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APPROVED

By OCD Dr Oberding at 9:23 am, Mar 02, 2017

Apache Corporation

**Lou Wortham
Remediation
Proposal**

Lou Wortham 20
F-11-T22S-R37E
2310' FNL & 2000' FWL
30-025-30285
Lea County, New Mexico

August 26, 2016

Jennifer Van Curen
Environmental Project Scientist

Lou Wortham

Remediation
Proposal
Lou Wortham 20
F-11-T22S-R37E
2310' FNL & 2000' FWL
30-025-30285
Lea County, New Mexico

Prepared for:
Apache
Corporation
Eddy County, New Mexico

Prepared by:
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Our Ref.:
MT001200.0000.0000

Date:
August 26, 2016

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Lea County, New Mexico

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Appendix C

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Existing Development Map

Geology Map

Hydrology Map

Karst Potential Map

Soils Map

Surface and Mineral Map

Topo Map

Vicinity Map

Appendix D

Soil Sampling Results

Appendix E

2011 Water Monitor Well Report

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1. INTRODUCTION

1.1 Site Information

The subject site is a pasture area located approximately 2.5 miles southeast of Eunice, New Mexico at GPS coordinates of 32°46'5.01"N, 104°15'3.87"W, and at UL/C, D, E & F, Sec. 11, T22S, R37E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately +/-40 feet below ground surface (bgs). The well site is owned and operated by Apache Corporation.

This is a historical event the rancher had located and requested that Apache consider remediating. Apache evaluated the site and estimated that there was at one time approximately 3 bbl hydrocarbon leak at a production line. There is no estimated date of the occurrence.

2. SUMMARY OF SITE INVESTIGATION ACTIVITIES

2.1 Initial Reporting and Incident Description

There was no initial reporting on this as it was below reportable levels and site is now a historical. A C-141 will be generated with this report.

2.2 Sampling Activities

Initial release site investigation activities were conducted on September 14, 2015 (0 - 45 feet bgs). Grab samples were collected utilizing a core drill rig to a depth of 45-feet bgs. Laboratory results are presented below in Table 1, and the laboratory results is shown in Appendix D.

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Table 1: Laboratory Sampling Results

	Depth (FBGS)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	Chloride (mg/Kg)	Field Chloride	GRO C6-C10 (mg/Kg)	DRO C10-C28 (mg/Kg)
SB-1	5	< 0.05	0.063	0.615	1.52	2.19	5200	6960	88.9	2500
	10	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1330	288	< 10	28.3
	15	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	352	404	< 10	< 10
	20	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	544	592	< 10	< 10
	25	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	384	492	< 10	< 10
	30	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	304	288	< 10	< 10
	35	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1040	764	< 10	< 10
	40	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1230	1040	< 10	15.2
	45	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	560	324	< 10	40.6
SB-2	5	< 0.05	0.054	0.318	3.34	3.71	7120	5436	179	5160
	10	< 0.05	0.074	0.1	3.74	3.91	7400	5900	73.4	1440
	15	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	2560	1204	< 10	129
	20	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	864	644	< 10	136
	25	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	608	448	< 10	82.7
	30	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	720	592	< 10	< 10
	35	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1170	964	< 10	< 10
	40	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1630	1256	< 10	< 10
	45	< 0.05	< 0.05	< 0.05	< 0.15	< 0.3	1330	1412	< 10	37.7

3. ENVIRONMENTAL ASSESSMENT

3.1 Surface and Mineral Ownership

The release site is located on private land (Mr. Boyd) and state minerals. Apache will work with the landowner and OCD to complete the remediation of the release site. (Appendix C)

3.2 Hydrology

Water depths for this area is approximately 40 feet bgs. There are no bodies of water, lakes, or streams near this release site. (Appendix C)

The site ranking for this site is a 20 based on the following:

Depth to ground water ~ 40'
Wellhead Protection Area >1000'
Distance to surface water body >1000'

From the monitor well sampling conducted at the site in 2011, it is evident that chloride levels coming onto the site are higher than those leaving the site suggesting the site has an up gradient source of contamination (Appendix A). Based on data found in the NMOCD website, there is evidence of an up gradient chloride contamination source which has impacted the surrounding area (Figure 3 and 4).

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These results indicate that this location and the surrounding area have pre-existing groundwater quality impairment, and that the effects of the Lou Wortham 20 are inconsequential. In addition, the liners proposed to be installed at the site and the re-vegetation of the surface will inhibit chloride migration through the vadose zone to the aquifer. Since the up gradient monitor well shows higher chloride readings than the source well, and liners will be installed at the site which will inhibit chloride migration, the site will not contribute to the degradation of the aquifer.

3.3 Karst

The area surrounding this release site has a low karst potential.

3.4 Soils, Geology, and Vegetation

According to the soil survey data in the United States Department of Agriculture Natural Resources Conservation Service (NRCS), the soil description is BE - Berino-Cacique: loamy fine sands, 0-3 percent slopes. The natural drainage is well-drained. Water movement is well drained. Shrink – swell potential is moderate. The soils in the area is a loamy sand soil. The parent material consists of sandy eolian deposits derived from sedimentary rock over calcareous sandy alluvium derived from sedimentary rock. According to United States Geological Survey, the underlying geology is in the eolian deposits / piedmont alluvial deposits. The vegetation in the area consist of mesquite, four-wing saltbush, and grasses found in loamy sand soils.

4. REMEDIATION PLAN

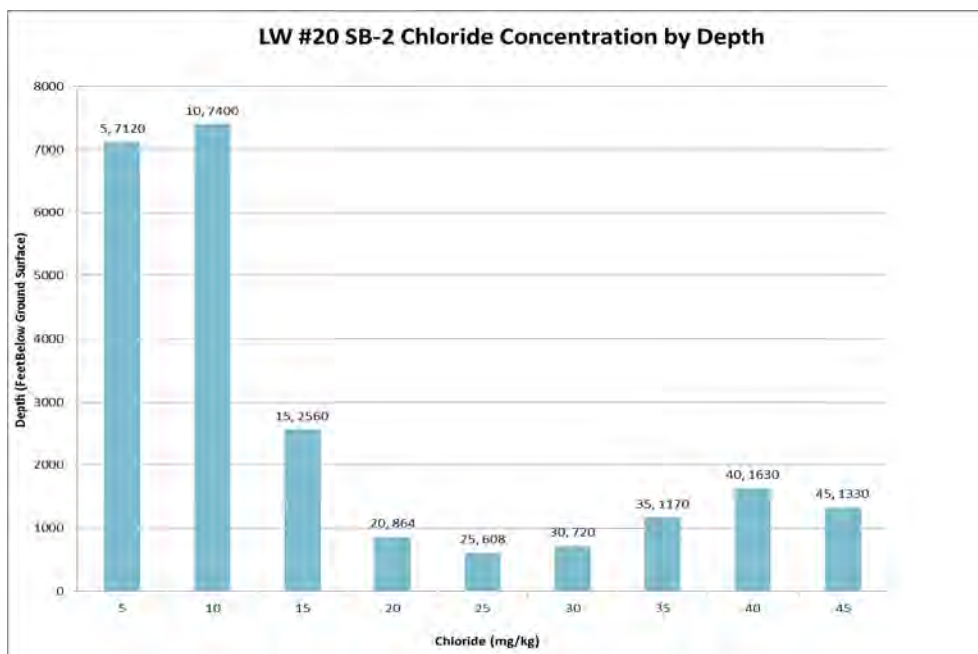
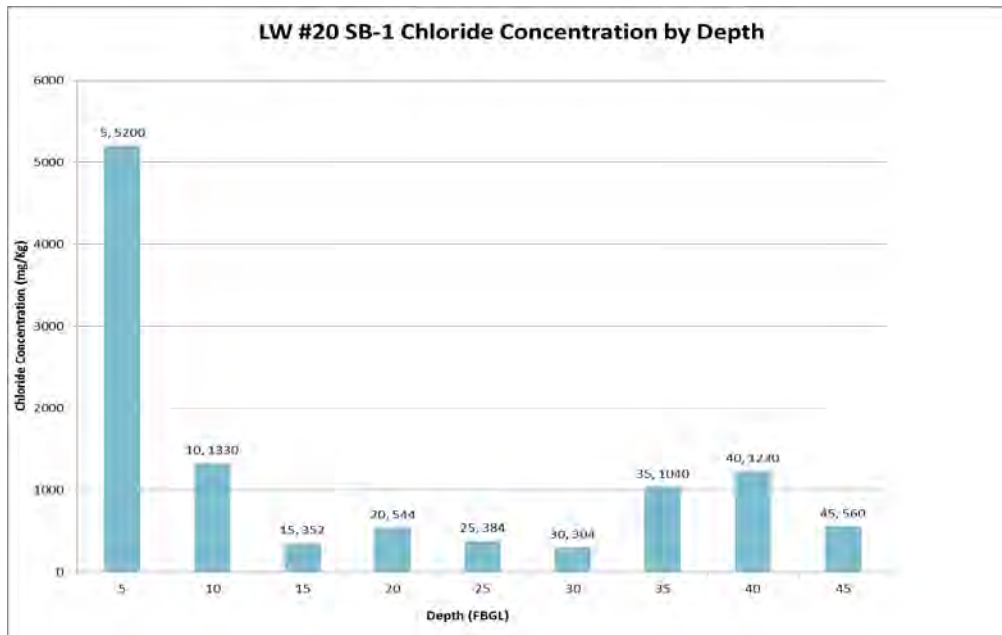
4.1 Soil Remediation Plan

Apache has met with the OCD to visit about the plans for remediation of this site. Apache will remove 5 feet bgs at SB1 and 10 feet bgs at SB2. A reinforced liner will be placed at bottom of excavation, and the lined excavation will be backfilled with clean soil.

All contaminants removed will be disposed of at an NMOCD approved disposal facility.

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4.2 Seeding Plan

The area will be seeded after the remediation work has been completed. The seed bed will be prepared by raking area, broadcast seeding, and raking lightly to cover seed.

5. REMEDIATION WORK SCHEDULE

Initial section of the remediation activities are expected to commence after receiving approval and funding of this proposed plan.

6. FOLLOW-UP SCHEDULE

A remediation report for this section will be completed and mailed within 30 days of remediation work being completed to OCD. This report will have the map of actual remediation area, photos of remediation, and finished product of proposed section.



Appendix A

Attachments

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

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in
accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

Name of Company <u>Apache Corporation</u>		OPERATOR		☒ Initial Report	☐ Final Report
Address <u>2350 Mainland Blvd Hobbs NM 88240</u>		Contact <u>Bruce Baker</u>			
Facility Name <u>LOW WORKING 20</u>		Telephone No. <u>432-631-6882</u>			
		Facility Type <u>PRODUCER</u>			
Surface Owner <u>Private (B/O/D)</u>		Mineral Owner <u>STATE</u>		API No. <u>30-025-30285</u>	

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
<u>F</u>	<u>11</u>	<u>22S</u>	<u>37E</u>	<u>2310'</u>	<u>ENL</u>	<u>2000'</u>	<u>FWL</u>	<u>LEA</u>

Latitude 32.407105 Longitude -103.135463

NATURE OF RELEASE

Type of Release <u>Emulsion</u>	Volume of Release <u>~388LS</u>	Volume Recovered <u>0</u>
Source of Release <u>Possible Line</u>	Date and Hour of Occurrence <u>?</u>	Date and Hour of Discovery <u>9/7/15</u>
Was Immediate Notice Given? ☐ Yes ☐ No ☒ Not Required	If YES, To Whom? <u>NO</u>	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

Landowner met with Bruce on some
historical staining and had him that he would like to have
remediated. Samples were taken to delineate the areas.

Describe Area Affected and Cleanup Action Taken.*

10'x10' area with small 20'x1' path leading to another 10'x10'
area affected. Proposal submitted with this C-141 notification.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOC 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 NMOC marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOC 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.

Signature: <u>Bruce Baker</u>		OIL CONSERVATION DIVISION	
Printed Name: <u>Bruce Baker</u>		Approved by Environmental Specialist:	
Title: <u>Environmental Tech</u>		Approval Date:	Expiration Date:
E-mail Address: <u>bruce.baker@apachecorp.com</u>		Conditions of Approval:	
Date: <u>8/30/16</u>	Phone: <u>432-631-6882</u>	Attached ☐	

* Attach Additional Sheets If Necessary



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced,
O=orphaned,
C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 00496 POD2		CUB	ED	4	4	4	35	22S	37E	676339	3579884*	172	30	142
CP 00003 POD1		CP	LE			4	22	22S	37E	674372	3583367*	142	110	32
CP 00009 POD2		CP	LE	4	4	1	27	22S	37E	673883	3582253*	90	52	38
CP 00081 POD1		CP	LE	2	4	4	21	22S	37E	673064	3583243*	120		
CP 00141			LE	4	4	4	27	22S	37E	674701	3581464*	41		
CP 00142			LE	1	2	1	34	22S	37E	673704	3581247*	350		
CP 00143			LE	1	1	4	34	22S	37E	674121	3580450*	140		
CP 00144 POD1		CP	LE	2	4	1	35	22S	37E	675520	3580874*	68	57	11
CP 00146 POD1		CP	LE	3	1	2	35	22S	37E	675715	3581083*	75	67	8
CP 00149 POD1		CP	LE		4	1	29	22S	37E	670568	3582296*			
CP 00154 POD2		CP	LE	3	3	3	09	22S	37E	671600	3586239*	172		
CP 00187	O		LE	3	3	1	24	22S	37E	676468	3583912*	70		
CP 00188	O		LE	4	4	4	01	22S	37E	677803	3587954*	56		
CP 00195 POD1		CP	LE	4	1	1	12	22S	37E	676602	3587532*	70		
CP 00199 POD1		CP	LE	2	4	2	14	22S	37E	676237	3585714*	75		
CP 00231 POD2		CP	LE	4	4	1	27	22S	37E	673883	3582253*	97		
CP 00233 POD2		CP	LE	1	2	3	27	22S	37E	673690	3582051*	90		
CP 00243 POD1		CP	LE	3	3	1	27	22S	37E	673281	3582246*	106		
CP 00243 POD2		CP	LE	1	2	3	27	22S	37E	673690	3582051*	90	54	36
CP 00244 POD2		CP	LE	3	4	1	27	22S	37E	673683	3582253*	87		
CP 00254 POD2	R	CP	LE	2	4	1	04	22S	37E	672159	3588860*	165	116	49
CP 00254 POD3		CP	LE	2	4	1	04	22S	37E	672159	3588860*	162	90	72
CP 00255 POD2		CP	LE	2	2	3	04	22S	37E	672166	3588458*	157	120	37
CP 00313			LE	3	3	3	15	22S	37E	673237	3584659*	100		
CP 00381			LE	3	1	4	22	22S	37E	674063	3583467*	130		
CP 00382			LE	3	3	4	22	22S	37E	674070	3583065*	130		

*UTM location was derived from PLSS - see Help

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD															
		Sub-	Q Q Q												
POD Number	Code	basin	County	64	16	4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column	
CP 00383			LE	3	1	4	22	22S	37E	674063	3583467*		130		
CP 00384			LE	2	2	1	27	22S	37E	673875	3582855*		82		
CP 00391			LE	4	4	4	17	22S	37E	671426	3584623*		96		
CP 00395			LE	4	2	3	28	22S	37E	672282	3581822*		90		
CP 00399			LE	4	1	4	17	22S	37E	671017	3585017*		110		
CP 00400			LE	2	1	3	28	22S	37E	671880	3582015*		108		
CP 00422			LE	3	4	4	04	22S	37E	672777	3587870*		130	92	38
CP 00427 POD1	O	CP	LE	3	3	3	02	22S	37E	674787	3587906*		4900		
CP 00445			LE	2	1	2	27	22S	37E	674277	3582863*		150		
CP 00451			LE	3	1	3	04	22S	37E	671564	3588250*				
CP 00467			LE	1	2	2	09	22S	37E	672784	3587668*		120		
CP 00468			LE	3	4	4	04	22S	37E	672777	3587870*		112		
CP 00470			LE	2	1	2	26	22S	37E	675886	3582892*		99	65	34
CP 00481			LE	4	2	2	05	22S	37E	671349	3589047*		125	90	35
CP 00503			LE		4	4	21	22S	37E	672965	3583144*		115	65	50
CP 00545			LE	3	2	2	35	22S	37E	676117	3581091*		70	35	35
CP 00547			LE		2	2	18	22S	37E	669696	3585901*		200		
CP 00560			LE	2	1	1	09	22S	37E	671778	3587646*		350		
CP 00561			LE	3	3	3	34	22S	37E	673324	3579834*		137	60	77
CP 00581			LE	2	2	2	14	22S	37E	676229	3586116*		125	65	60
CP 00628			LE		2	1	18	22S	37E	668892	3585888*		525	190	335
CP 00662			LE	3	3	1	15	22S	37E	673223	3585464*		180	150	30
CP 00666			LE			2	05	22S	37E	671055	3588939*		120	79	41
CP 00674			LE		1	1	15	22S	37E	673316	3585967*		100	75	25
CP 00675			LE	2	2	1	15	22S	37E	673817	3586073*		100		
CP 00679			LE		3	3	15	22S	37E	673338	3584760*		164	98	66
CP 00684			LE		1	1	15	22S	37E	673316	3585967*		200	180	20
CP 00699			LE	1	1	1	15	22S	37E	673215	3586066*		163	100	63
CP 00706			LE	3	3	1	24	22S	37E	676468	3583912*		96	60	36

*UTM location was derived from PLSS - see Help

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD															
Sub-															
Q Q Q															
POD Number	Code	basin	County	64	16	4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column	
CP 00708			LE				15	22S	37E	673941	3585363*		200	185	15
CP 00709			LE	1	3		15	22S	37E	673331	3585163*		200	87	113
CP 00756			LE	2	2	4	09	22S	37E	672999	3586863*		125	85	40
CP 00871			LE			3	09	22S	37E	671902	3586541*		167	94	73
CP 00911			LE	4	4	4	21	22S	37E	673064	3583043*		153		
CP 00929 POD1			LE	3	3	3	02	22S	37E	674939	3587915		1100		
CP 01101 POD1		CP	LE	2	4	4	21	22S	37E	673064	3583281		142		
CP 01157 POD1			LE	1	1	1	34	22S	37E	673325	3581348		143		
CP 01159 POD1			LE			2	03	22S	37E	674217	3589009		45		
CP 01159 POD2			LE			2	03	22S	37E	674223	3588982		40		
CP 01159 POD3			LE			2	32	22S	37E	674266	3588993		40		
CP 01159 POD4			LE			2	03	22S	37E	674279	3588986		40		
CP 01220 POD1			LE	1	2	02		22S	37E	675925	3589363		65	48	17
CP 01220 POD2			LE	1	2	02		22S	37E	675951	3589363		65	48	17
CP 01353 POD1			LE	3	1	3	09	22S	37E	671514	3586640		93	73	20

Average Depth to Water: **87 feet**

Minimum Depth: **30 feet**

Maximum Depth: **190 feet**

Record Count: 70

PLSS Search:

Township: 22S

Range: 37E

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



Appendix B

Historical Well Monitoring

1RP-2726

**Termination
Request**

DATE:

April 19th, 2012

Rice Environmental Consulting & Safety

P.O. Box 5630 Hobbs, NM 88241

Phone 575.393.4411 Fax 575.393.0293

CERTIFIED MAIL

RETURN RECEIPT NO. 7008 1140 0001 3070 6266

April 19th, 2012

Mr. Edward Hansen

New Mexico Energy, Minerals, & Natural Resources

Oil Conservation Division, Environmental Bureau

1220 S. St. Francis Drive

Santa Fe, New Mexico 87505

RE: Termination Request

Apache Corporation

Lou Wortham #20 AD (1R0711-2726): UL/F sec. 11 T22S R37E

Mr. Hansen:

Apache Corporation (Apache) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site. The site is located approximately 2.5 miles southeast of Eunice, New Mexico at UL/F, Sec. 11, T22S, R37E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately +/-37 feet below ground surface (bgs).

On May 25th, 2011 six soil bores were installed at the site. The samples were field tested for chlorides and screened in the field for hydrocarbons with a photo-ionization detector. Representative samples from the bores were taken to a commercial laboratory for confirmation of chloride field numbers. Laboratory readings showed chloride numbers ranging from a high of 7,900 mg/kg at 18 ft bgs in SB-2 to a low of 16 mg/kg at the surface of SB-3.

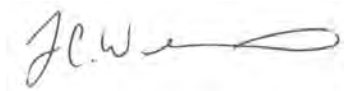
Per the approval of the NMOCD District 1 Office, the site was excavated to 120 ft by 188 ft by 5 ft bgs. Two additional areas within the excavation were excavated to 21 ft bgs. These two areas surrounded SB-1 and SB-2 respectively and measured 10' x 10' each. At the base of these two excavations, liners were installed to inhibit the downward migration of chlorides. A one foot clay layer was placed at the base of the two excavations and a 20-mil reinforced poly liner was properly seated on top of the clay. Then the two excavations were backfilled to 5 ft bgs with clean imported caliche. On August 12th, 2011, a 20-mil reinforced poly liner was properly seated over the entire 120 ft by 188 ft excavation. The site was backfilled with clean, imported soil and contoured to the surrounding area. Soil amendments were added to the site and the site was seeded with a native vegetative mix on September 6th, 2011.

On August 9th, 2011, two monitor wells were installed at the site. MW-1, the source monitor well, was installed 35 ft south southeast of the excavation and MW-2, the up gradient monitor well, was installed 63 ft north northwest of the excavation. MW-1 has been sampled twice since its installation and MW-2 has been sampled three times since its installation (Figure 2). From the monitor well sampling conducted at the site, it is evident that chloride levels coming onto the site are higher than those leaving the site suggesting the site has an up gradient source of contamination. (Appendix A). Based on data found in the NMOCD website, there is evidence of an up gradient chloride contamination source which has impacted the surrounding area (Figure 3 and 4). These results indicate that this location and the surrounding area have pre-existing groundwater quality impairment, and that the effects of the Lou Wortham #20 AD are inconsequential. In addition, the liners installed at the site and the re-vegetation of the surface will inhibit chloride migration through the vadose zone to the aquifer. Since the up gradient monitor well shows higher chloride readings than the source well, and liners have been installed at the site which will inhibit chloride migration, the site will not contribute to the degradation of the aquifer. Therefore, RECS requests that the site be granted 'remediation termination' status of the regulatory file.

Upon NMOCD's approval of the Termination Request, both monitor wells will be plugged and abandoned with a 1-3% bentonite/concrete slurry with a three foot concrete cap.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder – RECS at (575) 393-9174 or Natalie Gladden – Apache Corp. (575) 394-1503 if you have any questions or wish to discuss the site.

Sincerely,



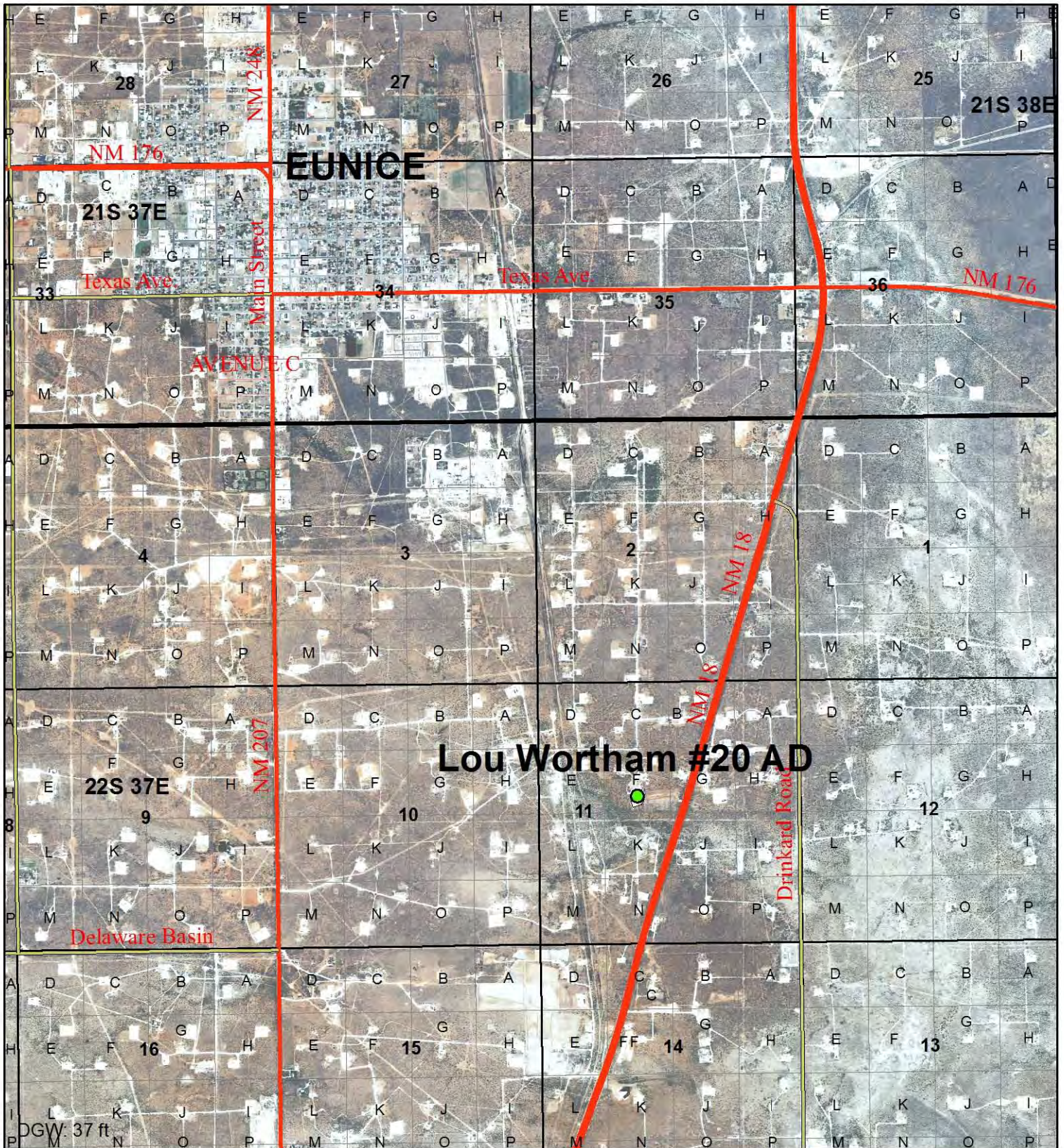
Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

- Figure 1 – Site Location Map
- Figure 2 – Monitor Well Sampling Data
- Figure 3 – Up Gradient Chloride Contamination Source Map
- Figure 4 – Potentiometric Map
- Appendix A – Laboratory Confirmation

Figures

Site Map



Apache Lou Wortham #20 AD

NMOCD Case #: 1R0711-2726

LEGALS: UL/F sec. 11
T22S R37E

Figure 1

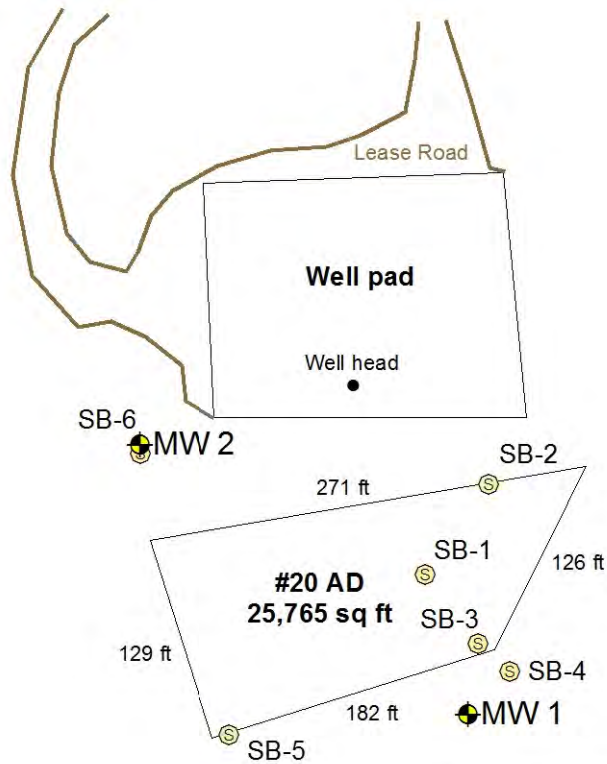


0 0.25 0.5 1
Miles

Drawing date: 8-18-11
Drafted by: L. Weinheimer

Monitor Well Sampling

MW	Depth to Water	Total Depth	Sample Date	CI
2	40.34	50.95	8/13/2011	18000
2	40.35	50.95	9/12/2011	17800
2	40.35	50.95	11/16/2011	18000



MW	Depth to Water	Total Depth	Sample Date	CI
1	39.67	80.78	9/12/2011	17400
1	39.69	80.78	11/16/2011	17000



Apache Lou Wortham #20 AD

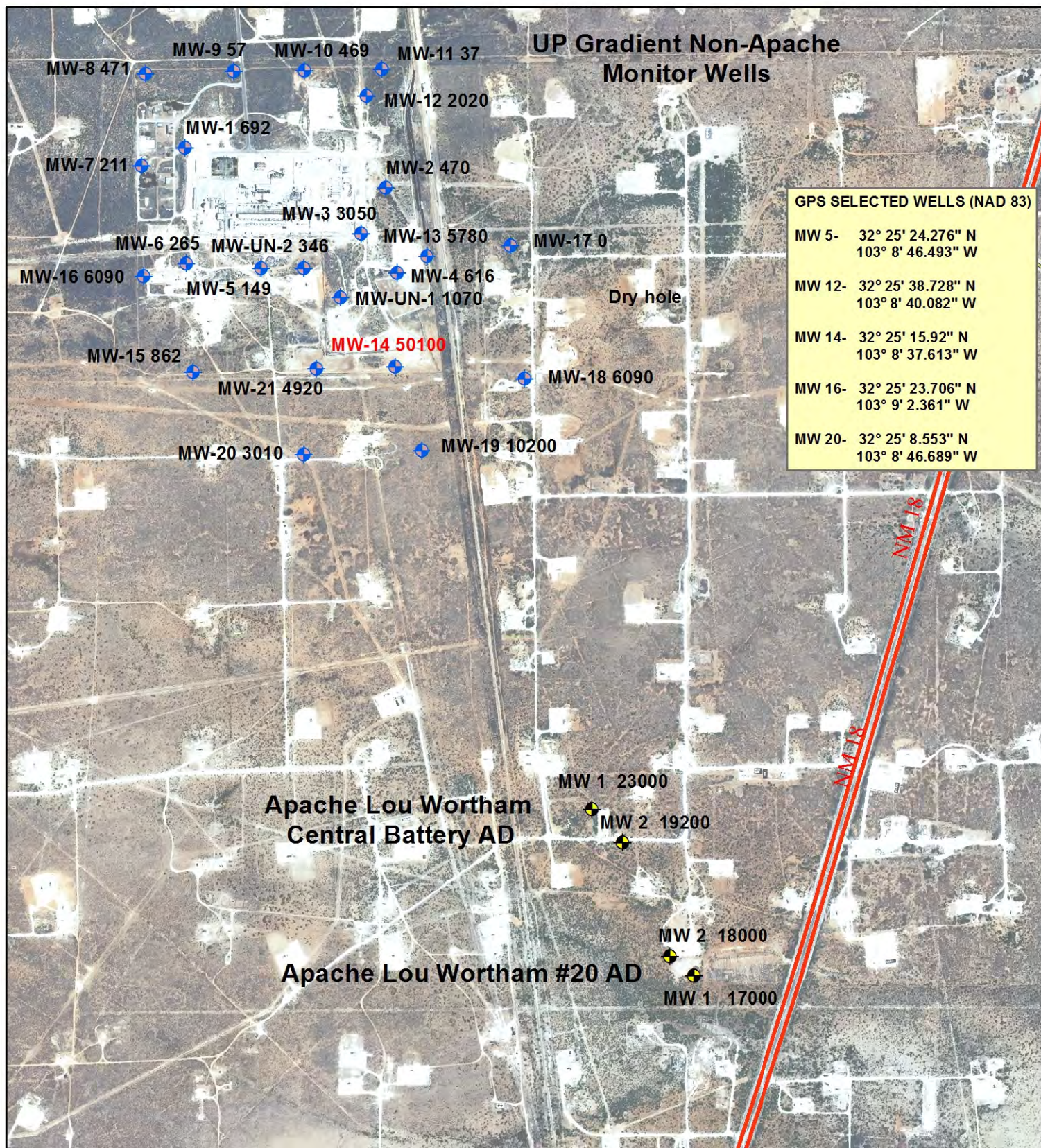
LEGALS: UL/F sec. 11
T22S R37E
NMOCD Case #: 1R0711-2726

Figure 2



0 37.5 75 150
Feet

Drawing date: 12-22-11
Drafted by: L. Weinheimer



Regional Chloride Concentrations

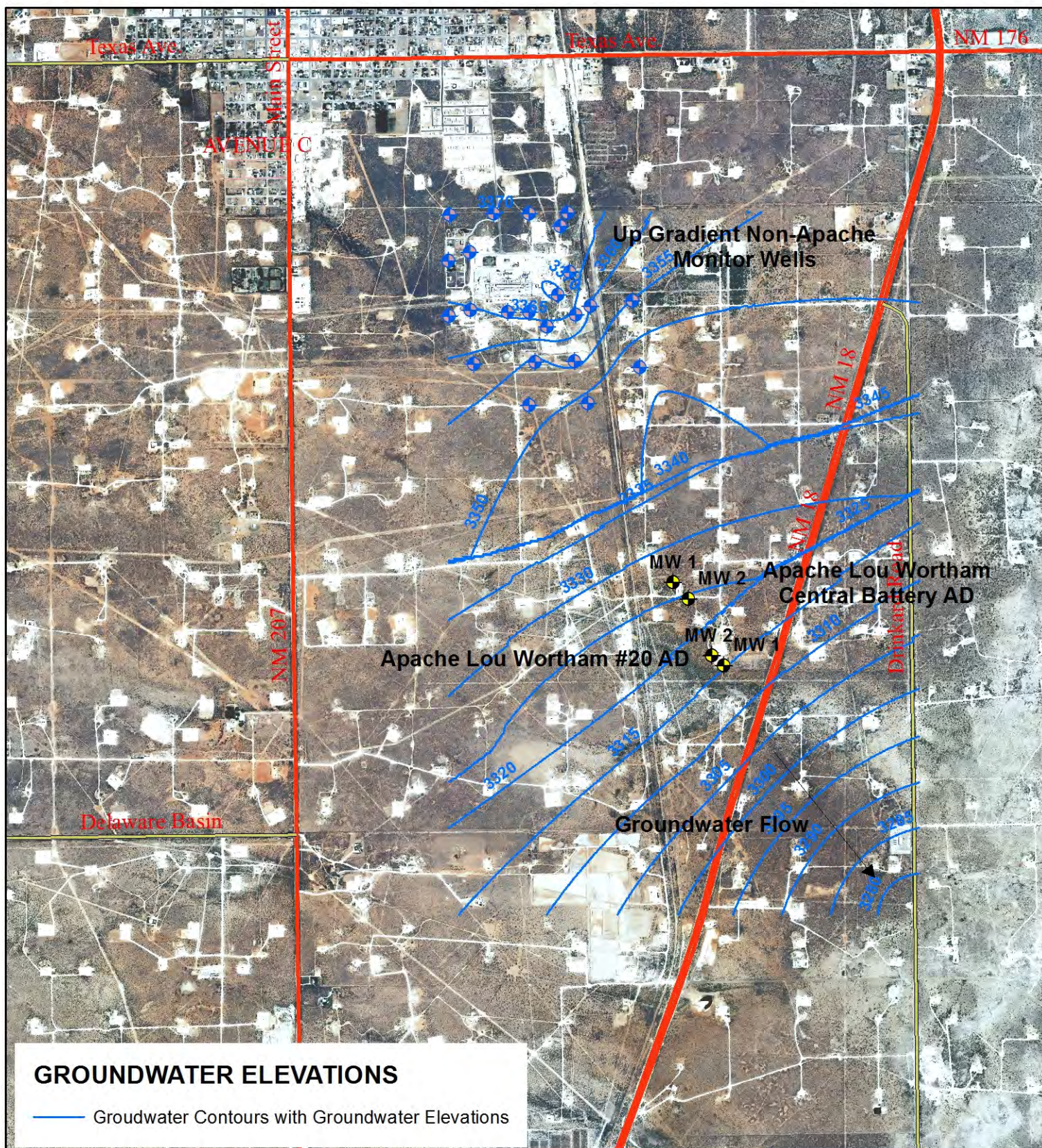
LEGALS: sec. 2, 3, 10 & 11
T22S R37E

Figure 3



0 500 1,000 2,000
Feet

Drawing date: 1-5-12
Drafted by: L. Weinheimer & T. Grieco



GROUNDWATER ELEVATIONS

— Groundwater Contours with Groundwater Elevations



Regional Potentiometric Map

LEGALS: sec. 2, 3, 10 & 11
T22S R37E

Figure 4



0 875 1,750 3,500
Feet

Drawing date: 1-5-11
Drafted by: L. Weinheimer

Appendix A

Laboratory Confirmation

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

November 18, 2011

NATALIE GLADDEN

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: APACHE LOU WORTHAM #20 AD

Enclosed are the results of analyses for samples received by the laboratory on 11/17/11 14:25.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received: 11/17/2011
Reported: 11/18/2011
Project Name: APACHE LOU WORTHAM #20 AD
Project Number: NONE GIVEN
Project Location: T22S-R37E-SEC11 UL-F ~ LEA CTY NM

Sampling Date: 11/16/2011
Sampling Type: Water
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: MONITOR WELL #1 (H102506-01)

Chloride, SM4500Cl-B		mg/L		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	17000	4.00	11/18/2011	ND	104	104	100	3.77	

Sample ID: MONITOR WELL #2 (H102506-02)

Chloride, SM4500Cl-B		mg/L		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	18000	4.00	11/18/2011	ND	104	104	100	3.77	

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

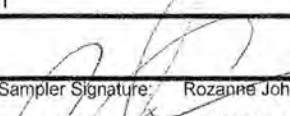
*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: Apache		BILL TO Company: Apache		PO#
Project Manager: Hack Conder, Rice Env Consulting Safety		Address: (Street, City, Zip)		
Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240		Phone#:		Fax#:
Phone #: (575) 393-9174		Fax #: (575) 397-1471		
Project #:		Project Name: Apache Lou Wortham #20 AD		
Project Location: T22S-R37E-Sec11 UL-F ~ Lea County New Mexico		Sampler Signature:  Rozanne Johnson (575)631-9310 rozanne@valornet.com		

[illegible]

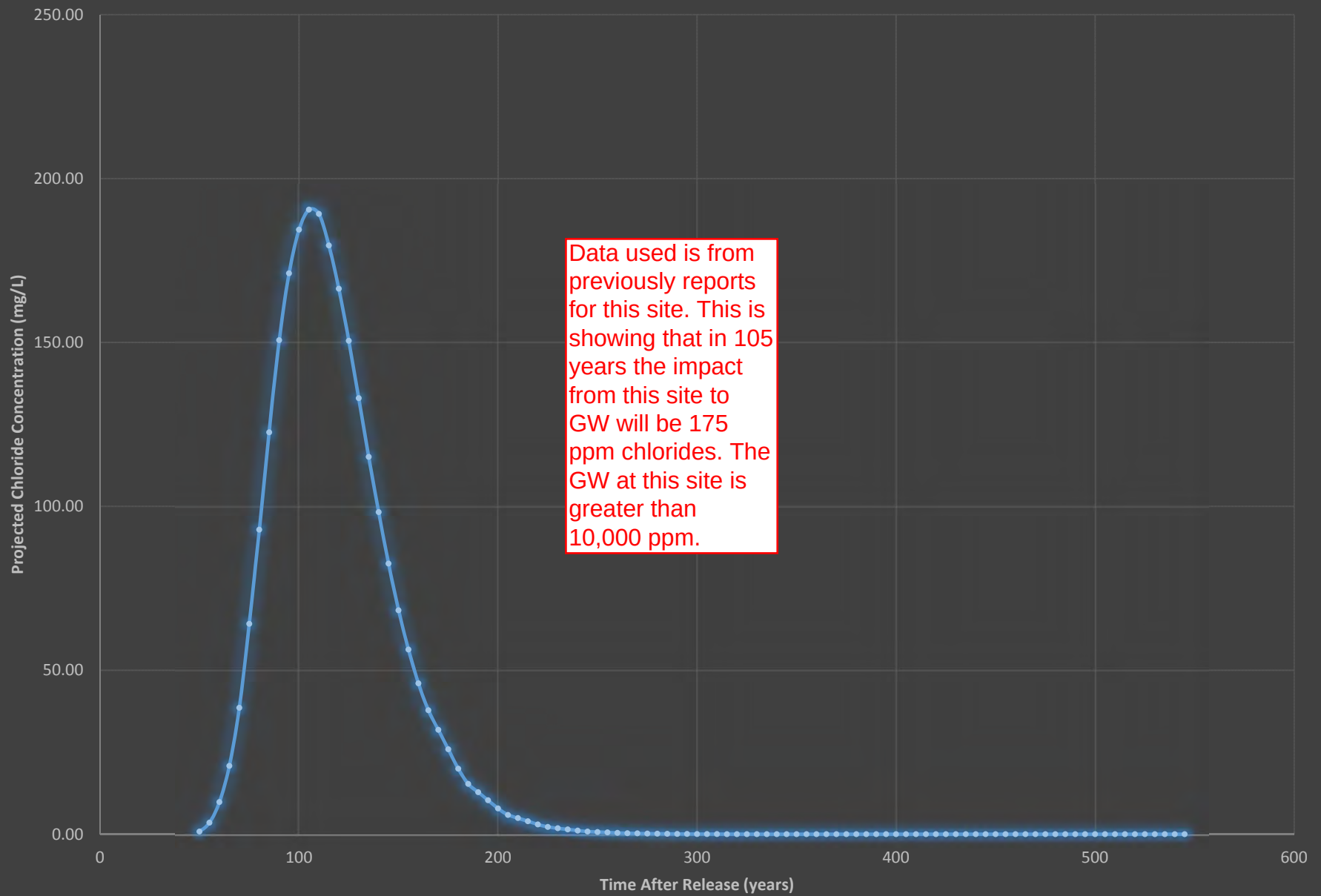
Relinquished by: <u>Rozanne Johnson</u>	Date: <u>11-17-2011</u>	Time: <u>14:25</u>	Received by: <u>JoDi Benson</u>	Date: <u>11/17/11</u>	Time: <u>14:25</u>
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)	Date:	Time:
Delivered By: (Circle One)	Sample Condition		CHECKED BY:		
Sampler - UPS - Bus - Other:	Cool		(Initials) <u>GA</u>		
	Intact				
	Yes ☒	No ☐	Yes ☒	No ☐	

ANALYSIS REQUEST									
(Circle or Specify Method No.)									
MTBE	8021B/602								
BTEX	8021B/602								
TPH	418.1/TX1005 / TX1005 Extended (C35)								
PAH	8270C								
Total Metals	Ag As Ba Cd Cr Pb Se Hg	6010B/200.7							
TCLP Metals	Ag As Ba Cd Cr Pb Se Hg								
TCLP Volatiles									
TCLP Semi Volatiles									
TCLP Pesticides									
RCI									
GC/MS Vol.	8260B/624								
GC/MS Semi. Vol.	8270C/625								
PCB's	8082/608								
Pesticides	8081A/608								
BOD, TSS, pH									
Moisture Content									
Cations (Ca, Mg, Na, K)									
Anions (Cl, SO4, CO3, HCO3)									
Sulfates									
Total Dissolved Solids									
Chlorides									
Turn Around Time	~ 24 Hours								

Phone Results	Yes	No
Fax Results	Yes	No Additional Fax Number:
REMARKS:		
Email Results to: hconder@riceswd.com kiones@riceswd.com twainheimer@rice-ecs.com rozanne@valornet.com		

#26

Projected Contribution of Chloride to Groundwater



1RP-2733

Approvals

DATE:

February 10, 2014

From: Lowe, Leonard, EMNRD
To: ["Hack Conder \(hconder@riceswd.com\)"](mailto:hconder@riceswd.com)
Subject: Terminated (1R-811-2733) - Apache Corporation Lou Wortham Central Battery AD
Date: Monday, February 10, 2014 10:34:00 AM

**Termination Request Approved
for the Apache Corporation Lou Wortham Central Battery AD (1R-811-2733)
Unit Letter C, D, E,F Section 11, T22S, R37E, NMPM, Lea County, New Mexico**

Dear Mr. Conder:

The New Mexico Oil Conservation Division (OCD) has received Apache Corporation report and request to terminate the above-referenced site, dated April 19, 2012. The termination request is acceptable to the OCD.

The above-referenced report, submitted in accordance with 19.15.29 NMAC (Rule 29; formally, Rule 116), indicates that Apache Corporation has met the requirements of 19.15.29 NMAC; therefore, the OCD approves the report and hereby notifies you that the remediation plan (1R-811-2733) is terminated in accordance with 19.15.29 NMAC.

Please be advised that OCD approval of this report does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

If you have any questions regarding this matter, please contact me at 505-476-3492.

Leonard Lowe

Environmental Engineer
[Environmental Bureau]

Oil Conservation Division/Energy Minerals and Natural Resources Department

1220 South St. Frances

Santa Fe, New Mexico 87004

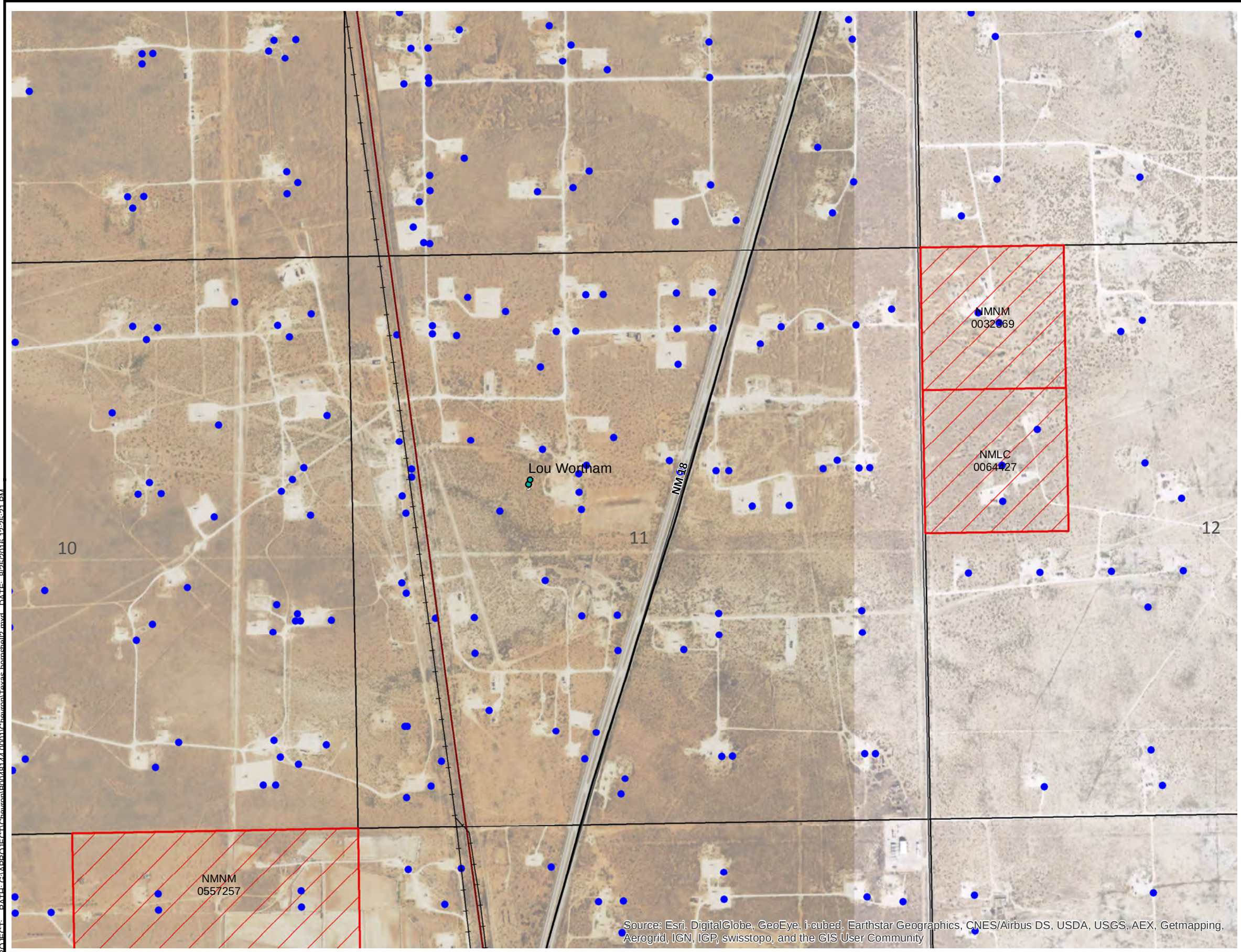
Office: 505-476-3492

E-mail: leonard.lowe@state.nm.us

Appendix C

Figures

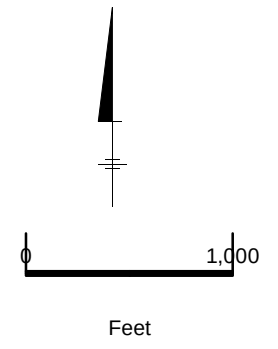
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LEGEND

- points
- area
- Railroads
- Major Roads
- Lea County Roads
- ROWS
- Completed Wells
- Leases
- Sections
- Townships
- World Imagery

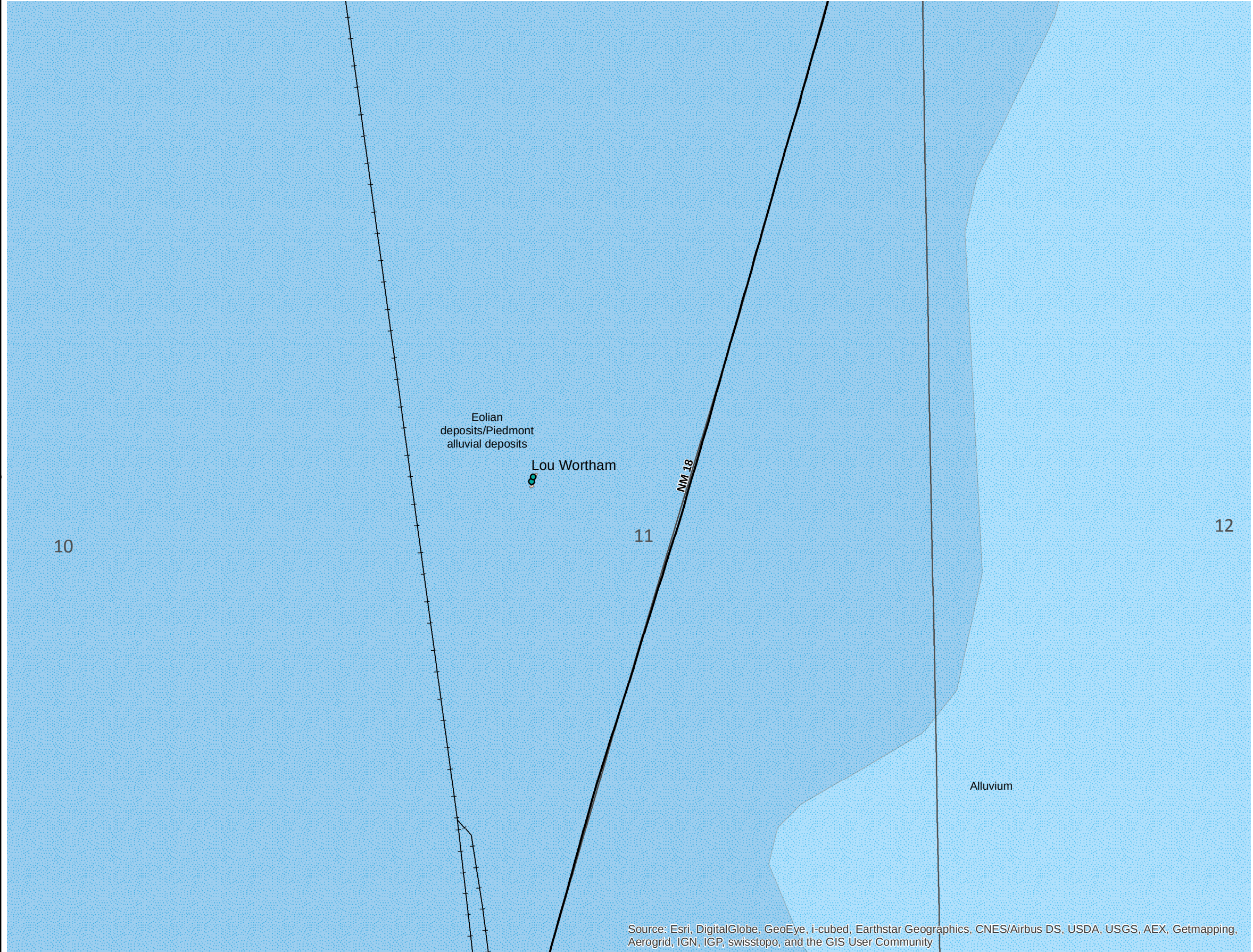


APACHE CORPORATION.
ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

EXISTING DEVELOPMENT



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LEGEND

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- Railroads
- Major Roads
- Lea County Roads

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Aquifer Name

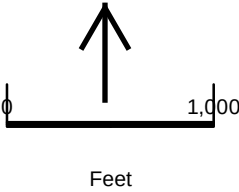
- Pecos River Basin Alluvial

Geology

NAME

- Qa
- Qe/Qp
- Sections
- Townships

World Imagery

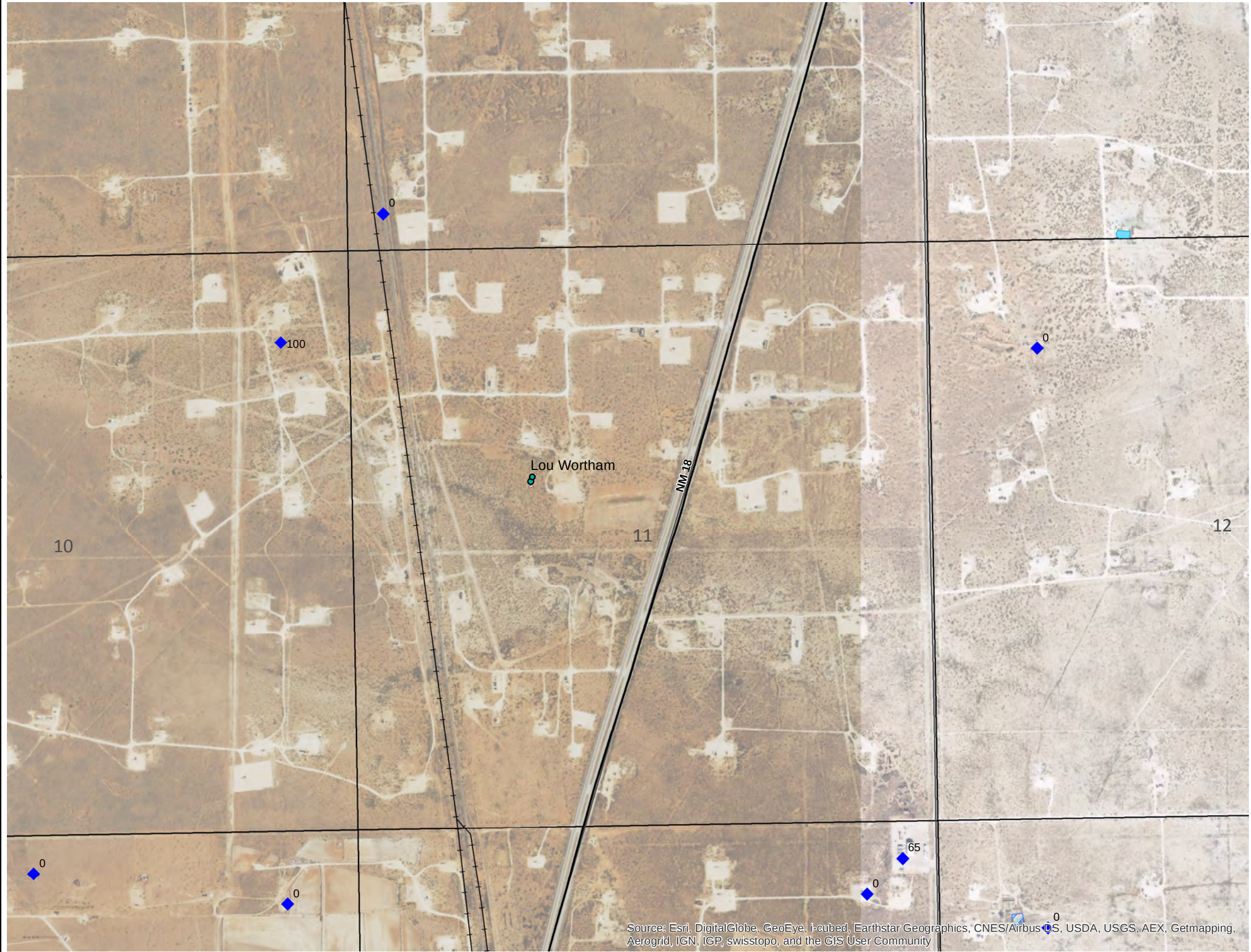


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ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

GEOLOGY



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LEGEND

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- Railroads
- Major Roads
- Lea County Roads
- Groundwater Wells (OSE)

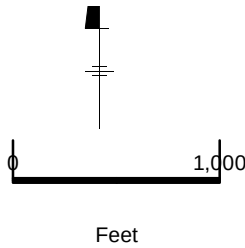
NHDWaterbo...

FType

- LakePond
- Reservoir

- Sections
- Townships

World Imagery



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EDDY COUNTY, NEW MEXICO

HYDROLOGY



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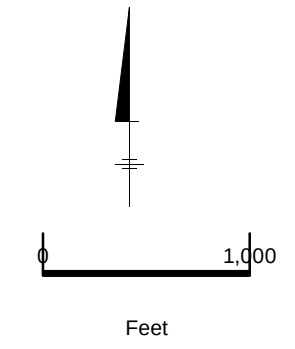
LEGEND

- points
- area
- Railroads
- Major Roads
- Lea County Roads

Karst Occure... Potential

Potential

- Low
- Sections
- Townships
- World Imagery

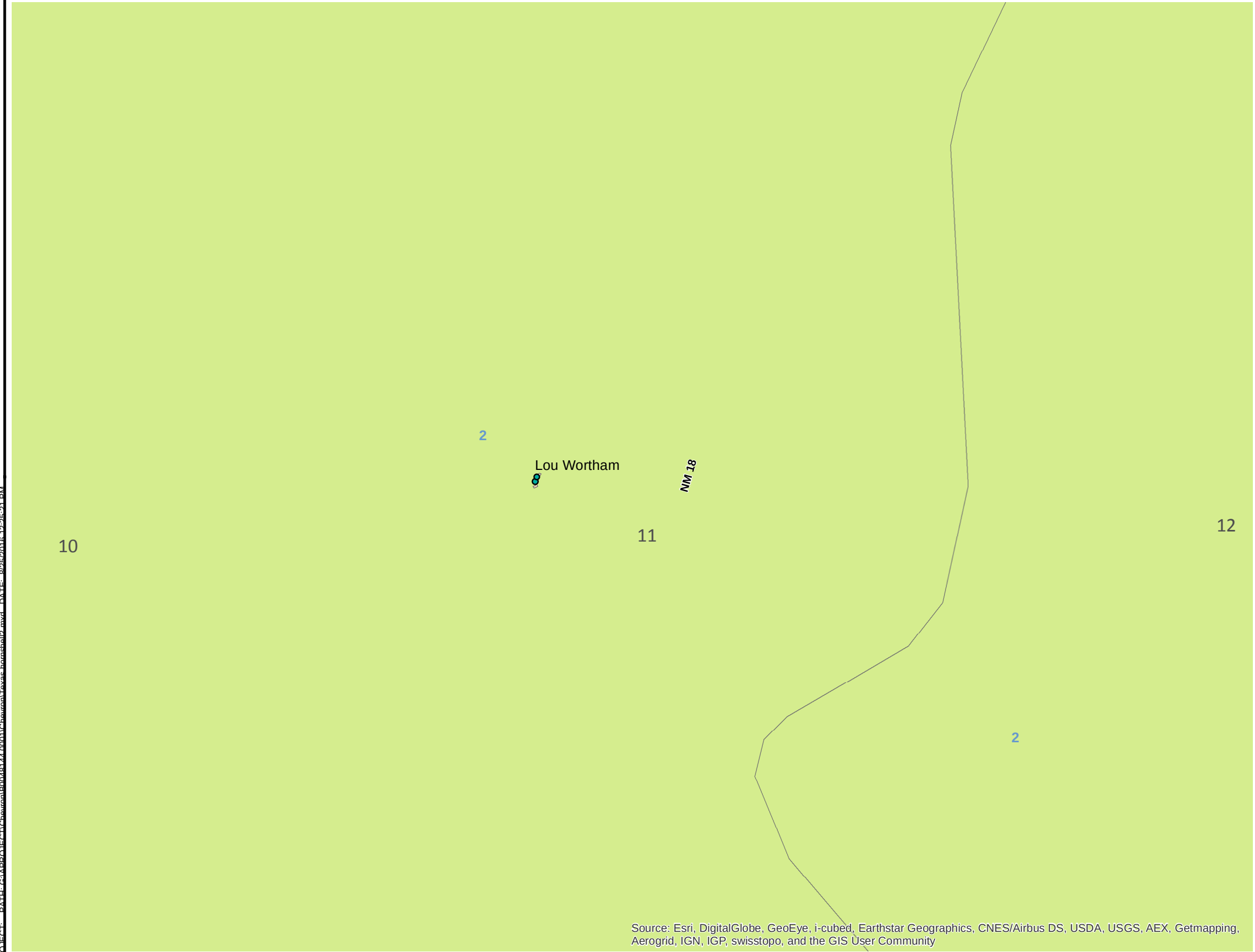


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ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

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- area

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- 2

- Railroads

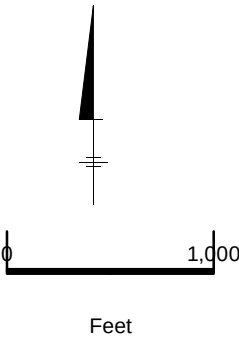
- Major Roads

- Lea County Roads

- Sections

- Townships

World Imagery



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EDDY COUNTY, NEW MEXICO

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LEGEND

-  Lou Wortham points
-  Lou Wortham
-  Lea County Soil Data
-  Sections
-  Townships
-  World Imagery



200

Feet

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ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

SOILS



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LEGEND

-  Lou Wortham points
-  Lou Wortham
-  Sections
-  Townships
-  World Imagery



200

Feet

APACHE CORPORATION.
ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

SPILL SITE



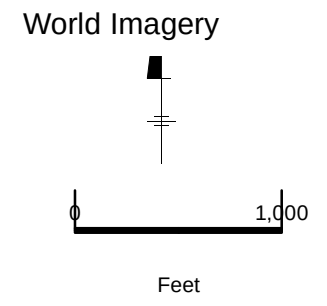
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LEGEND

- points
- area
- Railroads
- Major Roads
- Lea County Roads
- Sections
- Townships
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 - Private
 - State

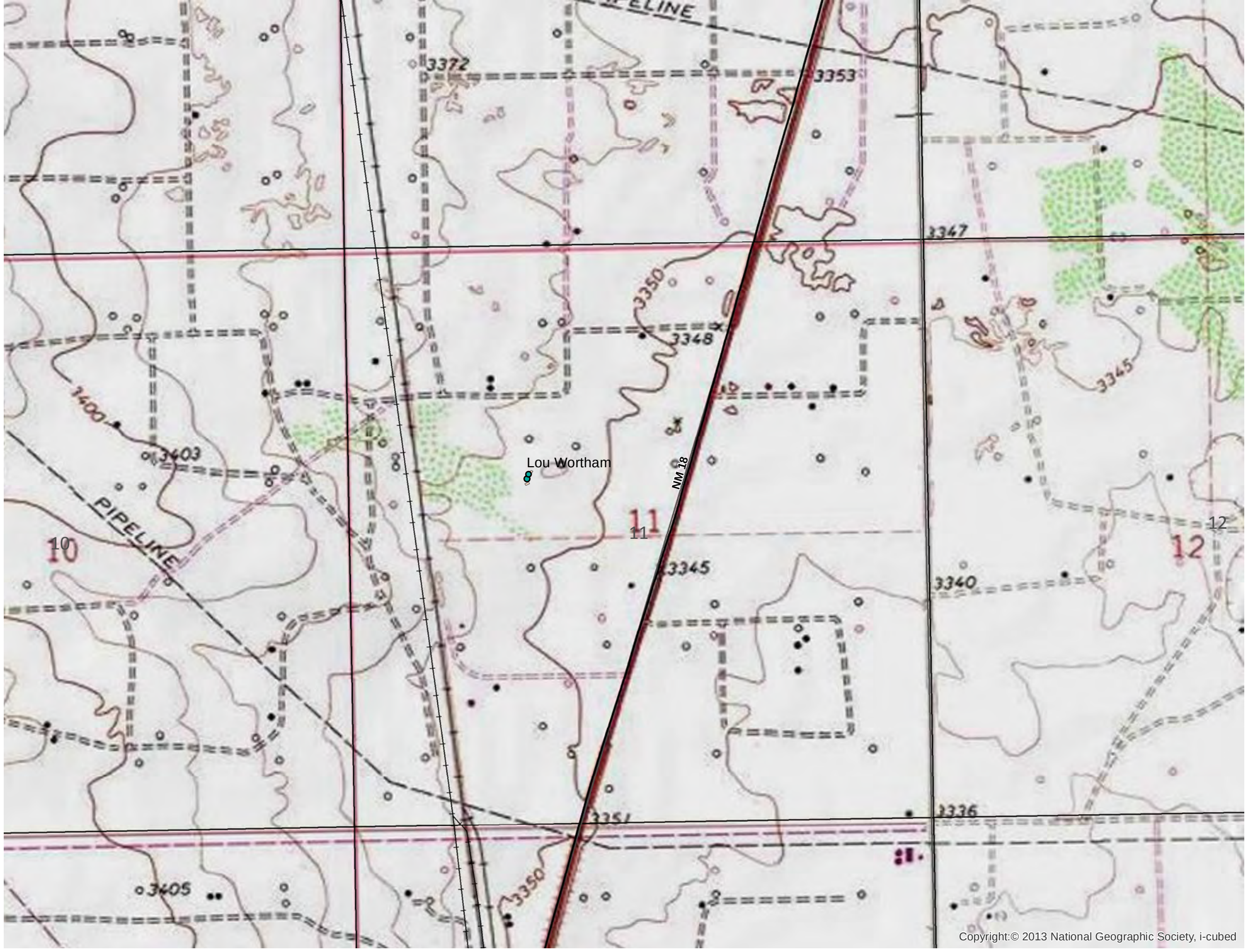


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EDDY COUNTY, NEW MEXICO

MINERAL AND SURFACE OWNERSHIP

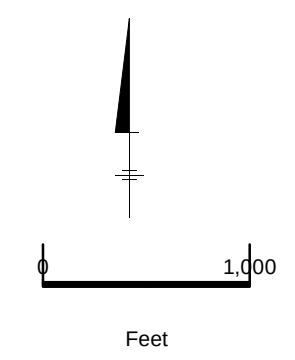


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LEGEND

- points
- area
- Railroads
- Major Roads
- Lea County Roads
- Sections
- Townships
- USA Topo Maps



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ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO

TOPOGRAPHY



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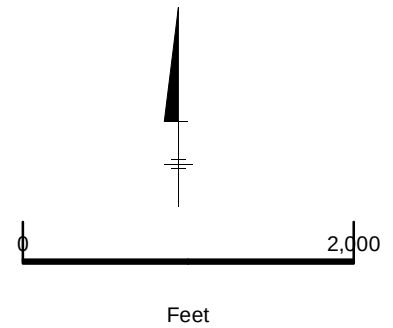
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LEGEND

- points
- area
- Railroads
- Major Roads
- Lea County Roads
- Sections
- Townships
- World Imagery



APACHE CORPORATION.
ENVIRONMENTAL ASSESSMENT
EDDY COUNTY, NEW MEXICO



FIGURE