloride concentration from the soil samples collected on June 19, 2020 and September 11, 2020. The samples were analyzed by Hall Environmental Laboratories. Analyses of four samples for petroleum hydrocarbons identified in Table 1 of Rule 29 are included the laboratory report for the September 11 sampling event. and demonstrate the absence of said hydrocarbons in concentrations higher than the listed thresholds.

☒ **Depth to water determination**

Distance to Groundwater

Figures 2 and 3 and the discussion presented below demonstrate that groundwater (freshwater, as defined by NMOCD Rules) at the location is greater than 100 feet beneath release footprint.

Hydrogeology of the Culwin Queen Lateral Release Site

The Culwin Queen Lateral Release Site is located approximately 28 miles southeast of Artesia, New Mexico and 24 miles northeast of Carlsbad, New Mexico. According to the Geologic Map of New Mexico (seen in Figures 2 and 3), the surface unit at the site is Quartermaster and Rustler Formations (Pqr). The Quartermaster Formation consists of red sandstone and siltstone and the Rustler Formation consists of siltstone, gypsum, sandstone, and dolomite.

North of the Culwin Queen site, there are 4 USGS wells reportedly completed in the Chinle formation (10026, 9387, 10247 and 10238). As shown on Figure 2, two of these four wells are on or within a few hundred feet of Permian outcrop. USGS-9387 probably overlies the same Permian rocks and USGS-10026 may overlie buried Chinle Formation. To the south, USGS-10034, which is reported as a Rustler well, lies between the outcrop of Triassic and Permian rocks. Certainly, three of the wells described above that are reported to be completed in the Chinle are likely not completed in the Chinle, as this formation is younger and higher stratigraphically than the Quartermaster and Rustler Formations.

The Chinle is exposed 1.5 miles to the south and southwest, at surface elevations ranging from about 3300 to 3385. The southern boundary of the Rustler/Quartermaster out crop is at an elevation ranging from 3340 to 3380. While the topographic relief between these two units is small, the stratigraphic relief is greater, perhaps as much as 100 feet. Our limited research suggests that subsidence caused by plastic flow or solution and removal of portions of the underlying Salado Formation or lower Rustler evaporites caused local subsidence. Based on a geodetic report from the nearby Apache Salt Fork 3-4 Federal Com #1H well (See Well Log Appendix), the Rustler (probably the top of anhydrite) exists from 417 feet below the surface to the top of the Salado halite, which is 603 feet below the surface. In this area, the Rustler can be 400[1]-500[2] feet thick. This implies that the top boundary of the Rustler (bottom of Quartermaster) is between 103 and 203 feet below the surface. We confirmed the Quartermaster is at the surface during our site visit (see *Appendix R.T. Hicks Field Data*). This evidence confirms that the three wells near the Culwin Queen site that supposedly tap an aquifer in the Chinle Formation likely tap an aquifer in a stratigraphically lower geologic unit, such as the Rustler Magenta Dolomite.

An examination of driller's logs for the OSE support a conclusion that there are no shallow water tables in the area. We found one well with a driller's log, CP-00873 (see Well Log Appendix). CP-00873 is approximately 3.5 miles southeast of the release location, the drilling on this well

[1] https://www.nps.gov/parkhistory/online_books/gumo/215/sec2e.htm
[2] https://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R356/Ch15_Rustler.pdf

was completed in January 1989. The driller's log states that water was found in a formation that is a "red shale with stringer of sand" and is 240 feet below the surface.

Depth to Water Analysis

Figure 3 and the associated legend used a topographic base map overlain by a transparent geologic map of New Mexico and shows:

1. The location of the Culwin Queen Lateral release site labeled with a yellow callout box.
2. Water wells from the USGS database as purple, red, and blue triangles. These symbols represent the principle water bearing unit of the well. In this case, the symbols represent the Chinle, Santa Rosa, and Rustler formations. The USGS well number, groundwater elevation measurement, and date the well was completed are also indicated on the figure
3. Water wells labeled "MISC" that are from the RT Hicks database, where depth to water measurements from wells in southeast New Mexico has been recorded by professionals over the years and groundwater elevations were subsequently calculated. These wells are symbolized by yellow, blue, and green squares with black dots in the center. The color of the square corresponds to the depth to water measurement. The wells are labeled by their number in the MISC database, the groundwater elevation, and the date the measurement was taken.
4. Isocontour lines displaying the elevation of the groundwater surface based upon measurements made by professionals.

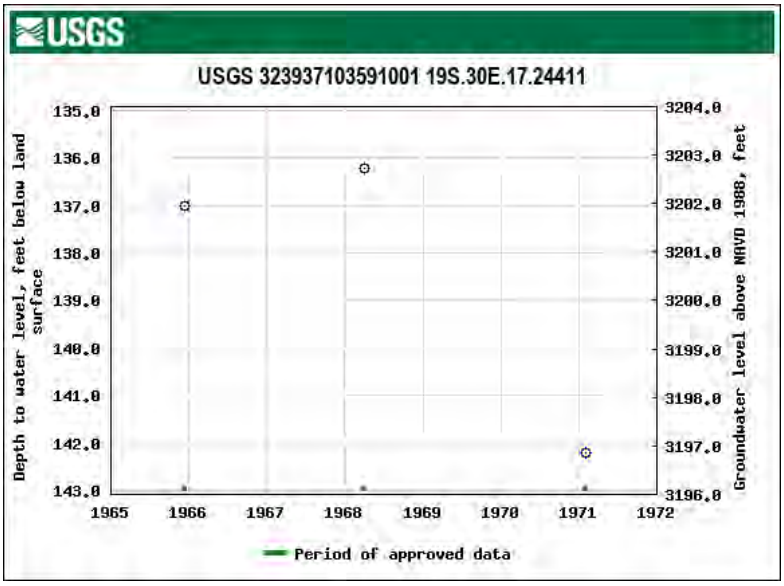
We relied upon the USGS and MISC wells from the various water bearing units to create the water table elevation map shown in Figure 3. Water level data from the OSE database rely upon observed water levels by drillers during the completion of the water well. OSE dataset provides some useful data in certain areas.

The data demonstrate that water levels in the south and western margins of the map are from wells completed in Rustler Formation. In the north and eastern margins, wells are reported to be completed in the Chinle Formation, but per our analysis in the previous section, we believe at least some these wells to be mislabeled.

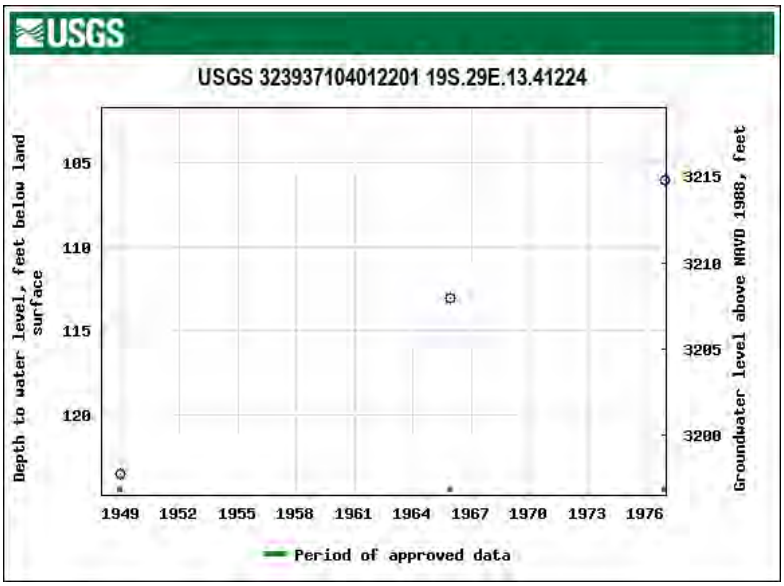
Mr. Randall Hicks measured depth to groundwater in MISC-179 in 2014, Randall Hicks found a groundwater elevation of 3201 feet above mean sea level. This well is located 3.36 miles southeast of the Culwin Queen site.

USGS-10034[3] is 2.36 miles southwest of the release location and the historical record of water level measurements is presented in the graphic below. The data shows 6 feet decrease in ground water elevation over the 4-year record.

[3] https://nwis.waterdata.usgs.gov/nwis/gwlevels/?site_no=323937103591001



USGS-10033[4] is 4.09 miles southwest of the Culwin Queen site and the historical record of water level measurements is presented in the graphic below. The data shows a 5-foot rise of ground water over the 4-year period.



From these data, we can conclude:

- Based on the potentiometric surface map in Figure 3, the elevation of the ground water surface beneath the release is approximately 3190 feet above mean sea level.
- OSE well logs provide evidence that perched, shallow groundwater zones within the area do not exist.

[4] https://nwis.waterdata.usgs.gov/nwis/gwlevels/?site_no=323937104012201

- Our field survey verifies the accuracy of the New Mexico State Geologic Map that shows the Rustler/Quartermaster Formation exposed at the release site. Thus, there is no shallow water table groundwater zone beneath the site. The minimum distance between the spill and uppermost water-bearing zone is approximately (3405-3190=) 215 feet.

☒ **Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release**

As seen in Figure 5, within a half-mile of the release site, there is one lake/pond 0.3 miles due south and one intermittent stream that runs roughly north to south 0.4 miles to the east. A significant watercourse is defined as a watercourse with a defined bed and bank either named or identified by a dashed blue line on a USGS 7.5-minute quadrangle map or the next lower order tributary with a defined bed and bank of such watercourse. Based on field inspection and analysis of aerial imagery (see Field Data Appendix), we can confidently say that the small channels in which the release material was contained are not natural nor significant watercourse based on the definition given above.

☒ **Boring or excavation logs**

No boring or excavation logs.

☒ **Photographs including date and GIS information**

See RT Hicks Field Data Appendix

☒ **Topographic/Aerial maps**

See Figure 5 for the topographic map and Figure 6 for the aerial map.

☒ **Laboratory data including chain of custody**

See Laboratory Report Appendix.

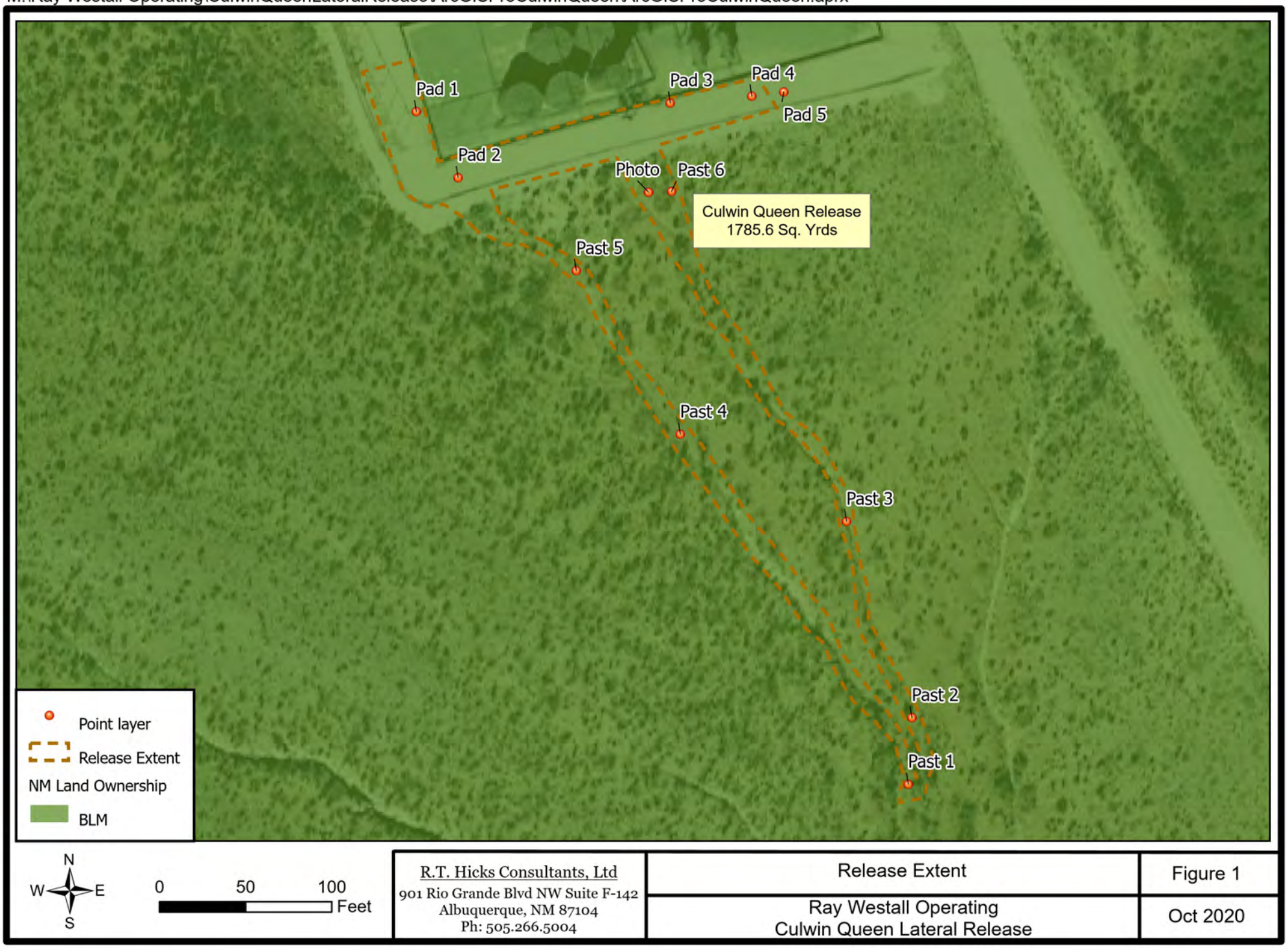
Additional Information Required by 19.15.29.11.A.3

Distance to Wellhead Protection Area, Water Supply Wells and Springs

The lateral extent of the release is not within incorporated municipal boundaries or a defined municipal fresh water well field. The nearest municipal fresh water well field and municipality is the city of Carlsbad, New Mexico, which is located approximately 23 miles southwest of the Culwin Queen release site.

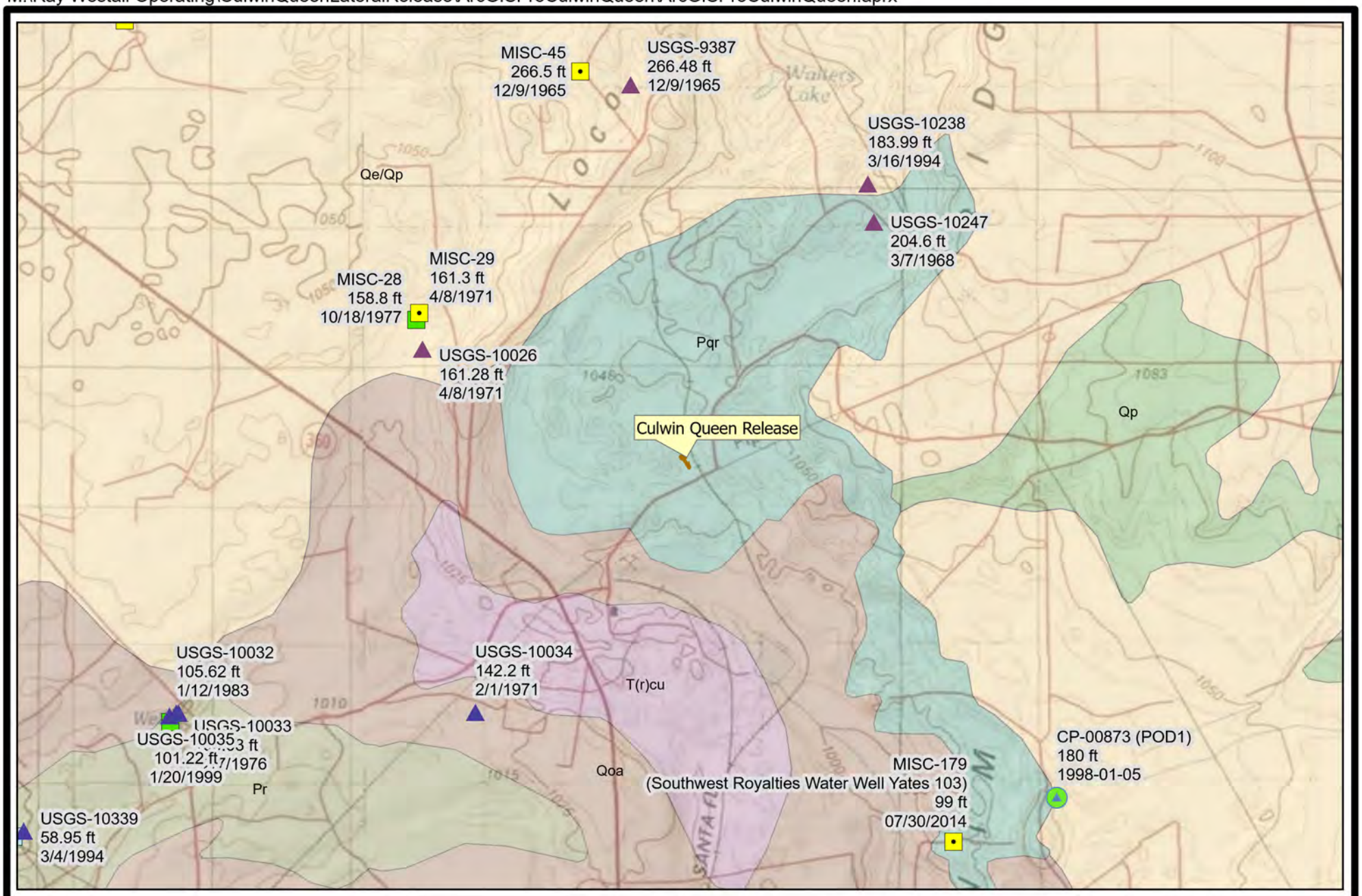
Figures

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



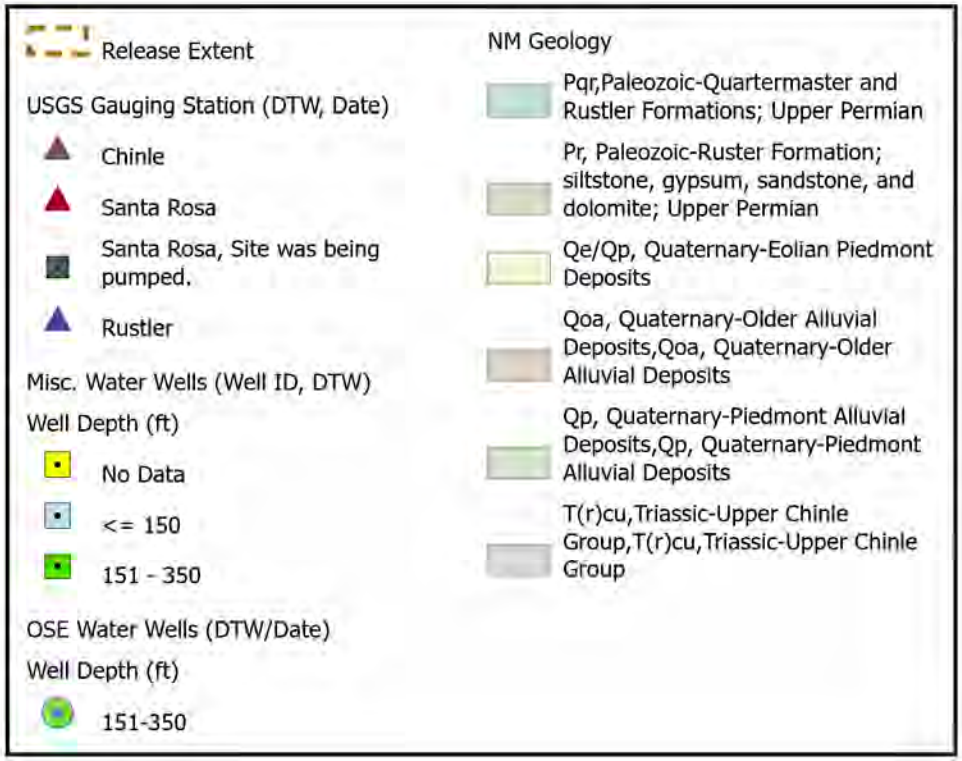
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Release Extent	Figure 1
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



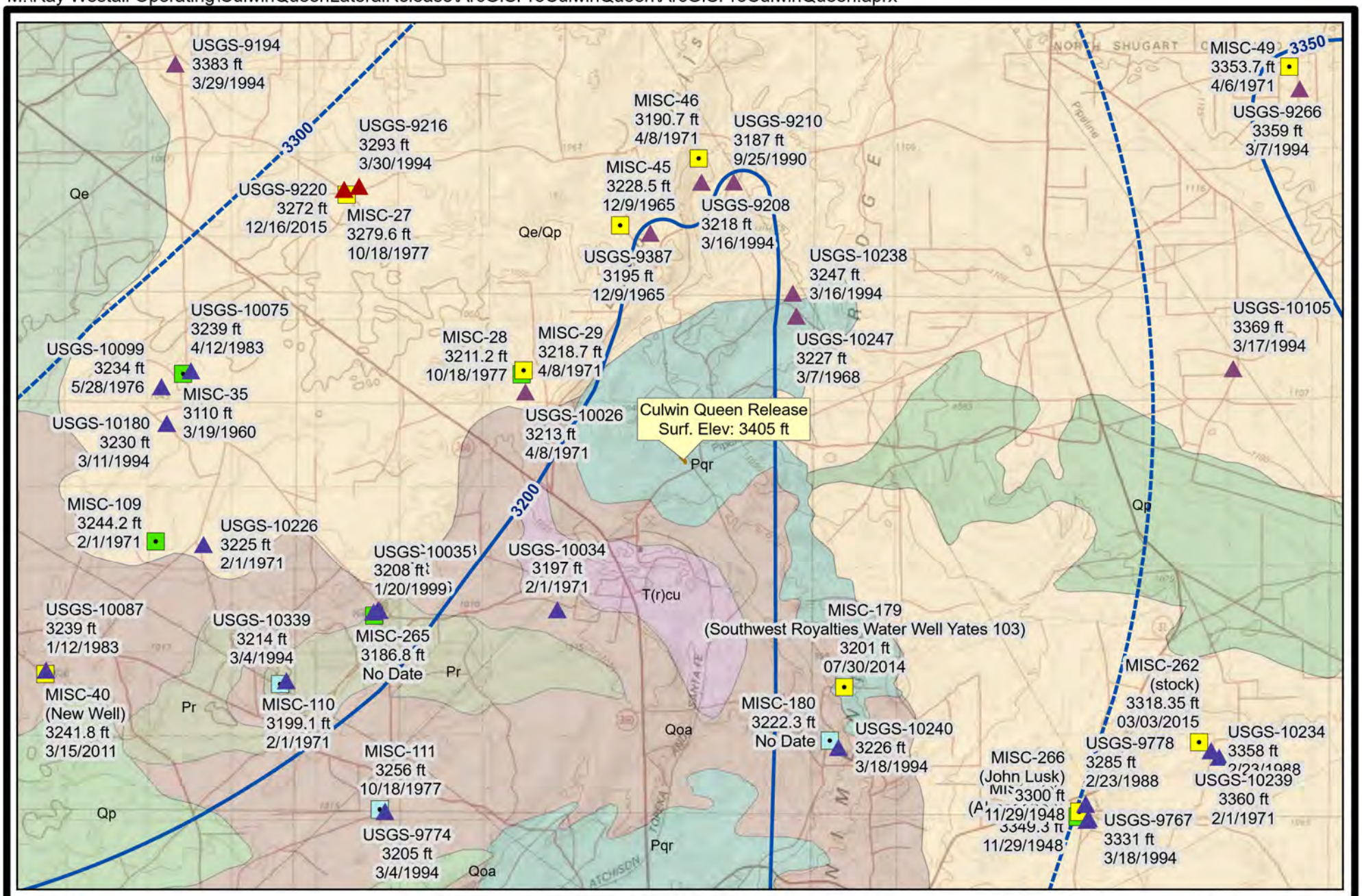
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth to Water and Geology Ray Westall Operating Culwin Queen Lateral Release	Figure 2 Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



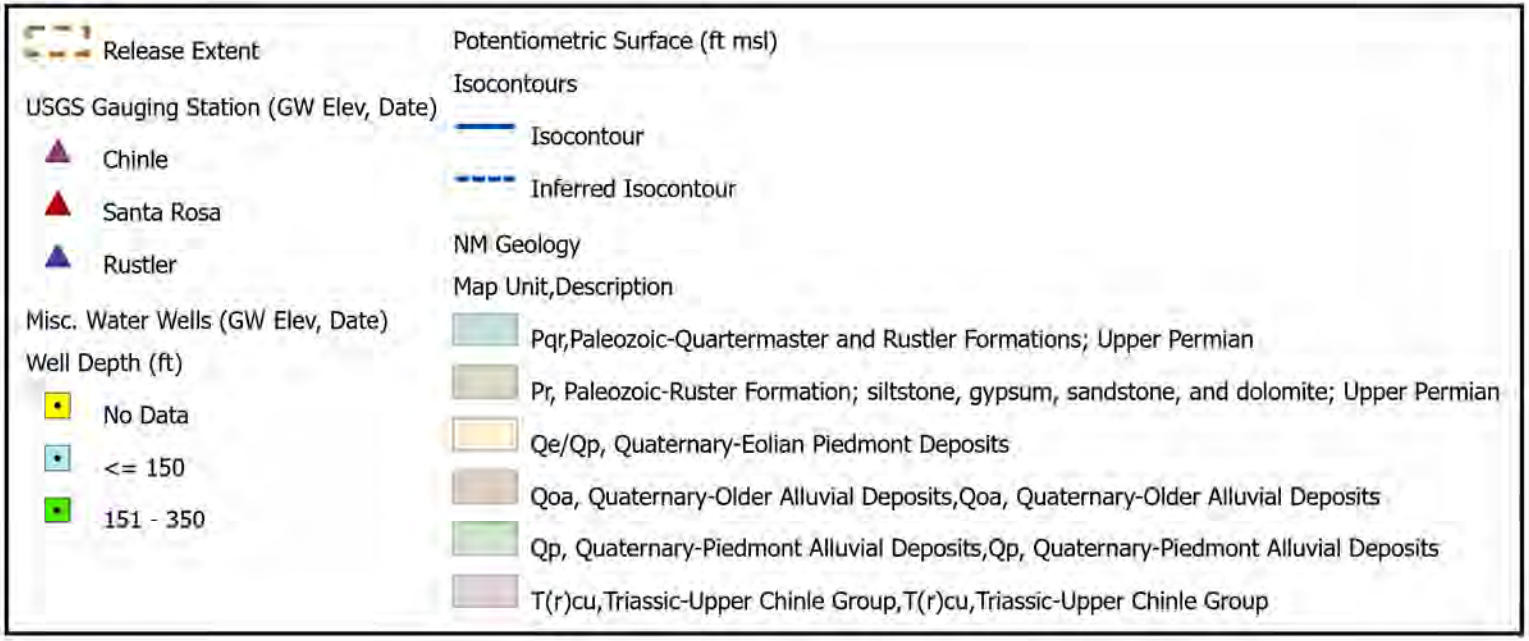
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth to Water and Geology Legend	Figure 2a
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Groundwater Elevation, Geology, and Potentiometric Surface Ray Westall Operating Culwin Queen Lateral Release	Figure 3 Oct 2020

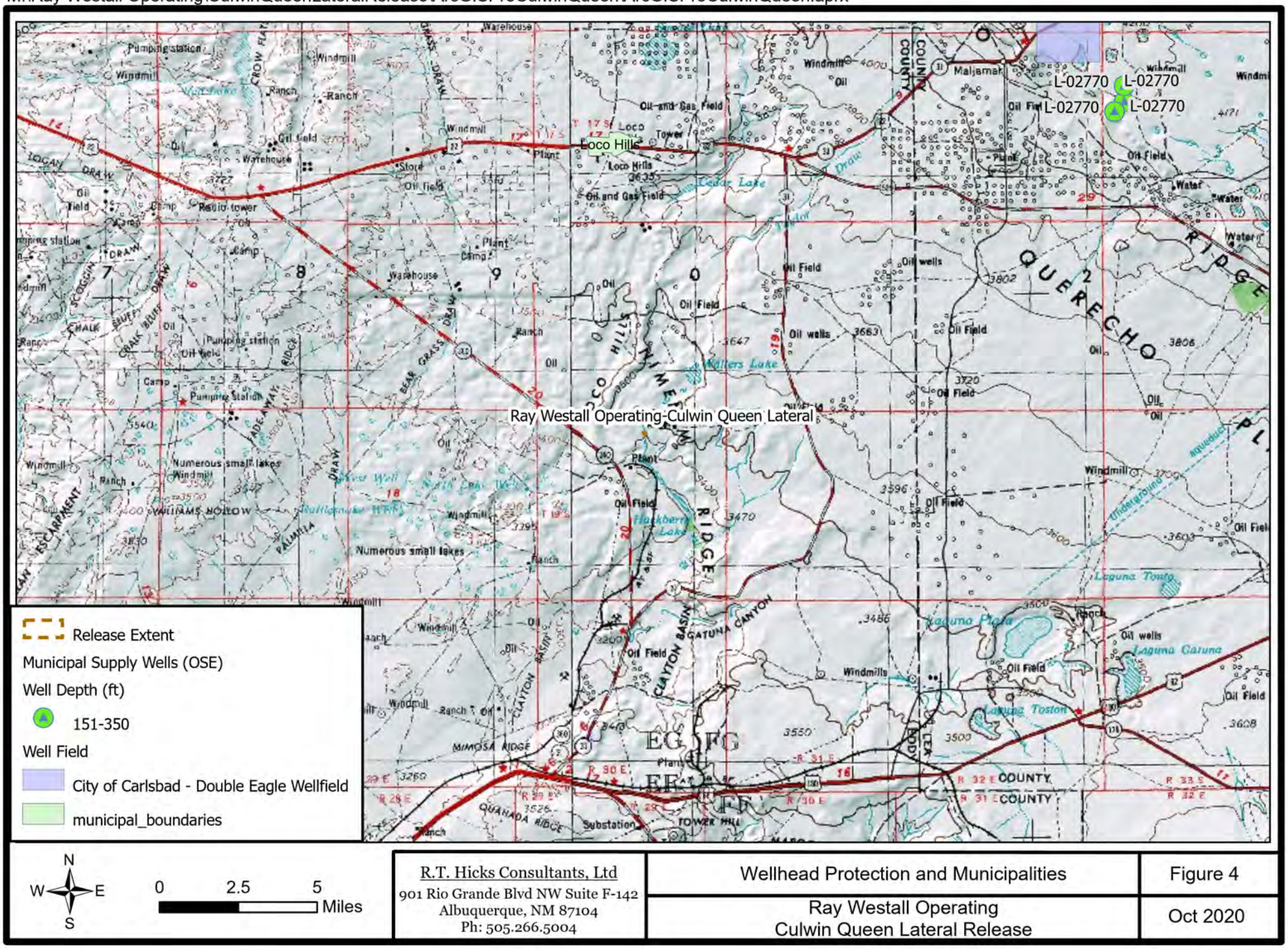
M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

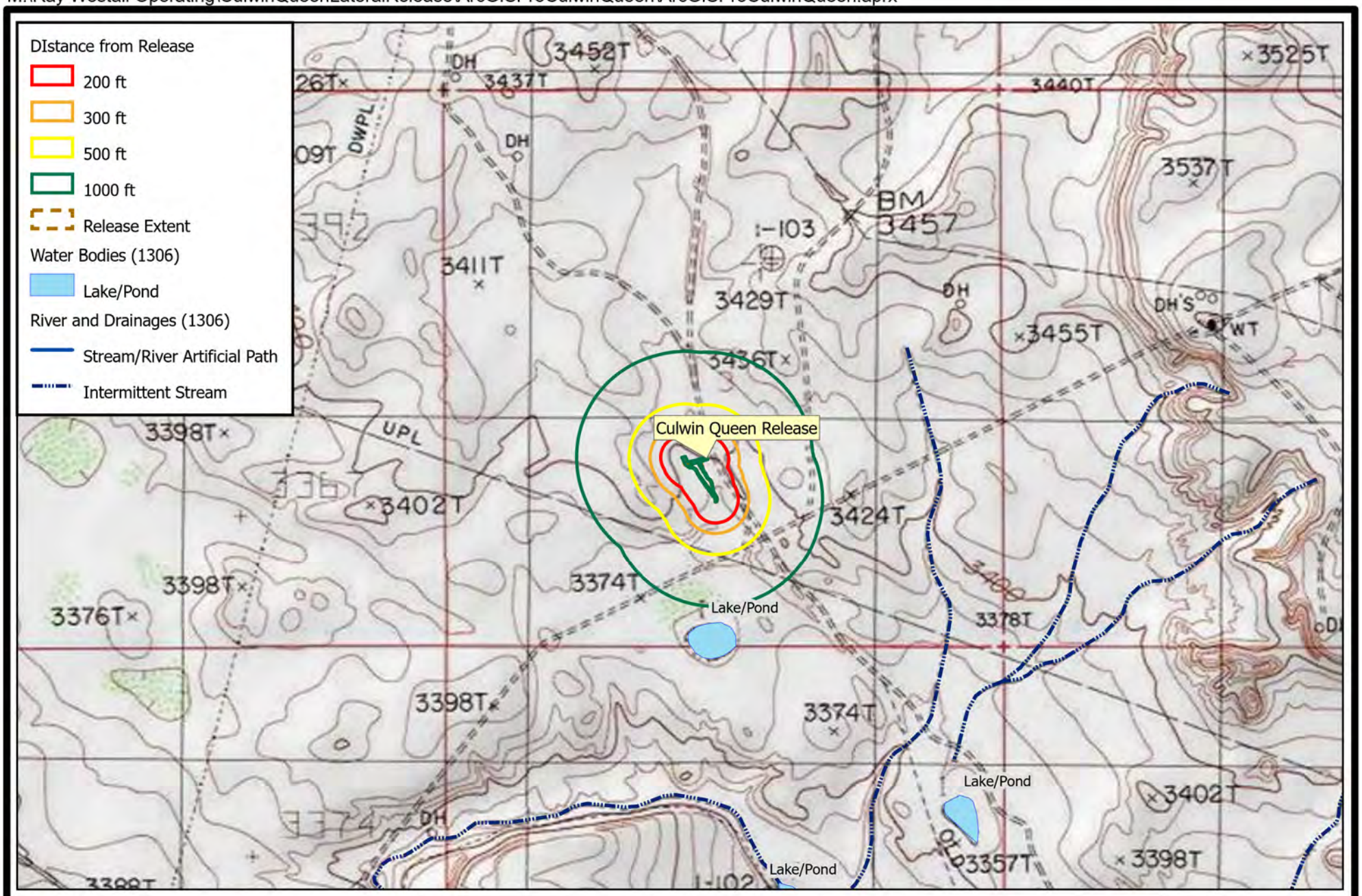
Groundwater Elevation, Geology, and Potentiometric Surface Legend	Figure 3a
Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



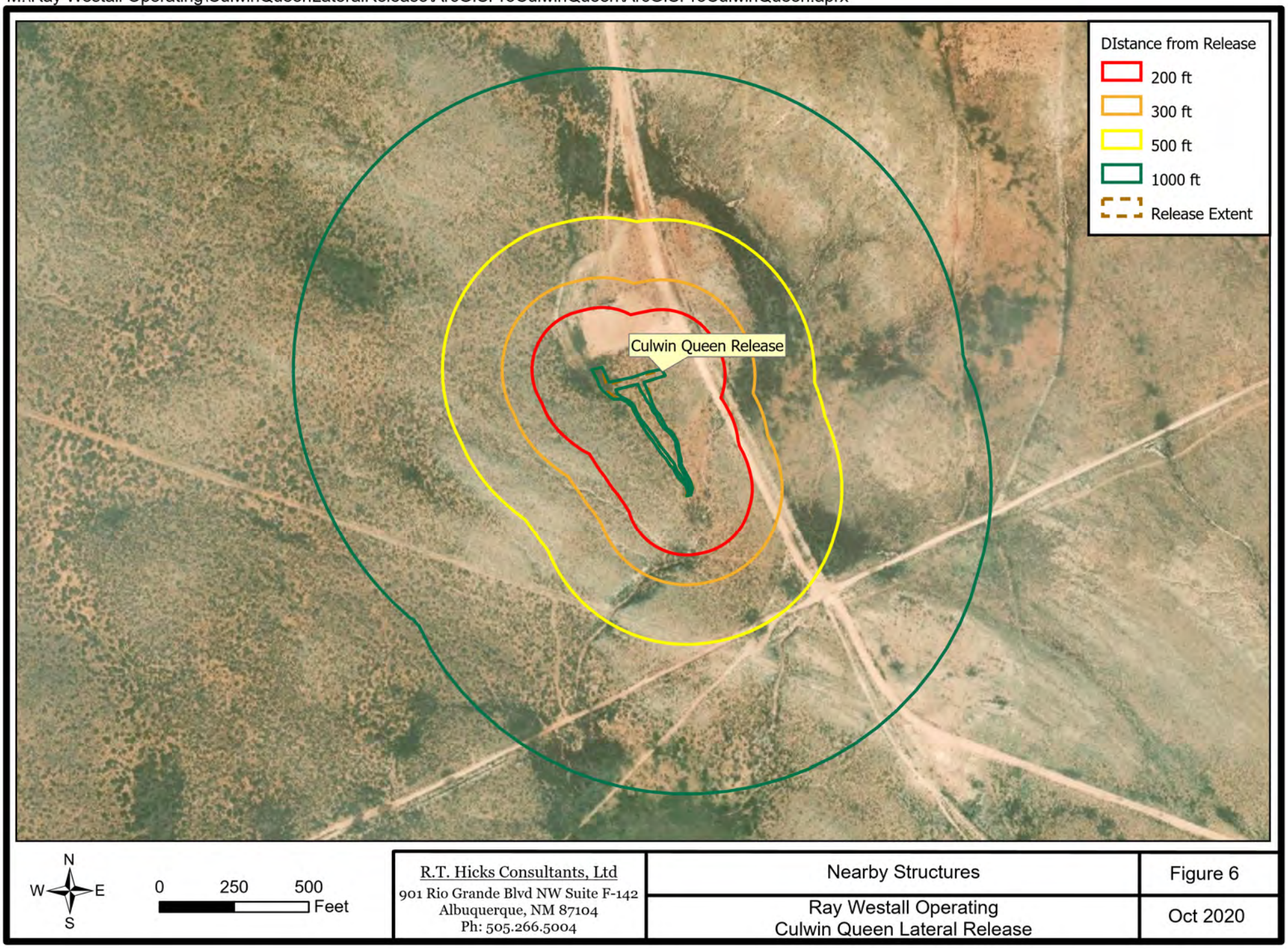
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Wellhead Protection and Municipalities	Figure 4
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



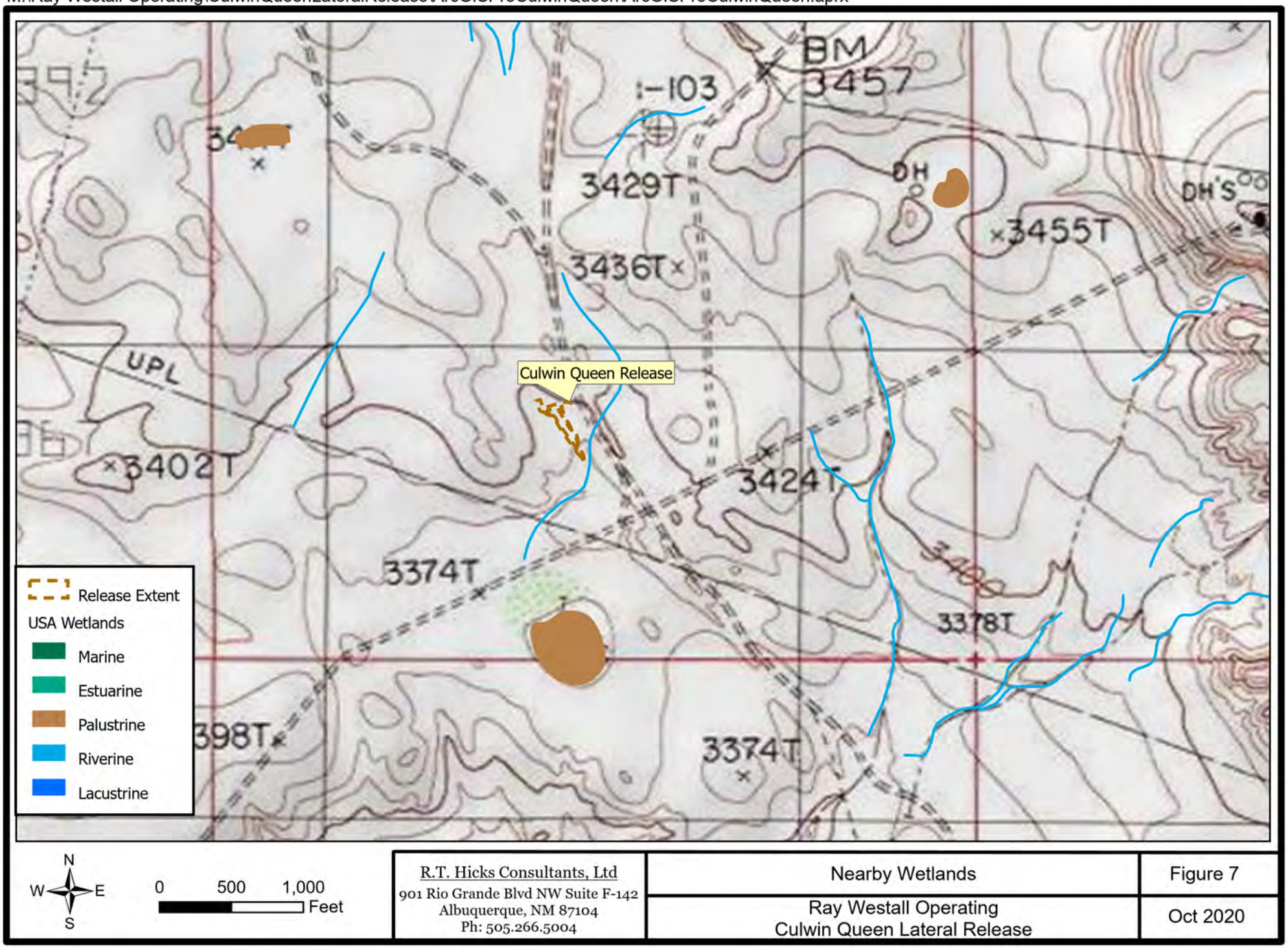
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Water Courses	Figure 5
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



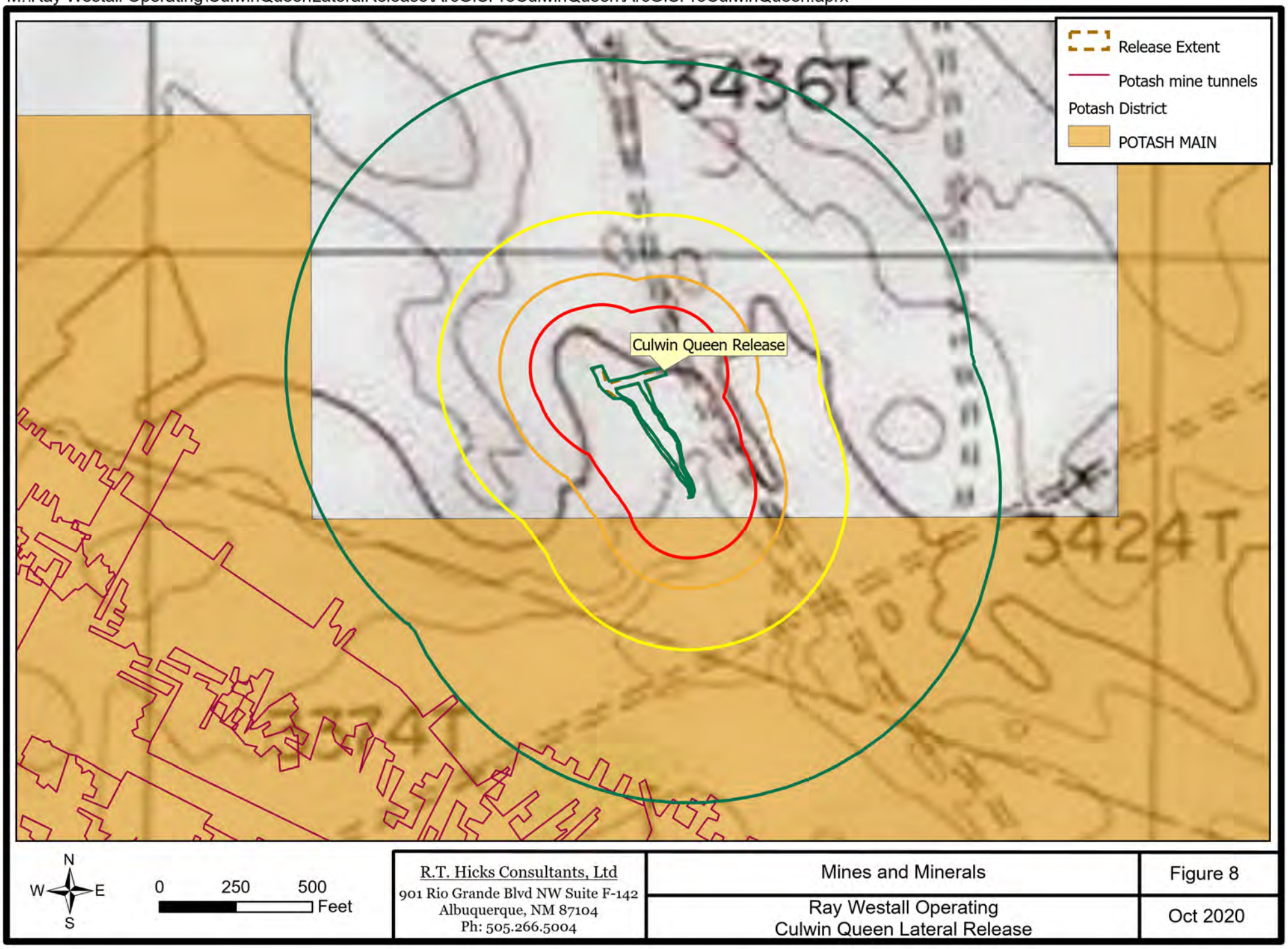
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures	Figure 6
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



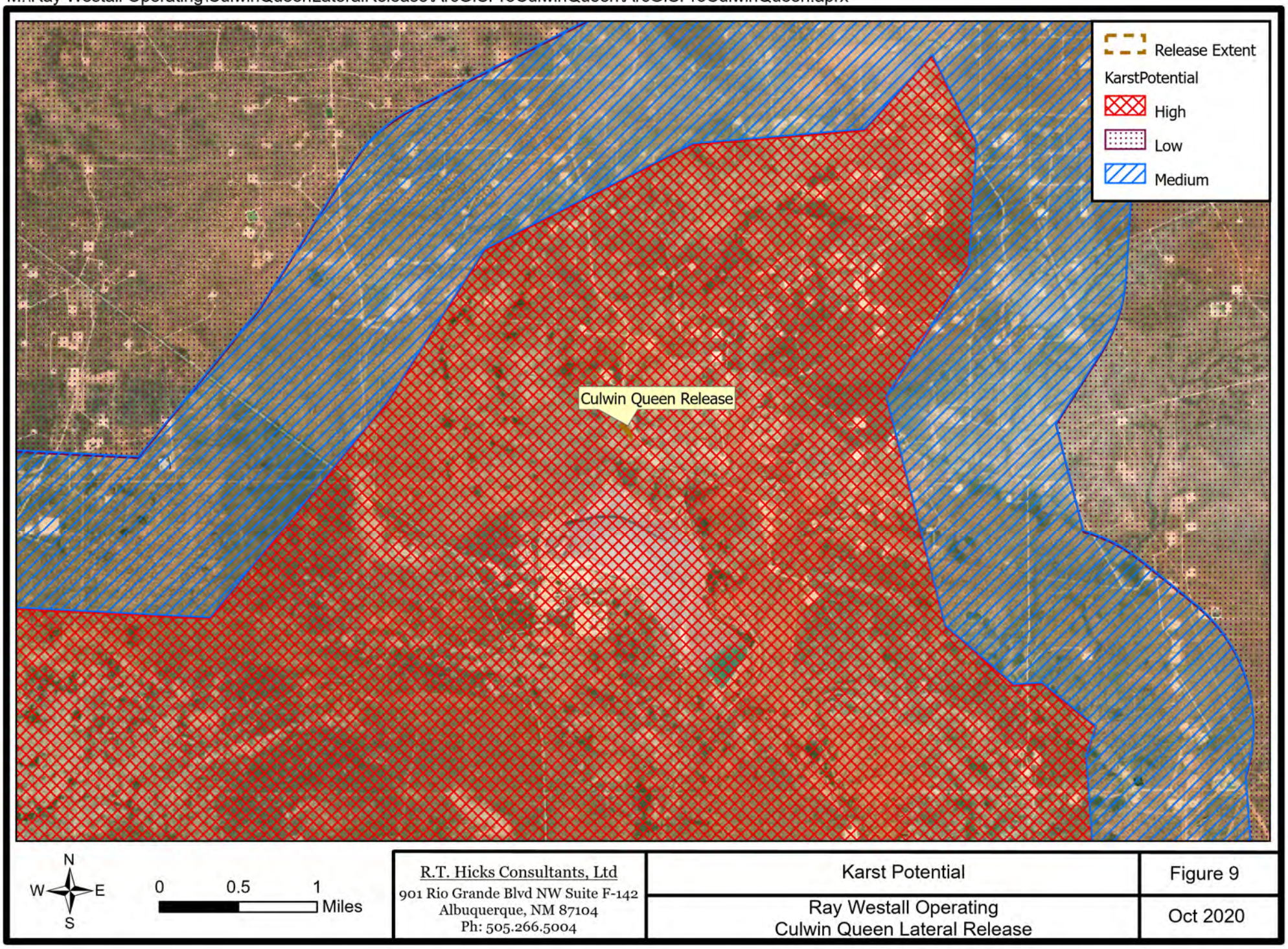
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Wetlands	Figure 7
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



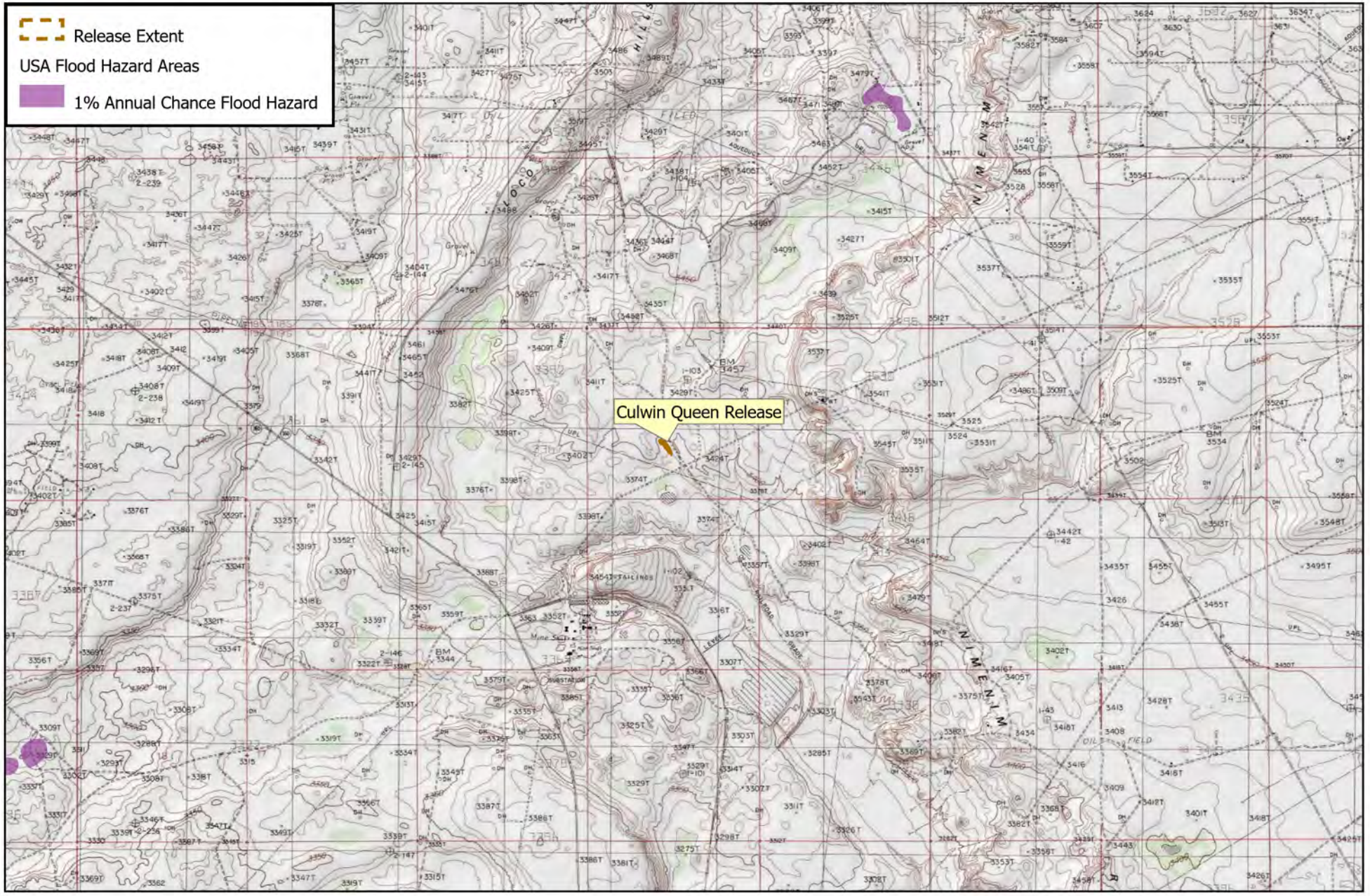
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mines and Minerals	Figure 8
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Figure 9
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

M:\Ray Westall Operating\CulwinQueenLateralRelease\ArcGISProCulwinQueen\ArcGISProCulwinQueen.aprx



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	FEMA Flood Hazard Zones	Figure 10
	Ray Westall Operating Culwin Queen Lateral Release	Oct 2020

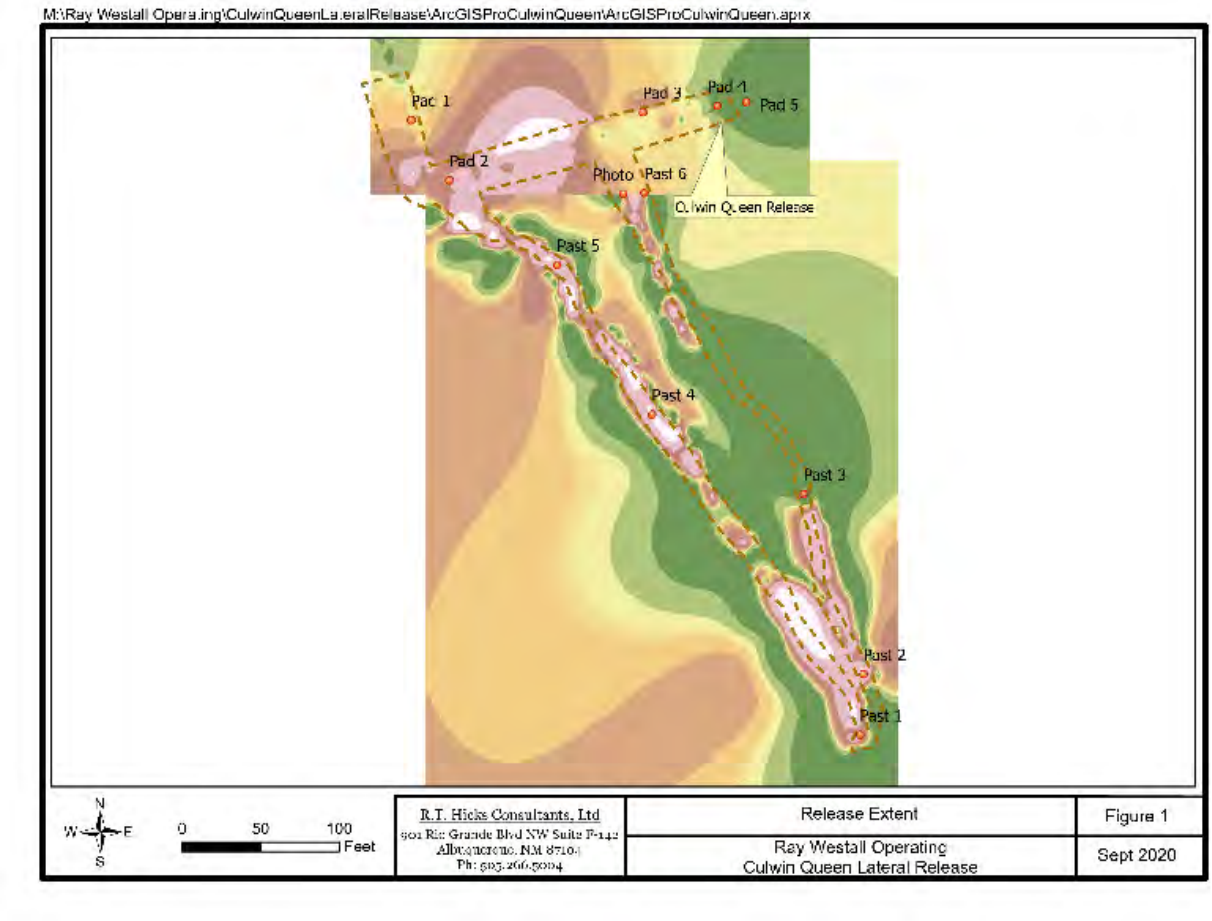
R.T. Hicks Field Data Appendix

Google Earth Image 11/2/2017 that are consistent with current conditions. Note the two drainage channels that appear to emanate from the pad. A third channel on the west side of the road is an extension of the vegetated swale east of the road.

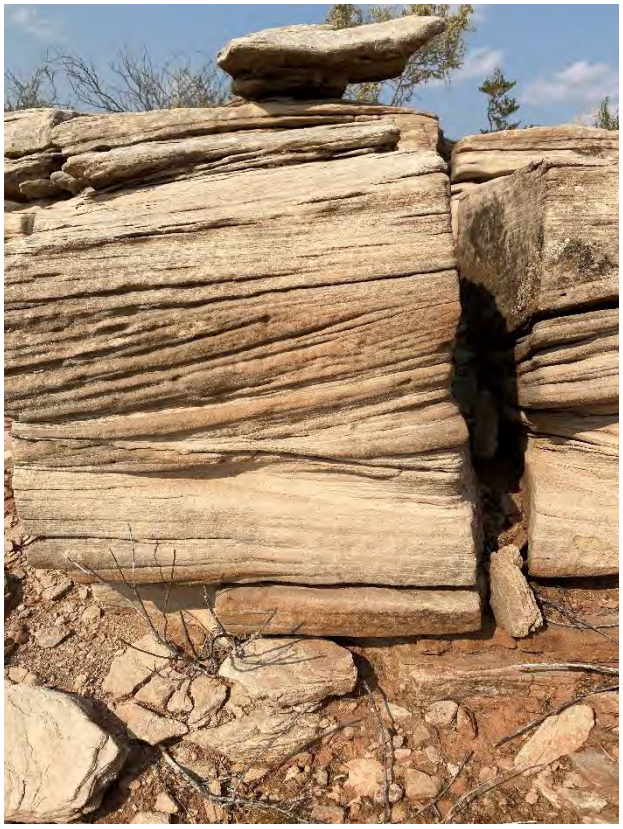
This 2/1/2017 image shows only one channel originating from the well pad, obviously prior to the construction of the tank battery. The drainage on the west side of the pad, which was not obvious in the Figure GE-1, continues southeast. Both the drainage and the channel are obvious in Google Earth images to 2012.

This 5/9/2009 image and the 2011 image do not provide any evidence of the previously described channel originating from the production pad or tank battery pad. Expanding the area of view shows that the road cut through the natural channel to the north, creating a need to construct a flow path to the west of the production pad.

This image taken 10/31/1997 shows the are prior to the development of the well and production pad. This expanded scale identifies the nature of the original drainage and the diversion of the drainage on the west side of the road.



The above image is the Culwin Queen Lateral release extent, underlain by the EM Survey conducted on June 19, 2020. The green areas represent locations with lower chloride concentrations, and the red/white areas indicate the location has a higher chloride concentration. The EM Survey was conducted in two parts: One on location, and one in the pasture. This was done because the on-location survey's data is skewed due to the presence of metal equipment on location. In the pasture, the survey results are more accurate due to the absence of metal. As seen in the image, the spill is contained primarily in the drainages.



The top image is a tan sandstone with very defined crossbeds. Scale from top to bottom of the sandstone block is ~20 inches. The bottom image shows the proximity of the sandstone to the Culwin Queen site. We believe this sandstone is a part of the Quartermaster formation.

The above image shows the strata that underlies the previous photo of the tan sandstone. The black arrow shows the location of the previous photo. The underlying strata is a red sandstone that is not well consolidated. We believe this to be a part of the Quartermaster formation.

Google Earth image illustrates the proximity of the potash tailings pile to the Culwin Queen release.

The above image depicts the western drainage that the Culwin Queen release is contained to. Shovel in the foreground is approximately 2 feet in length. Caliche can also be seen in exposed at the surface. View is north.

Upstream of western drainage, nearer to the tank battery. View is north.

The above image shows the eastern drainage, closer to the tank battery. Black arrow shows downhill/flow direction. Some wicked salt can be seen on the edges of the drainage.

The mechanical auger used to obtain deeper samples on the pad and in the pasture.

Tables

Ray Westall Operating
Culwin Queen Soil Sample Results

Table 2 Data by Depth

On-Pad Samples		
Sample ID	**Depth**	**Chlolride (mg/Kg)**
Pad1 0-6	0	11000
Pad2 0-6	0	6500
Pad3 0-6	0	12000
Pad4 0-6	0	12000
Pad5 0-6	0	2500
Pad2 12-14	12	7900
Pad3 12-14	12	5000
Pad4 12-14	12	3600
Pad2 14-24	14	890
Pad2 24-36	24	79
Pad3 3-4	36	150
Pad5 3-4	36	100
Pad3 4	48	140
Pad5 4	48	130

Average 0-24	6146.90
Average 25-48	130.00
Average all 4 feet	4427.79

Pasture Samples		
Sample ID	**Depth**	**Chlolride (mg/Kg)**
Past1 0-6	0	480
Past2 0-6	0	480
Past3 0-6	0	1300
Past4 0-6	0	6700
Past5 0-6	0	7500
Past1 12-14	12	1000
Past2 12-24	12	9700
Past5 12-24	12	12000
Past6 0-6	12	990
Past6 12-24	24	1900
Past1 3-4	36	730
Past4 3-4	36	8400
Past5 3-4	36	420
Past6 3-4	36	1600
Past1 4	48	2900
Past4 4	48	7500
Past5 4	48	2400
Past6 4	48	660

Average 0-24	4205.00
Average 25-48	3076.25
Average all 4 feet	3703.33

The samples marked in yellow were analyzed for hydrocarbons. All samples had no detectable amounts of vhydrocarbons

Ray Westall Operating
Culwin Queen Soil Sample Results

Table 1 Data by Location

On-Pad Samples		
Sample ID	**Depth**	**Chlolride (mg/Kg)**
Pad1 0-6	0	11000
Pad2 0-6	0	6500
Pad2 12-14	12	7900
Pad2 14-24	14	890
Pad2 24-36	24	79
Pad3 0-6	0	12000
Pad3 12-14	12	5000
Pad3 3-4	36	150
Pad3 4	48	140
Pad4 0-6	0	12000
Pad4 12-14	12	3600
Pad5 0-6	0	2500
Pad5 3-4	36	100
Pad5 4	48	130

Average 0-24	6146.90
Average 25-48	130.00
Average all 4 feet	4427.79

Pasture Samples		
Sample ID	**Depth**	**Chlolride (mg/Kg)**
Past1 0-6	0	480
Past1 12-14	12	1000
Past1 3-4	36	730
Past1 4	48	2900
Past2 0-6	0	480
Past2 12-24	12	9700
Past3 0-6	0	1300
Past4 0-6	0	6700
Past4 3-4	36	8400
Past4 4	48	7500
Past5 0-6	0	7500
Past5 12-24	12	12000
Past5 3-4	36	420
Past5 4	48	2400
Past6 0-6	12	990
Past6 12-24	24	1900
Past6 3-4	36	1600
Past6 4	48	660

Average 0-24	4205.00
Average 25-48	3076.25
Average all 4 feet	3703.33

The samples marked in yellow were analyzed for hydrocarbons. All samples had no detectable amounts of vhydrocarbons

Lab Reports Appendix

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

August 04, 2020

Randall Hicks

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX: (505) 266-0745

RE: RWO Culwin Queen OrderNo.: 2007D06

Dear Randall Hicks:

Hall Environmental Analysis Laboratory received 20 sample(s) on 7/24/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order: **2007D06**
Date Reported: **8/4/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD **Lab Order:** 2007D06
Project: RWO Culwin Queen

Lab ID: 2007D06-001 **Collection Date:** 6/19/2020 10:00:00 AM
Client Sample ID: Pad1 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	11000	600	H	mg/Kg	200	7/29/2020 2:01:51 AM	53954

Lab ID: 2007D06-002 **Collection Date:** 6/19/2020 10:02:00 AM
Client Sample ID: Pad2 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	6500	300	H	mg/Kg	100	7/29/2020 2:14:15 AM	53954

Lab ID: 2007D06-003 **Collection Date:** 6/19/2020 10:05:00 AM
Client Sample ID: Pad2 12-14 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	7900	300	H	mg/Kg	100	7/29/2020 2:26:40 AM	53954

Lab ID: 2007D06-004 **Collection Date:** 6/19/2020 10:08:00 AM
Client Sample ID: Pad2 14-24 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	890	60	H	mg/Kg	20	7/26/2020 5:02:16 PM	53954

Lab ID: 2007D06-005 **Collection Date:** 6/19/2020 10:12:00 AM
Client Sample ID: Pad2 24-36 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	79	61	H	mg/Kg	20	7/26/2020 5:14:40 PM	53954

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order: **2007D06**
Date Reported: **8/4/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD **Lab Order:** 2007D06
Project: RWO Culwin Queen

Lab ID: 2007D06-006 **Collection Date:** 6/19/2020 10:15:00 AM
Client Sample ID: Pad3 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	12000	600	H	mg/Kg	200	7/29/2020 8:42:32 PM	53954

Lab ID: 2007D06-007 **Collection Date:** 6/19/2020 10:18:00 AM
Client Sample ID: Pad3 12-14 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	5000	150	H	mg/Kg	50	7/29/2020 8:54:52 PM	53954

Lab ID: 2007D06-008 **Collection Date:** 6/19/2020 10:22:00 AM
Client Sample ID: Pad4 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	12000	600	H	mg/Kg	200	7/29/2020 9:07:13 PM	53954

Lab ID: 2007D06-009 **Collection Date:** 6/19/2020 10:25:00 AM
Client Sample ID: Pad4 12-14 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	3600	150	H	mg/Kg	50	7/29/2020 9:19:35 PM	53954

Lab ID: 2007D06-010 **Collection Date:** 6/19/2020 10:28:00 AM
Client Sample ID: Pad5 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2500	150	H	mg/Kg	50	7/29/2020 9:56:37 PM	53954

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order: **2007D06**
Date Reported: **8/4/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD **Lab Order:** 2007D06
Project: RWO Culwin Queen

Lab ID: 2007D06-011 **Collection Date:** 7/19/2020 10:50:00 AM
Client Sample ID: Past1 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	480	60		mg/Kg	20	7/26/2020 6:29:07 PM	53954

Lab ID: 2007D06-012 **Collection Date:** 7/19/2020 10:53:00 AM
Client Sample ID: Past1 12-24 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	1000	60		mg/Kg	20	7/26/2020 7:06:21 PM	53954

Lab ID: 2007D06-013 **Collection Date:** 7/19/2020 10:55:00 AM
Client Sample ID: Past2 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	480	60		mg/Kg	20	7/26/2020 7:18:45 PM	53954

Lab ID: 2007D06-014 **Collection Date:** 7/19/2020 10:58:00 AM
Client Sample ID: Past2 12-24 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	9700	300		mg/Kg	100	7/29/2020 10:08:59 PM	53954

Lab ID: 2007D06-015 **Collection Date:** 7/19/2020 11:02:00 AM
Client Sample ID: Past 30-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	1300	59		mg/Kg	20	7/26/2020 7:43:34 PM	53954

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order: **2007D06**
Date Reported: **8/4/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD **Lab Order:** 2007D06
Project: RWO Culwin Queen

Lab ID: 2007D06-016 **Collection Date:** 7/19/2020 11:05:00 AM
Client Sample ID: Past 40-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	6700	300		mg/Kg	100	7/29/2020 10:21:20 PM	53954

Lab ID: 2007D06-017 **Collection Date:** 7/19/2020 11:08:00 AM
Client Sample ID: Past5 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	7500	300		mg/Kg	100	7/29/2020 10:33:40 PM	53954

Lab ID: 2007D06-018 **Collection Date:** 7/19/2020 11:12:00 AM
Client Sample ID: Past5 12-24 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	12000	600		mg/Kg	200	7/30/2020 8:50:51 PM	54036

Lab ID: 2007D06-019 **Collection Date:** 7/19/2020 11:15:00 AM
Client Sample ID: Past6 0-6 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	990	60		mg/Kg	20	7/29/2020 1:55:07 PM	54036

Lab ID: 2007D06-020 **Collection Date:** 7/19/2020 11:18:00 AM
Client Sample ID: Past6 12-24 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1900	60		mg/Kg	20	7/29/2020 2:32:10 PM	54036

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2007D06**
04-Aug-20

Client: R.T. Hicks Consultants, LTD
Project: RWO Culwin Queen

Sample ID: **MB-53954** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **53954** RunNo: **70622**
Prep Date: **7/26/2020** Analysis Date: **7/26/2020** SeqNo: **2457328** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-53954** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **53954** RunNo: **70622**
Prep Date: **7/26/2020** Analysis Date: **7/26/2020** SeqNo: **2457330** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.0	90	110			

Sample ID: **MB-54036** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **54036** RunNo: **70708**
Prep Date: **7/29/2020** Analysis Date: **7/29/2020** SeqNo: **2460439** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54036** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **54036** RunNo: **70708**
Prep Date: **7/29/2020** Analysis Date: **7/29/2020** SeqNo: **2460440** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.6	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: R.T. Hicks Consultants, LTD Work Order Number: 2007D06 RcptNo: 1

Received By: **Andy Freeman** 7/24/2020 3:30:00 PM

Completed By: **Juan Rojas** 7/24/2020 4:06:20 PM

Reviewed By: EMN 7/24/20

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☐ No ☑ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C (Not Required) Yes ☐ No ☑ NA ☐
5. Sample(s) in proper container(s)? (Not required) Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☐ No ☐ NA ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: CMC 7/24/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	25.4	Good				

Chain-of-Custody Record

Client: RT Hicks Consultants

Mailing Address: 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104

Phone #: (505) 266-5004

email or Fax#: madison@rthicksconsult.com

QA/QC Package: ☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other ___

☐ EDD (Type) ___

Turn-Around Time: ☒ Standard ☐ Rush ___

Project Name: RWO Culwm Queen

Project #:

Project Manager: Randall Hicks

Sampler: MCB

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp (including CF): 25.4 + 0 = 25.4 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2007D06	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4 (Cl circled)	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)					
2020 0619	10:00	Soil	Pad1 0-6	1x4oz Jar	N/A	-001							↓								
↓	10:02	↓	Pad2 0-6	↓	↓	-002							↓								
↓	10:05	↓	Pad2 12-14	↓	↓	-003							↓								
↓	10:08	↓	Pad2 14-24	↓	↓	-004							↓								
↓	10:12	↓	Pad2 24-36	↓	↓	-005							↓								
↓	10:15	↓	Pad3 0-6	↓	↓	-006							↓								
↓	10:18	↓	Pad3 12-14	↓	↓	-007							↓								
↓	10:22	↓	Pad4 0-6	↓	↓	-008							↓								
↓	10:25	↓	Pad4 12-14	↓	↓	-009							↓								
↓	10:28	↓	Pad5 0-6	↓	↓	-010							↓								

Date	Time	Relinquished by	Received by	Via	Date	Time
24 Jul 2020	3:25	MadMCB (signature)	(signature)	coo	7/24/20	1530

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chain-of-Custody Record

Client: RT Hicks Consultants

Mailing Address: 901 Rio Grande Blvd NW Ste F-142 Albuquerque, NM 87104

Phone #: (505) 266-5004

email or Fax#: madison@rthicksconsult.com

QA/QC Package:

☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: RWO Culwin Queen

Project #:

Project Manager: Randall Hicks

Sampler: MCB

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp(including CF): 25.4 + 0 = 25.4 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2007D06	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
2020 07/9	10:50	soil	Past1 0-6	1x4oz jar	N/A	-011										
	10:53		Past1 12-24			-012										
	10:55		Past2 0-6			-013										
	10:58		Past2 12-24			-014										
	10:02		Past 3 0-6			-015										
	11:05		Past4 0-6			-016										
	11:08		Past5 0-6			-017										
	11:12		Past5 12-24			-018										
	11:15		Past6 0-6			-019										
	11:18		Past6 12-24			-020										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
24 Jul 2020	3:25			COC	7/24/20	1530
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

October 01, 2020

Randall Hicks

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX: (505) 266-0745

RE: Culwin Queen OrderNo.: 2009A01

Dear Randall Hicks:

Hall Environmental Analysis Laboratory received 12 sample(s) on 9/17/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past 1-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 9:45:00 AM
Lab ID: 2009A01-001 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	730	60		mg/Kg	20	9/25/2020 4:01:35 AM	55435

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past 1-4'
Project: Culwin Queen
Collection Date: 9/11/2020 9:48:00 AM
Lab ID: 2009A01-002 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	2900	150		mg/Kg	50	9/29/2020 12:40:51 AM	55449

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past5-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 9:51:00 AM
Lab ID: 2009A01-003 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	420	60		mg/Kg	20	9/25/2020 6:48:25 PM	55449
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/20/2020 12:55:18 AM	55273
Surr: BFB	98.0	70-130		%Rec	1	9/20/2020 12:55:18 AM	55273
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**	
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	9/21/2020 11:12:33 AM	55283
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/21/2020 11:12:33 AM	55283
Surr: DNOP	113	30.4-154		%Rec	1	9/21/2020 11:12:33 AM	55283
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	9/20/2020 12:55:18 AM	55273
Toluene	ND	0.049		mg/Kg	1	9/20/2020 12:55:18 AM	55273
Ethylbenzene	ND	0.049		mg/Kg	1	9/20/2020 12:55:18 AM	55273
Xylenes, Total	ND	0.097		mg/Kg	1	9/20/2020 12:55:18 AM	55273
Surr: 1,2-Dichloroethane-d4	90.3	70-130		%Rec	1	9/20/2020 12:55:18 AM	55273
Surr: 4-Bromofluorobenzene	99.3	70-130		%Rec	1	9/20/2020 12:55:18 AM	55273
Surr: Dibromofluoromethane	104	70-130		%Rec	1	9/20/2020 12:55:18 AM	55273
Surr: Toluene-d8	95.6	70-130		%Rec	1	9/20/2020 12:55:18 AM	55273

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past5-4
Project: Culwin Queen
Collection Date: 9/11/2020 9:54:00 AM
Lab ID: 2009A01-004 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	2400	150		mg/Kg	50	9/29/2020 1:18:05 AM	55449
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/20/2020 1:23:46 AM	55273
Surr: BFB	103	70-130		%Rec	1	9/20/2020 1:23:46 AM	55273
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**	
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	9/21/2020 11:22:09 AM	55283
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/21/2020 11:22:09 AM	55283
Surr: DNOP	106	30.4-154		%Rec	1	9/21/2020 11:22:09 AM	55283
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	9/20/2020 1:23:46 AM	55273
Toluene	ND	0.049		mg/Kg	1	9/20/2020 1:23:46 AM	55273
Ethylbenzene	ND	0.049		mg/Kg	1	9/20/2020 1:23:46 AM	55273
Xylenes, Total	ND	0.099		mg/Kg	1	9/20/2020 1:23:46 AM	55273
Surr: 1,2-Dichloroethane-d4	91.1	70-130		%Rec	1	9/20/2020 1:23:46 AM	55273
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	9/20/2020 1:23:46 AM	55273
Surr: Dibromofluoromethane	106	70-130		%Rec	1	9/20/2020 1:23:46 AM	55273
Surr: Toluene-d8	99.6	70-130		%Rec	1	9/20/2020 1:23:46 AM	55273

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past6-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 9:57:00 AM
Lab ID: 2009A01-005 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	1600	60		mg/Kg	20	9/25/2020 7:37:50 PM	55449

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past6-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:00:00 AM
Lab ID: 2009A01-006 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	660	60		mg/Kg	20	9/25/2020 7:50:10 PM	55449

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Pad3-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:03:00 AM
Lab ID: 2009A01-007 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	150	60		mg/Kg	20	9/25/2020 8:02:31 PM	55449
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/20/2020 1:52:12 AM	55273
Surr: BFB	98.6	70-130		%Rec	1	9/20/2020 1:52:12 AM	55273
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/21/2020 11:31:43 AM	55283
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/21/2020 11:31:43 AM	55283
Surr: DNOP	130	30.4-154		%Rec	1	9/21/2020 11:31:43 AM	55283
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	9/20/2020 1:52:12 AM	55273
Toluene	ND	0.049		mg/Kg	1	9/20/2020 1:52:12 AM	55273
Ethylbenzene	ND	0.049		mg/Kg	1	9/20/2020 1:52:12 AM	55273
Xylenes, Total	ND	0.098		mg/Kg	1	9/20/2020 1:52:12 AM	55273
Surr: 1,2-Dichloroethane-d4	88.6	70-130		%Rec	1	9/20/2020 1:52:12 AM	55273
Surr: 4-Bromofluorobenzene	98.1	70-130		%Rec	1	9/20/2020 1:52:12 AM	55273
Surr: Dibromofluoromethane	106	70-130		%Rec	1	9/20/2020 1:52:12 AM	55273
Surr: Toluene-d8	96.7	70-130		%Rec	1	9/20/2020 1:52:12 AM	55273

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Pad3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:06:00 AM
Lab ID: 2009A01-008 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	140	60		mg/Kg	20	9/25/2020 8:14:51 PM	55449
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/20/2020 2:20:36 AM	55273
Surr: BFB	102	70-130		%Rec	1	9/20/2020 2:20:36 AM	55273
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**	
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/21/2020 11:41:22 AM	55283
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/21/2020 11:41:22 AM	55283
Surr: DNOP	115	30.4-154		%Rec	1	9/21/2020 11:41:22 AM	55283
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	9/20/2020 2:20:36 AM	55273
Toluene	ND	0.049		mg/Kg	1	9/20/2020 2:20:36 AM	55273
Ethylbenzene	ND	0.049		mg/Kg	1	9/20/2020 2:20:36 AM	55273
Xylenes, Total	ND	0.098		mg/Kg	1	9/20/2020 2:20:36 AM	55273
Surr: 1,2-Dichloroethane-d4	87.8	70-130		%Rec	1	9/20/2020 2:20:36 AM	55273
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	9/20/2020 2:20:36 AM	55273
Surr: Dibromofluoromethane	103	70-130		%Rec	1	9/20/2020 2:20:36 AM	55273
Surr: Toluene-d8	94.6	70-130		%Rec	1	9/20/2020 2:20:36 AM	55273

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Pad5-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:09:00 AM
Lab ID: 2009A01-009 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	100	60		mg/Kg	20	9/25/2020 7:53:29 PM	55453

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Pad5-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:02:00 AM
Lab ID: 2009A01-010 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	130	59		mg/Kg	20	9/25/2020 8:30:43 PM	55453

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past4-3-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:05:00 AM
Lab ID: 2009A01-011 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	8400	300		mg/Kg	100	9/29/2020 1:30:29 AM	55453

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2009A01**
Date Reported: **10/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Past4-4'
Project: Culwin Queen
Collection Date: 9/11/2020 10:08:00 AM
Lab ID: 2009A01-012 **Matrix:** SOIL **Received Date:** 9/17/2020 9:11:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	7500	300		mg/Kg	100	9/29/2020 1:42:54 AM	55453

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009A01**
01-Oct-20

Client: R.T. Hicks Consultants, LTD
Project: Culwin Queen

Sample ID: **MB-55435** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55435** RunNo: **72148**
Prep Date: **9/24/2020** Analysis Date: **9/24/2020** SeqNo: **2529091** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-55435** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55435** RunNo: **72148**
Prep Date: **9/24/2020** Analysis Date: **9/24/2020** SeqNo: **2529092** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.4	90	110			

Sample ID: **MB-55449** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55449** RunNo: **72156**
Prep Date: **9/25/2020** Analysis Date: **9/25/2020** SeqNo: **2530492** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-55449** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55449** RunNo: **72156**
Prep Date: **9/25/2020** Analysis Date: **9/25/2020** SeqNo: **2530493** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.8	90	110			

Sample ID: **MB-55453** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55453** RunNo: **72181**
Prep Date: **9/25/2020** Analysis Date: **9/25/2020** SeqNo: **2530640** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-55453** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55453** RunNo: **72181**
Prep Date: **9/25/2020** Analysis Date: **9/25/2020** SeqNo: **2530641** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.9	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009A01**
01-Oct-20

Client: R.T. Hicks Consultants, LTD
Project: Culwin Queen

Sample ID: **LCS-55283** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **55283** RunNo: **72031**
Prep Date: **9/19/2020** Analysis Date: **9/21/2020** SeqNo: **2522561** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	70	130			
Surr: DNOP	5.4		5.000		108	30.4	154			

Sample ID: **MB-55283** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **55283** RunNo: **72031**
Prep Date: **9/19/2020** Analysis Date: **9/21/2020** SeqNo: **2522562** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		127	30.4	154			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009A01**
01-Oct-20

Client: R.T. Hicks Consultants, LTD
Project: Culwin Queen

Sample ID: **mb-55273** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519815** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		90.7	70	130			
Surr: 4-Bromofluorobenzene	0.52		0.5000		104	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.49		0.5000		98.4	70	130			

Sample ID: **lcs-55273** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519816** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	97.8	80	120			
Toluene	1.0	0.050	1.000	0	102	80	120			
Ethylbenzene	1.0	0.050	1.000	0	102	80	120			
Xylenes, Total	3.2	0.10	3.000	0	107	80	120			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.2	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		102	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		107	70	130			
Surr: Toluene-d8	0.49		0.5000		97.4	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009A01**
01-Oct-20

Client: R.T. Hicks Consultants, LTD
Project: Culwin Queen

Sample ID: **mb-55273** SampType: **MBLK** TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519845** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	510		500.0		103	70	130			

Sample ID: **lcs-55273** SampType: **LCS** TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519846** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	88.6	70	130			
Surr: BFB	520		500.0		103	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: R.T. Hicks Consultants, LTD Work Order Number: 2009A01 RcptNo: 1

Received By: **Cheyenne Cason** 9/17/2020 9:11:00 AM

Completed By: **Juan Rojas** 9/17/2020 10:48:43 AM

Reviewed By: JR 9/17/20

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☐ No ☑ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Not Required Yes ☐ No ☑ NA ☐
5. Sample(s) in proper container(s)? Not required Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☐ No ☐ NA ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: CMC 9/17/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	14.2	Good				

Chain-of-Custody Record

Client: RT Hicks Consultants

Mailing Address: 901 Rio Grande Blvd NW
Albuquerque, NM 87104

Phone #: (505) 266-5004

email or Fax#: madison@rthicksconsult.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Culwin Queen

Project #:

Project Manager: Randall Hicks

Sampler: MB

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp (including CF): 14.1 + 0.1 = 14.2 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2009A01	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
9/11/2020	9:45	soil	Past 1-3-4'	1x 4oz jar	~~refridge.~~	-001							X			
9/11/2020	9:48	soil	Past 1-4'			-002							X			
	9:51		Past 5-3-4'		refridge.	-003	X	X					X			
	9:54		Past 5-4'		refridge.	-004	X	X					X			
	9:57		Past 6-3-4'			-005							X			
	10:00		Past 6-4'			-006							X			
	10:03		Pad 3-3-4'		refridge.	-007	X	X					X			
	10:06		Pad 3-4'		refridge.	-008	X	X					X			
	10:09		Pad 5-3-4'			-009							X			
	10:02		Pad 5-4'			-010							X			
	10:05		Past 4-3-4'			-011							X			
↓	10:08	↓	Past 4-4'	↓		-012							X			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9/10 0917	9:55	Madison Breed	[illegible]	CDO	9/17/20	0911
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Well Log Appendix

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Santa Fe Energy Owner's Well No. _____
Street or Post Office Address c/o Glenn's Water Well Service, Inc.
City and State P.O. Box 692 Tatum, New Mexico 88267

Well was drilled under Permit No. CP-00873 and is located in the:

a. ____ ¼ ____ ¼ NW ¼ NE ¼ of Section 33 Township 21-S. Range 33-E. N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Glenn's Water Well Service License No. WD-421

Address P.O. Box 692 Tatum, New Mexico 88267

Drilling Began 1/2/98 Completed 1/5/98 Type tools rotary Size of hole 7 7/8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 340 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 180 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
240	320	80	red shale with stringer of sand	50

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
8 5/8	.188		0	24	24	none	none	
6 5/8	.188		0	340			226	340

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:
_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received 01/15/98 Quad _____ FWL _____ FSL _____

File No. ~~CP-00873~~ Use ~~OWD~~ Location No. ~~21.33.33.21~~

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	2	2	soil
2	14	12	caleche
14	18	4	sand
18	23	5	red clay and rock
23	54	31	rock
54	70	16	red clay
70	85	15	red clay and rock
85	105	20	red shale
105	155	50	red sandy shale
155	210	55	red shale
210	240	30	red clay and shale
240	320	80	red shale with stringers of sand
320	336	16	red clay
336	340	4	grey lime stone

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Corby Hern
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, except [illegible]on 5, shall be answered as completely and [illegible]rately as possible when any well is drilled, repaired or deepened. When this form [illegible]ed as a plugging record, only Section 1(a) an[illegible]tion 5 need be completed.

NM OIL CONSERVATION
ARTESIA DISTRICT
NMOCD
MAR 20 2017
Artesia
RECEIVED

Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM113962

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
SALT FORK 3-4 FEDERAL COM 1H

2. Name of Operator
APACHE CORPORATION
Contact: SORINA FLORES
E-Mail: sorina.flores@apachecorp.com

9. API Well No.
30-015-43665

3a. Address
303 VETERANS AIRPARK LANE SUITE 3000
MIDLAND, TX 79705

3b. Phone No. (include area code)
Ph: 432-818-1167

10. Field and Pool or Exploratory Area
LEO;BONE SPRING, SOUTH

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 3 T19S R30E Mer NMP NESW 2364FSL 2258FWL
32.688512 N Lat, 103.960549 W Lon

11. County or Parish, State
EDDY COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Accepted for record - NMOCD

BLM-CO-1463 NATIONWIDE; NMB000736
APACHE REQUESTS CHANGE TO DRILLING PLAN AS LISTED BELOW:
TVD: 8630' LP: 8465' MD: 15494.52'
CSG PROGRAM (NEW):

HOLE	INTERVAL	CSG SZ	WT	GRADE	CONN	COLLAPSE	BURST	TENSION
17-1/2"	0-415'	13-3/8"	48#	H-40	STC	5.19	1.44	2.06
12-1/4"	0-3950'	9-5/8"	36#	J-55	LTC	1.79	1.43	1.87
8-3/4"	0-7892'	7"	26#	P-110	BTC	1.64	1.18	2.89
8-3/4"	7821'-8901'	5-1/2"	17#	P-110	BTC	1.83	1.26	2.61
8-1/2"	8901 - 15494.52	5-1/2"	17#	P-110	BTC	1.83	1.26	2.61

**Well is located in SOP but not R-111-P;first 2 strings cemented to surf & 3rd string cmt tied back.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #362325 verified by the BLM Well Information System
For APACHE CORPORATION, sent to the Carlsbad
Committed to AFMSS for processing by DEBORAH MCKINNEY on 01/19/2017 ()

Name *(Printed/Typed)* SORINA FLORES — Title SUBMITTING CONTACT

Signature (Electronic Submission) — Date 12/29/2016

APPROVED
MAR 8 2017
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By — Title — Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. — Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

Additional data for EC transaction #362325 that would not fit on the form

32. Additional remarks, continued

CMT PROGRAM (NEW):
Surf Lead: 370sx Cl C w/1% CaCl2 (12hr - 1000psi; 24hr - 1800psi)
14.8# 1.33yld 6.32gal/sk 500# comp strength hrs: 7
Interm Lead: 720sx 35/65 Poz C w/6% gel, 5% salt, 1# Kolseal, 0.125# CF
(12hr - 325psi; 24hr - 649psi)
12.9# 1.8yld 9.36gal/sk 500# comp strength hrs: 18
Tail: 200sx 14.8# 1.33yld 6.31gal/sk 500# comp strength hrs: 7
Cl C w/0.2% retarder (12hr - 966psi; 24hr - 1442psi)
Prod Lead: 265sx 50/50 PozH, 10% gel, 5% salt (12hr-47psi; 24hr-284psi)
11.9# 2.32yld 13.08gal/sk 500# comp strength hrs: 72
Tail: 1600sx TXI light w/0.3% fluid loss, 0.2% retarder
(12hr-28psi; 24hr-1193psi) 12.8# 1.44yld 7.56gal/sk
500# comp strength hrs: 18
**Prod csg string TOC: 3450' 20% OH excess **If water flow or lost circ is encountered, Apache may 2-stage Interm csg. A DVT may be used in the 9-5/8" csg & ECP may be placed below DVT. TD of 12-1/4" @ +/- 3950'.
CONTINGENCY: Interm 1st stage contingency:
Lead: 330sx 35/65 Poz C w/6% gel, 5% salt, 1lb/sk kolseal, 0.125#/sk CF
(12hr-325psi; 24hr-649psi)12.9# 1.8yld 9.36gal/sx 500# comp strength hrs: 18
Tail: 200sx Cl C w/0.2% retarder (12hr-966psi; 24hr-1442psi)
14.8# 1.33yld 6.31gal/sx ECP/DVT: +/- 1820'
Interm 2nd stage contingency:
Lead: 250sx 35/65 Poz C w/6% gel, 5% salt (12hr-325psi; 24hr-649psi)
12.9# 1.8yld 9.36gal/sx 500# comp strength hrs: 18
Tail: 200sx Cl C (12hr-1000psi; 24hr-1600psi)14.8# 1.33yld 6.31gal/sx
BOP: 13-5/8" BOP Installed & tested before 12-1/4" hole (annular)-50% WP 2M
13-5/8" BOP installed & tested before 8-3/4" hole
(annular, blind ram, pipe ram)tested to 50% WP 3M
MUD PROGRAM: 0-surf shoe: FW Wt: 8.4-8.6 Visc: 28-32 Wtr loss: NC
Surf shoe-Int shoe: Brine Wt: 9.8-10.5 Visc: 28-32 Wtr loss: NC
Int shoe-8901'MD: FW/Brine Wt: 8.4-9.5 visc: 28-32 Wtr loss: NC
8901'MD-TD: BM Wt: 8.4-9.5 Visc: 35-50 Wtr loss: NC
ADDITIONAL LOGS: Mud Log INTERVAL: Int. shoe to TD **Surf csg will be pre-set**

Schlumberger Apache

Apache Salt Fork 3-4 Federal Com #1H Rev0 JP 06Oct16 Proposal
Geodetic Report
(Non-Def Plan)

Report Date:	October 06, 2016 - 09:12 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Apache	**Vertical Section Azimuth:**	266.783 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Apache Salt Fork 3-4 Federal Com #1H / Apache Salt Fork 3-4 Federal Com #1H	**TVD Reference Datum:**	RKB
Well:	Apache Salt Fork 3-4 Federal Com #1H	**TVD Reference Elevation:**	3430.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3410.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.586 °
Survey Name:	Apache Salt Fork 3-4 Federal Com #1H Rev0 JP 06Oct16	**Total Gravity Field Strength:**	998.5148mgn (9.80665 Based)
Survey Date:	August 11, 2016	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	114.135 ° / 7274.546 ft / 6.182 / 0.859	**Total Magnetic Field Strength:**	48379.779 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	60.605 °
Location Lat / Long:	N 32° 41' 18.64502", W 103° 57' 37.97827"	**Declination Date:**	October 06, 2016
Location Grid N/E Y/X:	N 614393.400 ftUS, E 614689.500 ftUS	**Magnetic Declination Model:**	HDGM 2016
CRS Grid Convergence Angle:	0.2013 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99992415	**Grid Convergence Used:**	0.2013 °
Version / Patch:	2.9.365.0	**Total Corr Mag North->Grid North:**	7.3850 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	100.00	0.00	246.60	100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	200.00	0.00	246.60	200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	300.00	0.00	246.60	300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	400.00	0.00	246.60	400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Rustler	*417.00*	*0.00*	*246.60*	*417.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
13 3/8" Casing	*425.00*	*0.00*	*246.60*	*425.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	500.00	0.00	246.60	500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	600.00	0.00	246.60	600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Top Salt	*603.00*	*0.00*	*246.60*	*603.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	700.00	0.00	246.60	700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	800.00	0.00	246.60	800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	900.00	0.00	246.60	900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1000.00	0.00	246.60	1000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1100.00	0.00	246.60	1100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1200.00	0.00	246.60	1200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1300.00	*0.00*	*246.60*	*1300.00*	*0.00*	*0.00*	0.00	0.00	*614393.40*	614689.50	N 32 41 18.65	W 103 57 37.98
	1400.00	0.00	246.60	1400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1500.00	0.00	246.60	1500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1600.00	0.00	246.60	1600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1700.00	0.00	246.60	1700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Base Salt	*1767.00*	*0.00*	*246.60*	*1767.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	1800.00	0.00	246.60	1800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	1900.00	0.00	246.60	1900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Yates	*1912.00*	*0.00*	*246.60*	*1912.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	2000.00	0.00	246.60	2000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2100.00	0.00	246.60	2100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Seven Rivers	*2180.00*	*0.00*	*246.60*	*2180.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	2200.00	0.00	246.60	2200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2300.00	0.00	246.60	2300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2400.00	0.00	246.60	2400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2500.00	0.00	246.60	2500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2600.00	0.00	246.60	2600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2700.00	0.00	246.60	2700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	2800.00	0.00	246.60	2800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Queen	*2893.00*	*0.00*	*246.60*	*2893.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	2900.00	0.00	246.60	2900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3000.00	0.00	246.60	3000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3100.00	0.00	246.60	3100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3200.00	0.00	246.60	3200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
9 5/8" Casing	*3250.00*	*0.00*	*246.60*	*3250.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	3300.00	0.00	246.60	3300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3400.00	0.00	246.60	3400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3500.00	0.00	246.60	3500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Capitan Reef	*3562.00*	*0.00*	*246.60*	*3562.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	3600.00	0.00	246.60	3600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3700.00	0.00	246.60	3700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	3800.00	0.00	246.60	3800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Cherry Canyon	*3828.00*	*0.00*	*246.60*	*3828.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	3900.00	0.00	246.60	3900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4000.00	0.00	246.60	4000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4100.00	0.00	246.60	4100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4200.00	0.00	246.60	4200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4300.00	0.00	246.60	4300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4400.00	0.00	246.60	4400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4500.00	0.00	246.60	4500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Delaware	*4598.00*	*0.00*	*246.60*	*4598.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	4600.00	0.00	246.60	4600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4700.00	0.00	246.60	4700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4800.00	0.00	246.60	4800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	4900.00	0.00	246.60	4900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5000.00	0.00	246.60	*5000.00*	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5100.00	0.00	246.60	5100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5200.00	0.00	246.60	5200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5300.00	0.00	246.60	5300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5400.00	0.00	246.60	5400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5500.00	0.00	246.60	5500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5600.00	0.00	246.60	5600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5700.00	0.00	246.60	5700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	5800.00	0.00	246.60	5800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Bone Spring	*5847.00*	*0.00*	*246.60*	*5847.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	5900.00	0.00	246.60	5900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6000.00	0.00	246.60	6000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6100.00	0.00	246.60	6100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6200.00	0.00	246.60	6200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6300.00	0.00	246.60	6300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6400.00	0.00	246.60	6400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6500.00	0.00	246.60	6500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6600.00	0.00	246.60	6600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6700.00	0.00	246.60	6700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6800.00	0.00	246.60	6800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	6900.00	0.00	246.60	6900.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7000.00	0.00	246.60	7000.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7100.00	0.00	246.60	7100.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7200.00	0.00	246.60	7200.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7300.00	0.00	246.60	7300.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7400.00	0.00	246.60	7400.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
1st Bone Spring Sand	*7454.00*	*0.00*	*246.60*	*7454.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	7500.00	0.00	246.60	7500.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7600.00	0.00	246.60	7600.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7700.00	0.00	246.60	7700.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
2nd Bone Spring Carb	*7736.00*	*0.00*	*246.60*	*7736.00*	*0.00*	*0.00*	*0.00*	*0.00*	*614393.40*	*614689.50*	*N 32 41 18.65*	*W 103 57 37.98*
	7800.00	0.00	246.60	7800.00	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
Build 10° DLS	7892.11	0.00	246.60	7892.11	0.00	0.00	0.00	0.00	614393.40	614689.50	N 32 41 18.65	W 103 57 37.98
	7900.00	0.79	246.60	7900.00	0.05	-0.02	-0.05	10.00	614393.38	614689.45	N 32 41 18.64	W 103 57 37.98
	8000.00	10.79	246.60	7999.36	9.51	-4.02	-9.30	10.00	614389.38	614680.21	N 32 41 18.61	W 103 57 38.09
	8100.00	20.79	246.60	8095.47	35.01	-14.81	-34.24	10.00	614378.59	614655.27	N 32 41 18.50	W 103 57 38.38
	8200.00	30.79	246.60	8185.39	75.79	-32.07	-74.11	10.00	614361.33	614615.39	N 32 41 18.33	W 103 57 38.85
	8300.00	40.79	246.60	8266.41	130.61	-55.27	-127.71	10.00	614338.14	614561.80	N 32 41 18.10	W 103 57 39.47
2nd Bone Spring Sand	*8348.86*	*45.68*	*246.60*	*8302.00*	*162.02*	*-68.56*	*-158.42*	*10.00*	*614324.85*	*614531.09*	*N 32 41 17.97*	*W 103 57 39.83*
	8400.00	50.79	246.60	8336.05	197.81	-83.70	-193.41	10.00	614309.71	614496.10	N 32 41 17.82	W 103 57 40.24
	8500.00	60.79	246.60	8392.20	275.33	-116.50	-269.21	10.00	614276.91	614420.31	N 32 41 17.50	W 103 57 41.13
	8600.00	70.79	246.60	8433.16	360.82	-152.67	-352.81	10.00	614240.74	614336.72	N 32 41 17.15	W 103 57 42.11
	8700.00	80.79	246.60	8457.68	451.69	-191.13	-441.66	10.00	614202.29	614247.67	N 32 41 16.77	W 103 57 43.15
	8800.00	90.79	246.60	8465.01	545.18	-230.88	-533.08	10.00	614162.74	614156.47	N 32 41 16.38	W 103 57 44.22
LP, Turn 3° DLS	8801.11	90.90	246.60	8465.00	546.22	-231.12	-534.09	10.00	614162.29	614155.45	N 32 41 16.38	W 103 57 44.24
	8900.00	90.91	249.57	8463.44	639.87	-268.03	-625.82	3.00	614125.40	614063.73	N 32 41 16.01	W 103 57 45.31
	9000.00	90.91	252.57	8461.85	736.11	-300.46	-720.38	3.00	614092.96	613969.17	N 32 41 15.70	W 103 57 46.42
	9100.00	90.92	255.57	8460.25	833.63	-327.91	-816.52	3.00	614065.52	613873.05	N 32 41 15.43	W 103 57 47.55
	9200.00	90.92	258.57	8458.65	932.17	-350.28	-913.96	3.00	614043.15	613775.61	N 32 41 15.21	W 103 57 48.69
	9300.00	90.92	261.57	8457.05	1031.46	-367.52	-1012.44	3.00	614025.90	613677.14	N 32 41 15.04	W 103 57 49.84
	9400.00	90.91	264.57	8455.45	1131.23	-379.59	-1111.68	3.00	614013.84	613577.91	N 32 41 14.93	W 103 57 51.00
	9500.00	90.90	267.57	8453.87	1231.20	-386.44	-1211.42	3.00	614006.99	613478.17	N 32 41 14.86	W 103 57 52.17
Hold to TD	9575.60	90.90	269.84	8452.68	1306.74	-388.15	-1286.99	3.00	614005.28	613402.61	N 32 41 14.85	W 103 57 53.05
	9600.00	90.90	269.84	8452.30	1331.10	-388.22	-1311.39	0.00	614005.21	613378.22	N 32 41 14.85	W 103 57 53.34
	9700.00	90.90	269.84	8450.73	1430.95	-388.51	-1411.37	0.00	614004.92	613278.24	N 32 41 14.85	W 103 57 54.51
	9800.00	90.90	269.84	8449.17	1530.79	-388.79	-1511.36	0.00	614004.64	613178.26	N 32 41 14.85	W 103 57 55.68
	9900.00	90.90	269.84	8447.60	1630.64	-389.07	-1611.35	0.00	614004.36	613078.28	N 32 41 14.85	W 103 57 56.85
	10000.00	90.90	269.84	8446.04	1730.49	-389.36	-1711.33	0.00	614004.07	612978.30	N 32 41 14.85	W 103 57 58.02
	10100.00	90.90	269.84	8444.47	1830.33	-389.64	-1811.32	0.00	614003.79	612878.32	N 32 41 14.85	W 103 57 59.19
	10200.00	90.90	269.84	8442.90	1930.18	-389.92	-1911.31	0.00	614003.51	612778.34	N 32 41 14.85	W 103 58 0.36
	10300.00	90.90	269.64	8441.34	2030.02	-390.21	-2011.30	0.00	614003.22	612678.36	N 32 41 14.85	W 103 58 1.53
	10400.00	90.90	269.64	8439.77	2129.87	-390.49	-2111.28	0.00	614002.94	612578.38	N 32 41 14.85	W 103 58 2.70
	10500.00	90.90	269.84	8438.21	2229.71	-390.77	-2211.27	0.00	614002.66	612478.40	N 32 41 14.65	W 103 58 3.87
	10600.00	90.90	269.84	8436.64	2329.56	-391.06	-2311.26	0.00	614002.37	612378.42	N 32 41 14.66	W 103 58 5.04
	10700.00	90.90	269.84	8435.08	2429.41	-391.34	-2411.25	0.00	614002.09	612278.44	N 32 41 14.66	W 103 58 6.21
	10800.00	90.90	269.84	8433.51	2529.25	-391.62	-2511.23	0.00	614001.81	612178.46	N 32 41 14.86	W 103 58 7.38
	10900.00	90.90	269.84	8431.94	2629.10	-391.91	-2611.22	0.00	614001.52	612078.48	N 32 41 14.86	W 103 58 8.55
	11000.00	90.90	269.84	8430.38	2728.94	-392.19	-2711.21	0.00	614001.24	611978.50	N 32 41 14.86	W 103 58 9.72
	11100.00	90.90	269.84	8428.81	2828.79	-392.47	-2811.20	0.00	614000.96	611878.52	N 32 41 14.86	W 103 58 10.89
	11200.00	90.90	269.84	8427.25	2928.63	-392.76	-2911.18	0.00	614000.67	611778.54	N 32 41 14.86	W 103 58 12.06
	11300.00	90.90	269.84	8425.68	3028.48	-393.04	-3011.17	0.00	614000.39	611678.56	N 32 41 14.86	W 103 58 13.23
	11400.00	90.90	269.84	8424.11	3128.33	-393.32	-3111.16	0.00	614000.11	611578.59	N 32 41 14.86	W 103 58 14.40
	11500.00	90.90	269.84	8422.55	3228.17	-393.61	-3211.14	0.00	613999.82	611478.61	N 32 41 14.86	W 103 58 15.57
	11600.00	90.90	269.84	8420.98	3328.02	-393.89	-3311.13	0.00	613999.54	611378.63	N 32 41 14.86	W 103 58 16.74
	11700.00	90.90	269.84	8419.42	3427.86	-394.18	-3411.12	0.00	613999.26	611278.65	N 32 41 14.86	W 103 58 17.90
	11800.00	90.90	269.84	8417.85	3527.71	-394.46	-3511.11	0.00	613998.97	611178.67	N 32 41 14.86	W 103 58 19.07
	11900.00	90.90	269.84	8416.28	3627.55	-394.74	-3611.09	0.00	613998.69	611078.69	N 32 41 14.86	W 103 58 20.24
	12000.00	90.90	269.84	8414.72	3727.40	-395.03	-3711.08	0.00	613998.41	610978.71	N 32 41 14.86	W 103 58 21.41
	12100.00	90.90	269.84	8413.15	3827.25	-395.31	-3811.07	0.00	613998.12	610878.73	N 32 41 14.86	W 103 58 22.58
	12200.00	90.90	269.84	8411.59	3927.09	-395.59	-3911.06	0.00	613997.84	610778.75	N 32 41 14.86	W 103 58 23.75
	12300.00	90.90	269.84	8410.02	4026.94	-395.88	-4011.04	0.00	613997.55	610678.77	N 32 41 14.86	W 103 58 24.92
	12400.00	90.90	269.84	8408.46	4126.78	-396.16	-4111.03	0.00	613997.27	610578.79	N 32 41 14.87	W 103 58 26.09
	12500.00	90.90	269.84	8406.89	4226.63	-396.44	-4211.02	0.00	613996.99	610478.81	N 32 41 14.87	W 103 58 27.26
	12600.00	90.90	269.84	8405.32	4326.47	-396.73	-4311.01	0.00	613996.70	610378.83	N 32 41 14.87	W 103 58 28.43
	12700.00	90.90	269.84	8403.76	4426.32	-397.01	-4410.99	0.00	613996.42	610278.85	N 32 41 14.87	W 103 58 29.60
	12800.00	90.90	269.84	8402.19	4526.17	-397.29	-4510.98	0.00	613996.14	610178.87	N 32 41 14.87	W 103 58 30.77
	12900.00	90.90	269.84	8400.63	4626.01	-397.58	-4610.97	0.00	613995.85	610078.89	N 32 41 14.87	W 103 58 31.94
	13000.00	90.90	269.84	8399.06	4725.86	-397.86	-4710.95	0.00	613995.57	609978.91	N 32 41 14.87	W 103 58 33.11
	13100.00	90.90	269.84	8397.49	4825.70	-398.14	-4810.94	0.00	613995.29	609878.93	N 32 41 14.87	W 103 58 34.28
	13200.00	90.90	269.84	8395.93	4925.55	-398.43	-4910.93	0.00	613995.00	609778.95	N 32 41 14.87	W 103 58 35.45
	13300.00	90.90	269.84	8394.36	5025.39	-398.71	-5010.92	0.00	613994.72	609678.97	N 32 41 14.87	W 103 58 36.62
	13400.00	90.90	269.84	8392.80	5125.24	-398.99	-5110.90	0.00	613994.44	609578.99	N 32 41 14.87	W 103 58 37.79
	13500.00	90.90	269.84	8391.23	5225.09	-399.28	-5210.89	0.00	613994.15	609479.01	N 32 41 14.87	W 103 58 38.96
	13600.00	90.90	269.84	8389.67	5324.93	-399.56	-5310.88	0.00	613993.87	609379.03	N 32 41 14.87	W 103 58 40.13
	13700.00	90.90	269.84	8388.10	5424.78	-399.84	-5410.87	0.00	613993.59	609279.06	N 32 41 14.87	W 103 58 41.30
	13800.00	90.90	269.84	8386.53	5524.62	-400.13	-5510.85	0.00	613993.30	609179.08	N 32 41 14.87	W 103 58 42.47
	13900.00	90.90	269.84	8384.97	5624.47	-400.41	-5610.84	0.00	613993.02	609079.10	N 32 41 14.87	W 103 58 43.64
	14000.00	90.90	269.84	8383.40	5724.31	-400.69	-5710.83	0.00	613992.74	608979.12	N 32 41 14.87	W 103 58 44.81
	14100.00	90.90	269.84	8381.84	5824.16	-400.98	-5810.82	0.00	613992.45	608879.14	N 32 41 14.87	W 103 58 45.98
	14200.00	90.90	269.84	8380.27	5924.01	-401.26	-5910.80	0.00	613992.17	608779.16	N 32 41 14.87	W 103 58 47.15
	14300.00	90.90	269.84	8378.70	6023.65	-401.55	-6010.79	0.00	613991.89	608679.18	N 32 41 14.88	W 103 58 48.32
	14400.00	90.90	269.84	8377.14	6123.70	-401.83	-6110.78	0.00	613991.60	608579.20	N 32 41 14.88	W 103 58 49.49
	14500.00	90.90	269.84	8375.57	6223.54	-402.11	-6210.76	0.00	613991.32	608479.22	N 32 41 14.88	W 103 58 50.66
	14600.00	90.90	269.84	8374.01	6323.39	-402.40	-6310.75	0.00	613991.04	608379.24	N 32 41 14.88	W 103 58 51.83
	14700.00	90.90	269.84	8372.44	6423.23	-402.68	-6410.74	0.00	613990.75	608279.26	N 32 41 14.88	W 103 58 53.00
	14800.00	90.90	269.84	8370.88	6523.08	-402.96	-6510.73	0.00	613990.47	608179.28	N 32 41 14.88	W 103 58 54.17
	14900.00	90.90	269.84	8369.31	6622.93	-403.25	-6610.71	0.00	613990.19	608079.30	N 32 41 14.88	W 103 58 55.34

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	15000.00	90.90	269.84	8367.74	6722.77	-403.53	-6710.70	0.00	613989.90	607979.32	N 32 41 14.88	W 103 58 56.51
	15100.00	90.90	269.84	8366.18	6822.62	-403.81	-6810.69	0.00	613989.62	607879.34	N 32 41 14.88	W 103 58 57.68
	15200.00	90.90	269.84	8364.61	6922.46	-404.10	-6910.68	0.00	613989.33	607779.36	N 32 41 14.88	W 103 58 58.85
	15300.00	90.90	269.84	8363.05	7022.31	-404.38	-7010.66	0.00	613989.05	607679.38	N 32 41 14.88	W 103 59 0.02
	15400.00	90.90	269.84	8361.48	7122.15	-404.66	-7110.65	0.00	613988.77	607579.40	N 32 41 14.88	W 103 59 1.19
Apache Salt Fork 3-4 Federal Com #1H - PBHL	15494.52	90.90	269.84	8360.00	7216.53	-404.93	-7205.16	0.00	613988.50	607484.90	N 32 41 14.88	W 103 59 2.30

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	20.000	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG-Depth Only	Original Borehole / Apache Salt Fork 3-4 Federal Com #1H Rev0 JP 06Oct16
	1	20.000	15494.522	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG	Original Borehole / Apache Salt Fork 3-4 Federal Com #1H Rev0

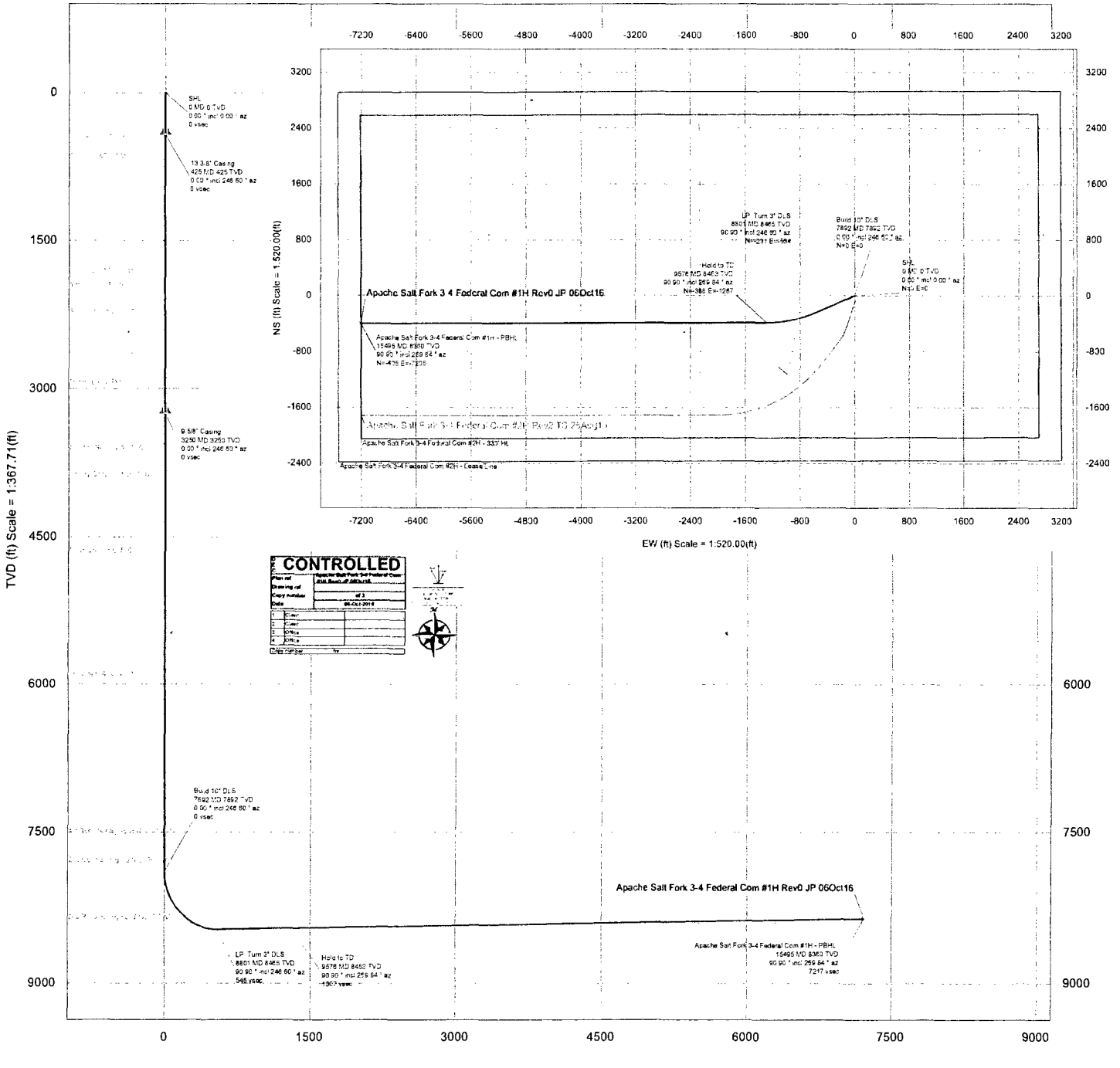
Schlumberger **Apache** Rev0

Borehole:	Well:	Field:	Structure:
Original Borehole	Apache Salt Fork 3-4 Federal Com #1H	NM Eddy County (NAD 27)	Apache Salt Fork 3-4 Federal Com #1H

Gravity & Magnetic Parameters					Surface Location	NAD27 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous		
Model:	HDGM 2016	Dip: 60.605°	Date:	06-Oct-2016	Lat:	N 32 41 16.85	Northing:	614393.4fUS	Grid Conv: 0.2013°	Slot:	Apache Salt Fork 3-4 Federal Com #1H	TVD Ref: RKB(3430ft above MSL)
MagDec:	7.586°	FS: 48379.779nT	Gravity FS:	998.515mgn (9 80665 Based)	Lon:	W 103 57 37.98	Easting:	614689.5fUS	Scale Fact: 0.99992415	Plan:	Apache Salt Fork 3-4 Federal Com #1H Rev0 JP 06Oct16	

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rustler	417.00	0.00	246.60	417.00	0.00	0.00	0.00	0.00
13 3/8" Casing	425.00	0.00	246.60	425.00	0.00	0.00	0.00	0.00
Top Salt	603.00	0.00	246.60	603.00	0.00	0.00	0.00	0.00
Base Salt	1767.00	0.00	246.60	1767.00	0.00	0.00	0.00	0.00
Yates	1912.00	0.00	246.60	1912.00	0.00	0.00	0.00	0.00
Seven Rivers	2180.00	0.00	246.60	2180.00	0.00	0.00	0.00	0.00
Queen	2893.00	0.00	246.60	2893.00	0.00	0.00	0.00	0.00
9 5/8" Casing	3250.00	0.00	246.60	3250.00	0.00	0.00	0.00	0.00
Capitan Reef	3562.00	0.00	246.60	3562.00	0.00	0.00	0.00	0.00
Cherry Canyon	3828.00	0.00	246.60	3828.00	0.00	0.00	0.00	0.00
Delaware	4598.00	0.00	246.60	4598.00	0.00	0.00	0.00	0.00
Bone Spring	5847.00	0.00	246.60	5847.00	0.00	0.00	0.00	0.00
1st Bone Spring Sand	7454.00	0.00	246.60	7454.00	0.00	0.00	0.00	0.00
2nd Bone Spring Carb	7736.00	0.00	246.60	7736.00	0.00	0.00	0.00	0.00
Build 10° DLS	7892.11	0.00	246.60	7892.11	0.00	0.00	0.00	0.00
2nd Bone Spring Sand	8348.86	45.68	246.60	8302.00	152.02	-58.56	-158.42	10.00
LP, Turn 3° DLS	8801.11	90.90	246.60	8465.00	546.22	-231.12	-534.09	10.00
Hold to TD	9575.60	90.90	269.84	8452.68	1306.74	-388.15	-1286.99	3.00
Apache Salt Fork 3-4 Federal Com #1H - PBHL	15494.52	90.90	269.84	8360.00	7216.53	-404.93	-7205.16	0.00



Vertical Section (ft) Azim = 266.78° Scale = 1:367.71(ft) Origin = 0N/-S, 0E/-W

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Apache Corporation
LEASE NO.:	NMNM114973
WELL NAME & NO.:	Salt Fork 3 4 Federal Com 1H
SURFACE HOLE FOOTAGE:	2364'/S & 2258'/W
BOTTOM HOLE FOOTAGE	1980'/S & 330'/W
LOCATION:	Section 3, T.19 S., R.30 E., NMPM
COUNTY:	Eddy County, New Mexico
API:	30-015-43665

The original COAs still stand with the following drilling modifications:

I. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☒ **Lea County**
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 393-3612

1. A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Queen** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.).

The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Potash Areas:
After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE.

Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

HIGH CAVE/ KARST AREA: A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH. IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

Possibility of water flows in the Salado and in the Artesia Group.
Possibility of lost circulation in the Artesia Group.
Secretary Potash.

1. The **13-3/8** inch surface casing shall be set at approximately **415** feet (in a competent bed of an anhydrite zone, and if salt is encountered, set casing at least 25 feet above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Intermediate casing shall be kept fluid filled while running into hole to meet BLM minimum collapse requirements.

2. The minimum required fill of cement behind the **9/5/8** inch intermediate casing, which shall be set at approximately **3950** feet, is:

Option 1:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/ karst and potash.**

Option 2:

Operator has proposed DV tool at depth of 1820 feet, but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50 feet below previous shoe and a minimum of 200 feet above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range.

a. First stage to DV tool:

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Excess calculates to 22% - Additional cement may be required. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/ karst and potash.**

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **7 X 5-1/2** inch production casing is:

☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.

2. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** inch intermediate casing shoe shall be **3000 (3M)** psi.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

    a. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time.

    b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

    c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

    d. The results of the test shall be reported to the appropriate BLM office.

    e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

    f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

JAM 030817

State of New Mexico
Oil Conservation Division

Incident ID	NRM2020635561
District RP	
Facility ID	
Application ID	

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? (*Figure 3 and 3a)*	215 (ft bgs)
Did this release impact groundwater or surface water? (*Figures 2, 3, 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse? (*Figure 5)*	☐ Yes ☒ 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)? (*Figure 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church? (*Figure 6)*	☐ Yes ☒ 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? (*Figure 4)*	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring? (*Figure 5, 2)*	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field? (*Figure 5)*	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland? ((*Figure 7)*	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine? (*Figure 8)*	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology? (*Figure 9)*	☒ Yes ☐ No
Are the lateral extents of the release within a 100-year floodplain? (*Figure 10)*	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site? (*Figure 1)*	☒ Yes ☐ 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, delineation points, and monitoring wells.
☒ Field data
☒ Data table of soil contaminant concentration data
☒ Depth to water determination
☒ Determination of water sources and significant watercourses within ½-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

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.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	NRM2020635561
District RP	
Facility ID	
Application ID	

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: Donnie Mathews Title: General Manager

Signature: Donnie Mathews Date: 10/13/20

email: Telephone: 575-677-2370

OCD Only

Received by: Robert Hamlet Date: 3/18/2021

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 10602

CONDITIONS OF APPROVAL

Operator:	OGRID:	Action Number:	Action Type:
RAY WESTALL OPERATING, INC. P.O. Box 4 Loco Hills, NM88255	119305	10602	C-141

OCD Reviewer	Condition
rhamlet	The SA-Characterization is Conditionally Approved. This release is in a high karst area and will need to be remediated to the strictest closure criteria of <50' depth to groundwater from Table 1 of the spill rule. If rock refusal is encountered, use hydrovac to clean contaminated soil off rock. Use rotary drill to drill 18"-24" hole into the rock, pull sample and do lab analysis. If clean, layer clean rock with microbial strains to digest organics and hydrocarbons. Back-fill with clean material.