INFORMATION ONLY

GROUNDWATER INVESTIGATION REPORT

LMPSU Trash Pit
Lea County, New Mexico
1RP-3360

LAI Project No. 14-0107-01

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1.0 EXECUTIVE SUMMARY

This report is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of Legacy Reserves, L.P. (Legacy) by Larson & Associates, Inc. (LAI) to present the groundwater investigation for the Langlie Mattix Penrose Sand Unit (LMPSU) Trash Pit (Site) in Unit O (SW/4, SE/4), Section 27, Township 22 South, Range 37 East, Lea County, New Mexico. The geodetic position is north 32° 21' 28.40'' and west 103° 8' 50.07''. The trash pit excavation was closed in August 2014 under approval from the OCD (Appendix A). Legacy is the owner of a 40 acre tract of land that includes the Site.

The following is concluded from the groundwater investigation:

- Four (4) monitoring wells, including an existing well (MW-1), were installed at the Site for delineating groundwater impacted from chloride and total dissolved solids (TDS);
- The source for the groundwater impact is two (2) unlined pits that were used by a previous owner/operator for disposal of produced water and hydrocarbons;
- The pits were observed on a historical aerial photograph from February 4, 1968, before Legacy operated the lease;
- Groundwater occurs in the Ogallala formation between about 40 and 42 feet below ground surface (bgs);
- The groundwater flow direction is from northwest to southeast at a gradient of about 0.0009 feet per foot (September 11, 2015) and is consistent with the regional flow direction;
- A water well used for livestock watering in located about 3,700 feet southwest (cross gradient) of the Site and outside the groundwater flow path;
- Laboratory results of groundwater samples from well MW-1 (January 28, 2015) reported chloride at 3,230 milligrams per liter (mg/L) and TDS at 6,260 mg/L;
- The chloride and TDS concentrations in well MW-1 exceed the New Mexico Water Quality Control Commission (WQCC) domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively;
- The average horizontal hydraulic conductivity calculated from slug tests is 3.2553 feet per day (ft/day).

Legacy proposes to monitor groundwater quality on a quarterly (four times per year) schedule for the remainder of 2015 and during 2016. Notice will be given to the OCD at least 48-hours prior to each sampling event. Laboratory results and depth to groundwater will be reported to the OCD in semi-annual (twice annual) reports to be submitted to the OCD within 45 days following receipt of the laboratory report. Any significant changes in groundwater quality will be reported to the OCD as soon as possible.

2.0 INTRODUCTON

This report is submitted to the New Mexico Oil Conservation Division (NMOCD) on behalf of Legacy Reserves, L.P. (Legacy) by Larson & Associates, Inc. (LAI) to present the groundwater investigation at a former trash pit (Site) located at the Langlie Mattix Penrose Sand Unit (LMPSU) in Lea County, New Mexico. The Site was used by a previous operator for unauthorized disposal of oilfield refuse including, but not limited to, used drums, concrete, equipment, pipe and miscellaneous refuse. The material was buried in several pits that were excavated near the east side of the Site. Two (2) unlined pits were excavated near the west side of the Site that previously used for disposal of produced water and hydrocarbons. The unlined pits were identified on a historic aerial photograph. On July 1, 2014, Legacy purchased an approximate 40 acre tract of land that includes the Site. The Site is located in Unit O (SW4/SE4), Section 27, Township 22 South, Range 37 East, in Lea County, New Mexico. The geodetic position is north 32° 21' 28.40" and west 103° 8' 50.07". Figure 1 presents a topographic map. Figure 2 presents an aerial map. Figure 3 presents a Site drawing.

2.1 Background

On May 16, 2011, NMOCD issued a letter to Legacy and past operators that referenced a landowner complaint that burial of miscellaneous refuse and debris occurred at the Site in the early 2000's. Appendix A presents the NMOCD correspondence.

Legacy, as current operator, began excavating the Site, including 3 trash pits near the east side of the Site and 2 unlined disposal pits near the west side of the Site. Legacy later retained Etech Environmental & Safety Solutions, Inc. (Etech) to install a monitoring well and collect soil samples. A metal detector was used to identify buried metallic waste. Five (5) locations, including the 2 disposal pits, were excavated to a maximum depth of about 20 feet below ground surface (bgs). Waste and debris was segregated from the soil and disposed at a permitted facility. About 7,500 to 9,000 cubic yards of soil was retained on the Site in 3 piles (west, north and south).

In 2013, a monitoring well (MW-1) was installed near the west side of the Site about 50 feet south of the west excavation. The monitoring well was drilled to about 64 feet bgs. Groundwater was gauged at about 42 feet bgs. No construction documentation is available monitoring well MW-1.

In March 2014, Legacy retained LAI to investigate and close the excavations. On April 9, 2014, LAI personnel collected soil samples from the excavations. The samples were analyzed to determine the in-situ concentrations of total petroleum hydrocarbons (TPH) and chloride. The laboratory reported TPH above the OCD recommended remediation action level (RRAL) of 100 parts per million (ppm) and chloride above 250 mg/Kg. LAI supervised drilling and sample collection from fifteen (15) borings to delineate vertical and lateral extent of TPH and chloride. Chloride and TPH were delineated vertically in samples from nine (9) borings. Figure 3a presents the soil boring locations. Figure 3b presents the soil sample locations.

On August 1, 2014, the OCD District 1 approved closing the excavations by placing a 20 mil thickness liner in the bottom of the excavations at least 4 feet bgs and backfilling with soil. The OCD approved using soil from the north and south piles to fill the excavations based on laboratory analysis of soil samples by synthetic precipitation leaching procedure (SPLP) according to EPA SW-846 method 1312. Soil from west soil pile failed the SPLP test and was disposed at Sundance Services (Parabo) landfill located east of Eunice, New Mexico. Approximately 1,630 cubic yards of soil from the west stockpile was disposed at the landfill. Excavation closure was completed on August 30, 2014. Figure 3 presents the location of the lined excavation. The excavation closure was documented in a report titled, ""*Excavation Closure Report and Groundwater Investigation Plan", September 22, 2014".*

On April 11, 2014, LAI personnel collected a groundwater sample from well MW-1 located near the southwest corner of the Site. The sample was analyzed for BTEX, cations (calcium, magnesium, sodium and potassium), anions (alkalinity, sulfate and chloride), nitrate and total dissolved solids (TDS). The BTEX concentrations were below the reporting limits (RL) and New Mexico Water Quality Control Commission (WQCC) human health standards. Chloride and TDS were 1,480 milligrams per liter (mg/L) and 3,510 mg/L, respectively. On June 12, 2014, LAI supervised installing monitoring well MW-2 about 275 feet north (up gradient) of the Site. On June 13, 2014, groundwater samples were collected from wells MW-1 and MW-2. Chloride and TDS in well MW-2 was 58.8 mg/L and 1,000 mg/L, respectively. Chloride and TDS in well MW-1 was 2,720 mg/L and 6,700 mg/L, respectively. The suspected source for the groundwater impact is 2 unlined disposal pits that were located near the west side of the Site. On July 1, 2014, Legacy purchased an approximate 40 acre tract of land that includes the Site. The OCD issued the remediation project number 1RP-3360. Appendix A presents the OCD approval for closing the excavation.

2.2 Setting

2.2.1 Topography and Surface Water

The Site is located about 5.5 miles southeast of Eunice, in rural Lea County, New Mexico. The surface elevation is approximately 3,315 feet above mean sea level (MSL) and slopes gently to the southeast. The nearest surface water is the ephemeral Monument Draw, which is located about 1.5 miles east of the Site. There are no apparent surface connection for runoff between the Site and Monument Draw.

2.2.2 Water Wells

A well was identified on the New Mexico State Engineer (NMOSE) database in Unit O, Section 27, Township 22 south and Range 37 east. The well is located about 3,700 feet southwest of the Site and is used for livestock watering. Depth to groundwater is reported at approximately 46 feet bgs. Figure 1 and Figure 2 present the approximate water well location.

2.2.3 Soils

Surface soils are gently undulating and well drained. The Natural Resource Conservation Service Soil Survey for Lea County identifies the surface soil as Pyote-Maljamar-Kermit association. The soil is used for range and wildlife habitat.

2.2.4 Geology

Fifteen (15) borings (SB-1 through SB-15) and three (3) monitoring wells (MW-2, MW-3 and MW-4) were drilled at the Site. The stratigraphy consists of recent-age eolian to Pleistocene-age alluvium derived mostly from reworking the underlying Tertiary-aged Blackwater Draw and Ogallala formations, in descending order. The Blackwater Draw formation is comprised mainly of fine grained wind-blown sand derived from the underlying Ogallala formation. The Ogallala formation consists of fluvial sand, silt, clay and localized gravel, with indistinct to massive cross beds. The Ogallala sand is generally fine- to medium-grained quartz. The lithology consists of unconsolidated eolian sand over a unit of carbonate-indurated sand commonly referred to as "caliche". The caliche ranges in thickness between about 5 and 25 feet, depending on location. Beneath the caliche is a unit of fine-grained pink quartz sand. Locally the sand is lithified into sandstone with clayey sand. The Ogallala formation is underlain by the Triassic-age Chinle formation of the Dockum group which is comprised of interbedded sand, clay and mudstone. The Dockum Group is locally referred to as "redbed". Figure 3 and Figure 3a present the soil boring and monitoring well locations and lines of geological cross section. Figures 4a and 4b present west to east (A to A') and north to south (B to B') geologic cross-sections Appendix B presents the boring logs and monitoring well completion diagrams.

2.2.5 Groundwater

Groundwater occurs in the Ogallala formation at approximately 42 feet bgs. The Dockum Group is the lower confining unit and occurs at about 60 feet bgs. The saturated thickness of the Ogallala formation (aquifer) is approximately 20 feet. Depth to groundwater measurements were used to prepare groundwater potentiometric maps for June 1, 2015, August 18, 2015 and September 11, 2015 presented in Figures 4a, 4b and 4c, respectively.

Referring to Figure 4a, on June 1, 2015, the groundwater elevation ranged from 3,280.40 feet above mean sea level (ASML) in MW-1 to 3,275.30 feet AMSL in MW-2. The groundwater flow direction was from south to north at a gradient of approximately 0.01 feet per foot. The groundwater flow direction on June 1, 2015, is not consistent with the regional groundwater flow direction which is generally from northwest to southeast. On August 18, 2015 (Figure 4b), the groundwater elevation ranged from 3,280.43 feet AMSL in MW-2 to 3,277.49 feet AMSL in MW-1. The groundwater flow direction was from north to south and consistent with the regional groundwater flow direction. On September 11, 2015 (Figure 4c) the groundwater elevation ranged from 3,280.68 feet AMSL at MW-2 to 3,280.16 feet AMSL at MW-4. Groundwater flow was to the southeast at a gradient of about 0.0009 feet per foot.

2.2.6 Historical Aerial Photographs

Historical aerial photographs were ordered from GeoSearch located in Austin, Texas. The historical aerial photographs cover several decades and go back to April 28, 1954. A review of the photographs is presented in chronological order from most recent to oldest. Appendix C presents the aerial photographs.

2.2.6.1 2011 US Geological Survey Color Photograph

This 2011 color photograph has a scale of 1" to 700'. The photograph depicts the Site condition following closure of the trash pits by the previous operator. The photograph shows evidence of surface scarring from prior operations at the Site.

2.2.6.2 1997 US Geological Survey Black and White Photograph

This black and white photograph was taken in 1997, and has a scale of 1" to 700'. This photograph shows evidence of scarring from previous operations at the Site. Adjoining properties to the north, south, west and east are in similar configuration observed during the current investigation and remediation.

2.2.6.3 1983 US Geological Survey Color Photograph

This color photograph was taken on June 3, 1983, and has a scale of 1" to 700'. The photograph shows evidence of scarring from previous operations or releases and shows the Site similar to the condition observed in the previous photograph (1997). The adjoining properties to the north, south, east, and west are in similar configuration observed during the current investigation and remediation. The disposal pits observed in an earlier photograph are not visible in this photograph and appear covered.

2.2.6.4 1968 USGS Black and White Photograph

This black and white photograph was taken on February 4, 1968, and has a scale of 1" to 700'. The photograph shows two (2) darkened objects at the Site. The darkened objects are the disposal pits located near the west side of the Site. The disposal pits would have received produced water and hydrocarbons from the lease tank battery located about 500 feet southwest of the Site.

2.2.6.5 1954 USGS Black and White Photograph

This black and white photograph was taken on April 28, 1954, and has a scale of 1" to 700'. This photograph shows a rectangular object that resembles a pit in close proximity to the Site.

3.0 ELECTROMAGNETIC TERRAIN CONDUCTIVITY SURVEY

During September and October 2014 and February 2015, LAI personnel conducted electromagnetic ("EM") terrain conductivity surveys to qualitatively assess the chloride and TDS impact to groundwater. The EM method measures the electrical conductivity of soil, rock and groundwater by imparting an alternating electric current into the subsurface from a surface transmitter. An EM-34 terrain conductivity meter, manufactured by Geonics, Ltd., in Toronto, Ontario, Canada, was used for the survey. The EM-34 has exploration capabilities ranging from approximately 0 to 196.9 feet bgs,

depending the separation of the transmitter and receiver coils (i.e., 10, 20 or 40 meters) and orientation of the transmitter and receiver coils (i.e., horizontal dipole ("HD") mode or vertical dipole ("VD") mode). The EM 34 survey was performed in the 10 and 20 meter HD and VD modes. The EM-34-10 meter HD and VD have exploration depth from approximately 0 to 24.6 and 0 to 49.2 feet bgs, respectively. The EM-34-20 HD and VD have exploration depths from approximately 0 to 49.2 and 0 to 98.4 feet bgs, respectively. The conductivity response is greater near ground surface in the HD mode. The conductivity response is null near the surface and increases rapidly to a depth equal to about 0.4 times the coil spacing in the VD mode. The EM measurements were collected using sample grids measuring about 100 x 100 feet.

The EM-34 data were compared to background values to identify areas of elevated conductivity. The background station is located near well MW-2, which is free of groundwater impacts, cultural or metallic interferences (i.e., pipelines, overhead power lines, etc.). EM-34 survey results are compiled on contour drawings showing areas of elevated conductivity relative to background.

The EM survey was performed over an area measuring approximately 800 x 1,200 square feet or about 22 acres. Figure 6 presents the EM-34 survey grid layout. Figures 6a through 6d presents the EM-34-10 and 20 meter HD and VD conductivity maps. Appendix D presents the EM-34 survey field sheets.

Referring to Figure 6a, the EM-34- 10 meter HD background value was 39.5 millimhos per meter (mmhos/m). The maximum EM-34-10 meter HD conductivity readings (82.3 to 88.4 mmhos/m) occur in the vicinity of well MW-1 and extend south about 200 feet. The area of elevated EM-34-10 meter HD readings is greater than 2.5 times background and represents a near surface impact.

Referring to Figure 6b, the EM-34-10 meter VD background value was 44.1 mmhos/m. The maximum EM-34-10 meter VD reading (102.7 mmhos/m) occurs in the vicinity of well MW-1 and is 3 times background. The anomaly reflects the elevated chloride in groundwater. Three (3) anomalies with EM-34-10 meter VD reading exceeding 3 times background were observed west of the Site and appear to be caused by interference.

Referring to Figure 6c, the EM-34-20 meter HD background value was 56.2 mmhos/m. An area of elevated EM-34-20 meter HD readings was observed about 200 feet southwest of the Site. The elevated EM-34-20 meter HD readings are greater than 2.5 times background. The area appears to correspond with a historic spill. The anomaly represents a near surface impact that is not connected with the Site.

Referring to Figure 6d, the EM-34-20 meter VD background value was 82.5 mmhos/m. An area of EM-34-20 meter VD readings greater than 2.5 times background was observed in the vicinity of well MW-1. The anomaly shows slight migration southward and extends west toward a tank battery located about 400 feet west. The results of the EM-34 survey suggest groundwater and contaminant migration east of the Site.

4.0 MONITORING WELLS

On June 12, 2014 and April 15, 2015, LAI supervised installing monitoring wells MW-2, MW-3 and MW-4. Permit applications were submitted to the NMSE and wells were installed by Scarborough Drilling Company, Inc. (SDC), Lamesa, Texas. The borings were drilled with an air rotary rig and were advanced near the base of the Ogallala formation about 60 feet bgs. Drill cuttings were collected every 5 feet to about 60 feet for chloride analysis by laboratory methods and lithology according to the Unified Soil Classification System (USCS). The wells were completed with 2-inch schedule 40 PVC casing and screen. Approximately 20 feet of screw-threaded 0.010 inch factory slotted screen was placed in each well, with about 15 feet of screen in groundwater and about 5 feet of screen above groundwater, depending on subsurface conditions. The screens are surrounded with graded (12 – 16) silica that extends about 2 feet above the screen. The remainder of the annulus above the screen was filled with bentonite chips and hydrated with potable water. Each well was secured with a locking steel above-grade cover anchored in concrete. West Company, Midland, Texas, a New Mexico licensed professional land surveyor (NMPLS), surveyed the wells for location and elevation including top of casing and ground referenced to a USGS datum. The monitoring wells were developed by pumping with an electric submersible environmental pump equipped with backflow preventer and dedicated tubing. The water was contained in 55 gallon drum and retained at the Site until disposal is arranged. Table 1 presents the monitoring well drilling and completion summary. Table 2 presents the soil chloride analytical data summary. Appendix B presents the boring logs and well completion diagrams. Appendix E presents the MW-2 NMOSE well permit. Appendix F presents the laboratory reports.

Referring to Table 2, chloride in soil samples from borings MW-2 and MW-3 decreases below 250 milligrams per kilogram (mg/Kg) at about 25 and 15 feet bgs, respectively. The highest chloride concentration in soil samples from MW-4 was 52.4 mg/Kg at 20 feet bgs.

5.0 GROUNDWATER SAMPLES

Groundwater samples were collected from monitoring wells MW-1 and MW-2 on January 28, 2015 and from wells MW-1 through MW-4 on June 1, 2015 and August 18, 2015. The groundwater samples were collected after removing approximately three (3) well volumes of groundwater by purging dry with dedicated disposable polyethylene bailers or pumping with an electric submersible pump and dedicated tubing. The samples were carefully transferred to laboratory containers that were labeled, sealed with custody labels, packed in an ice filled chest and delivered under chain of custody control to DHL Analytical, Inc. (DHL), a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory, located in Round Rock, Texas. DHL analyzed the samples for benzene, toluene, ethylbenzene, xylene (BTEX), cations (calcium, magnesium, sodium and potassium), anions (alkalinity, sulfate and chloride), nitrate and total dissolved solids (TDS). Purge water was contained in 55 gallon drums for disposal in a permitted Class II injection well. Table 3 presents the groundwater analytical data summary. Appendix F presents the laboratory reports.

5.1 BTEX Analytical Results

Samples were analyzed for BTEX using EPA SW-846 method S8021B. All BTEX values except xylene were below the RL. Xylene was 0.0015 milligrams per liter (mg/L) in the sample from MW-4 on August 18, 2015. The xylenes concentration is below the New Mexico Water Quality Control Commission (WQCC) human health standards of 0.62 mg/L.

5.2 General Chemistry Analytical Results

Cations (calcium, magnesium, sodium and potassium) were analyzed using EPA SW-846 method S-6010C. The cations were within acceptable tolerances and are not regulated by the WQCC.

Anions (alkalinity, chloride and sulfate), nitrate and TDS were analyzed by Standard Methods 2320B, E300 and 2540C. Nitrate was below the WQCC human health standard (10 mg/L) in wells MW-1 through MW-4. Sulfate exceeded the WQCC domestic water quality standard (600 mg/L) in MW-1 on January 28, 2015 (947 mg/L). Chloride (3,230 mg/L) and TDS (6,260 mg/L) were highest in well MW-1 on January 28, 2015, and exceeded the WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively. Chloride and TDS also exceeded the WQCC domestic water quality standards in well MW-3 located west of the Site. Figures 7a and 7b present isopleths maps for chloride in groundwater on June 1, 2015 and August 18, 2015, respectively. Figures 8a and 8b present isopleths maps for TDS in groundwater on June 1, 2015 and August 18, 2015, respectively.

6.0 AQUIFER (SLUG) TESTS

On September 11, 2015, LAI personnel performed horizontal hydraulic conductivity (slug) tests, including falling and rising head, in wells MW-2, MW-3, and MW-4. The slug test data was used to calculate the average horizontal hydraulic conductivity for the aquifer. Well MW-1 was not slug tested since no well completion data was available. The falling and rising head slug tests were performed by lowering (falling head) and raising (rising head) a weighted PVC tube (slug). An In-Situ Troll®700 pressure transducer was installed near the bottom of the well to measure changes in head, which was recorded with an electronic data logger. The Bouwer-Rice (1976) solution was used to evaluate the response data.

Table 4 presents the horizontal hydraulic (slug) test conductivity summary. Appendix G presents the horizontal hydraulic conductivity (slug test) data.

Referring to Table 4, the falling head conductivity extremes were 2.214 ft/day (MW-2, Test 2) and 5.115 ft/day (MW-3, Test 2). The rising head conductivity extremes were 1.42 ft/day (MW-2, Test 2) and 4.3 ft/day (MW-2, Test 1). Three (3) tests had insufficient data to produce confident results. The overall mean hydraulic conductivity for the aquifer was calculated at 3.2553 feet per day (ft/day).

7.0 CONCLUSIONS

The following conclusions are documented in this report:

- On July 1, 2014, Legacy purchased the tract of land (approximately 40 acres) that includes the Site;
- A historical aerial photograph (February 4, 1968) revealed two (2) unlined disposal pits near the west side of the Site. The pits received produced water and hydrocarbons from a tank battery located about 500 feet southwest of the Site and are suspected of being the source for elevated chloride and TDS in groundwater;
- EM-34-10 and 20 meter conductivity surveys identified an anomaly near the southwest corner of the Site, in the vicinity of well MW-1, that appears to migrate to the east;
- Laboratory results of groundwater samples from four (4) monitoring wells (MW-1 through MW-4) reported chloride and TDS above the WQCC domestic water quality standards in wells MW-1 (down gradient) and MW-3 (cross gradient);
- The apparent groundwater flow direction (September 11, 2015) is to the southeast at a gradient of about 0.0009 ft/ft;
- The overall horizontal hydraulic conductivity for the aquifer based on slug tests from 3 wells (September 11, 2015) is 3.2553 ft/day;

A well used for livestock watering is located about 3,700 feet southwest of the Site and is not located within the groundwater flow path.

8.0 RECOMMENDATIONS

Legacy proposes to monitor groundwater quality on a quarterly (four times per year) schedule for the remainder of 2015 and during 2016. The groundwater samples will be analyzed for BETX, chloride and TDS. Depth to groundwater will be gauged in the wells during each event for preparing a groundwater potentiometric surface map. The samples results and potentiometric map will be submitted to the OCD semi-annual (twice yearly) reports. Notice will be given to the OCD at least 48-hours prior to each sampling event. Any significant changes in groundwater quality will be reported to the OCD as soon as possible.

TABLES

Table 1
Monitoring Well Drilling and Completion Summary
Legacy Reserves, L.P., LMPSU Trash Pit
Unit) (SW/4, SE/4), Section 27, Township 22 South, Range 37 East
Lea County, New Mexico

Well Information									Groundwater Data			
Well	Date Installed	Drilled Depth (bgs)	Well Depth from TOC	Well Diameter (inches)	Surface Elevation	Screen Interval (bgs)	Casing Stickup	TOC Elevation	Date Gauged	Depth to Water (TOC)	Depth to Water (BGS)	Groundwater Elevation (Feet)
MW-1	--	--	63.69	2	3,321.1	--	2.86	3324.09	04/02/2014	44.35	41.49	3,279.74
									06/13/2014	43.38	40.52	3,280.71
									1/28/2015	43.79	40.93	3,280.30
									6/1/2015	43.69	40.83	3,280.40
									8/18/2015	46.6	43.74	3,277.49
									9/11/2015	43.6	40.74	3,280.49
MW-2	6/12/2014	58.00	60.50	2	3322.9	38.17 - 57.77	2.16	3,325.18	06/12/2014	45.30	43.14	3,279.88
									06/13/2014	45.27	43.11	3,279.91
									1/28/2015	43.79	41.63	3,281.39
									6/1/2015	49.88	47.72	3,275.30
									8/18/2015	44.75	42.59	3,280.43
									9/11/2015	44.50	42.34	3,280.68
MW-3	4/15/2015	55.00	57.83	2	3322.9	34.69 - 54.75	2.83	3,325.87	4/15/2015	46.00	43.17	3,279.87
									6/1/2015	45.53	42.70	3,280.34
									8/18/2015	45.42	42.59	3,280.45
									9/11/2015	45.40	42.57	3,280.47
MW-4	4/15/2015	58.00	60.00	2	3320.1	38.31 - 57.77	2.00	3,322.16	4/15/2015	42.08	40.08	3,280.08
									6/1/2015	42.35	40.35	3,279.81
									8/18/2015	42.20	40.20	3,279.96
									9/11/2015	42.00	40.00	3,280.16

Note: Drilling and completion details for MW-1 are unknown. Wells MW-2, MW-3, and MW-4 drilled and installed by Scarborough Drilling, Inc., Lamesa, Texas.

Table 2
Borehole Soil Analytical Data Summary
Legacy Reserves, L.P., LMPSU Trash Pit
Lea County, New Mexico
1RP-3360

Boring	Date	Depth (Feet BGS)	Chloride (mg/Kg)
MW-2	6/12/2014	5	131
		10	692
		15	381
		20	315
		25	562
		30	81.2
		35	--
		40	--
		45	--
		50	--
		55	--
		60	--
MW-3	04/15/2015	0	<1.11
		10	550
		20	166
		30	195
		40	66.5
		*50	11.6
		*60	46.6
MW-4	04/15/2015	0	<1.09
		10	<1.19
		20	52.4
		30	28.1
		40	5.53
		*50	17.5
		*60	126

Notes: Samples analyzed by Permian Basin Environmental Lab, LP, Midland, Texas, using EPA method 300

Depth measurements are in feet below ground surface (bgs).

All concentrations are in milligrams per kilogram (mg/Kg) equivalent to parts per million (ppm).

--: No data available

* Denotes sample collected below groundwater surface

Table 3
Groundwater Analytical Data Summary
Leagacy Reserves, L.P., LMPSU Trash Pit
Lea County, New Mexico
1RP-3360

		BTEX				Cations				Anions				
Sample	**Date**	**Benzene (mg/L)**	**Toluene (mg/L)**	**Ethylbenzene (mg/L)**	**Xylenes (mg/L)**	**Sodium (mg/L)**	**Magnesium (mg/L)**	**Potassium (mg/L)**	**Calcium (mg/L)**	**Sulfate (mg/L)**	**Chloride (mg/L)**	**Alkalinity (mg/L)**	**Nitrate (mg/L)**	**TDS (mg/L)**
WQCC Standard:		**0.01**	**0.75**	**0.75**	**0.62**					**600**	**250**		**10**	**1,000**
MW-1	04/10/2014	<0.0008	<0.002	<0.002	<0.003	**840**	**195**	**20.9**	**168**	**509**	**1,480**	**673**	<0.1	**3,510**
	06/13/2014	--	--	--	--	**1,420**	**384**	**29.5**	**447**	**896**	**2,720**	**394**	<0.1	**6,700**
	12/11/2014	--	--	--	--	**913**	**242**	**22.3**	**186**	**543**	**1,600**	**888**	<0.100	**5,330**
	1/28/2015	--	--	--	--	**1,430**	**437**	**32.5**	**610**	**947**	**3,230**	**417**	<0.100	**6,260**
	6/1/2015	<0.001	<0.001	<0.001	<0.001	**950**	**270**	**27.6**	**201**	**446**	**1,560**	**653**	<0.2	**3,920**
	8/18/2015	<0.0008	<0.002	<0.002	<0.003	**820**	**224**	**21.5**	**152**	**433**	**1,600**	**723**	<0.10	**3,830**
MW-2	06/13/2014	--	--	--	--	**114**	**30.6**	**7.86**	**48.2**	**121**	**58.8**	**227**	**1.54**	**564**
	12/11/2014	--	--	--	--	**116**	**34.9**	**8.29**	**64.5**	**119**	**71.8**	**361**	**1.42**	**619**
	1/28/2015	--	--	--	--	**126**	**36.6**	**7.30**	**91.1**	**112**	**71.3**	**288**	**1.36**	**573**
	6/1/2015	<0.001	<0.001	<0.001	<0.001	**117**	**34.6**	<10	**54.9**	**112**	**57.8**	**281**	**1.63**	**578**
	8/18/2015	<0.0008	<0.002	<0.002	<0.003	**104**	**32.6**	6.01	**118.0**	**114**	**73.9**	**274**	**1.35**	**583**
MW-3	6/1/2015	<0.001	<0.001	<0.001	<0.001	**324**	**60.5**	**10.70**	**57.6**	**234**	**399.0**	**290**	**2.19**	**1,180**
	8/18/2015	<0.0008	<0.002	<0.002	<0.003	**284**	**51.5**	**8.22**	**147.0**	**239**	**405.0**	**230**	**1.50**	**1,380**
MW-4	6/1/2015	<0.001	<0.001	<0.001	**0.0015**	**186**	**58.6**	**10.10**	**83.0**	**251**	**190.0**	**236**	**2.34**	**918**
	8/18/2015	<0.0008	<0.002	<0.002	<0.003	**160**	**52.8**	**8.28**	**70.6**	**251**	**213.0**	**256**	**1.54**	**974**

Notes: Analysis performed by DHL Analytical, Inc., Round, Rock, Texas
Samples analyzed by EPA method SW-8021B (BTEX), SW-8015M (TPH) and E-300 (chloride)
mg/L: milligrams per liter - equivalent to parts per million (ppm)
Bold denotes analyte detected
Bold and highlighted denotes concentration exceed New Mexico Water Quality Control Commission (WQCC) domestic water quality standard

Table 4
Horizontal Hydraulic Conductivity Summary
LMPSU Trash Pit
Lea County, New Mexico
1RP-3360

Well	Falling Head K (Ft/Day)	Rising Head K (Ft/Day)
MW-2 Test 1	2.354	4.30
MW-2 Test 2	2.214	1.42
Average:	2.284	2.86
MW-3 Test 1	*	4.093
MW-3 Test 2	5.115	*
Average	*	*
MW-4 Test 1	*	2.706
MW-4 Test 2	3.689	3.319
Average	*	3.0125
Range	2.214 - 5.115	1.42 - 4.30
Overall Average: 3.2553 ft/day		

Notes: data analyzed by Bouwer and Rice method (1976)
All results are reported in feet per day (ft/day).
*-Insufficient data to produce confident results

FIGURES

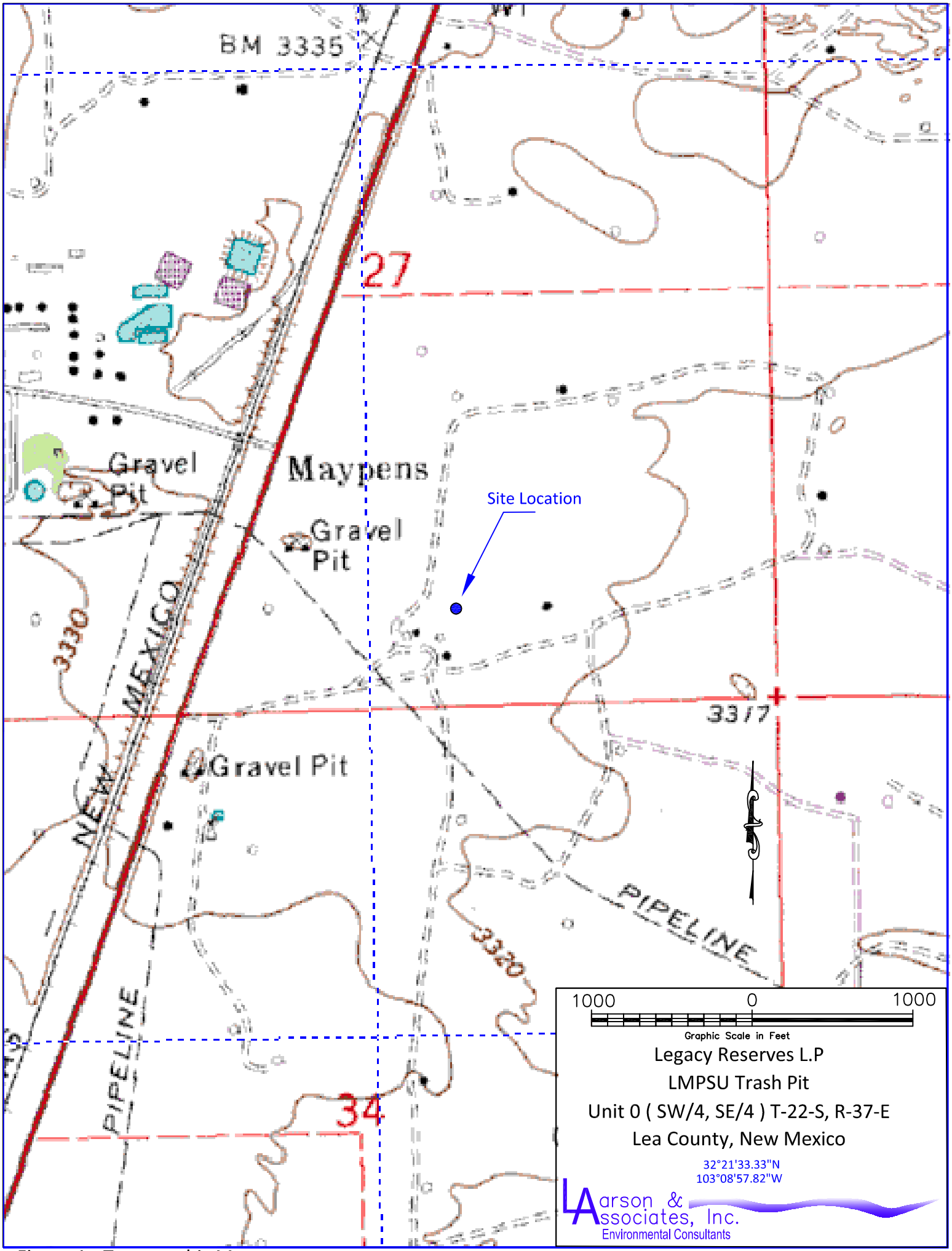


Figure 1 - Topographic Map

Figure 2 - Aerial Map

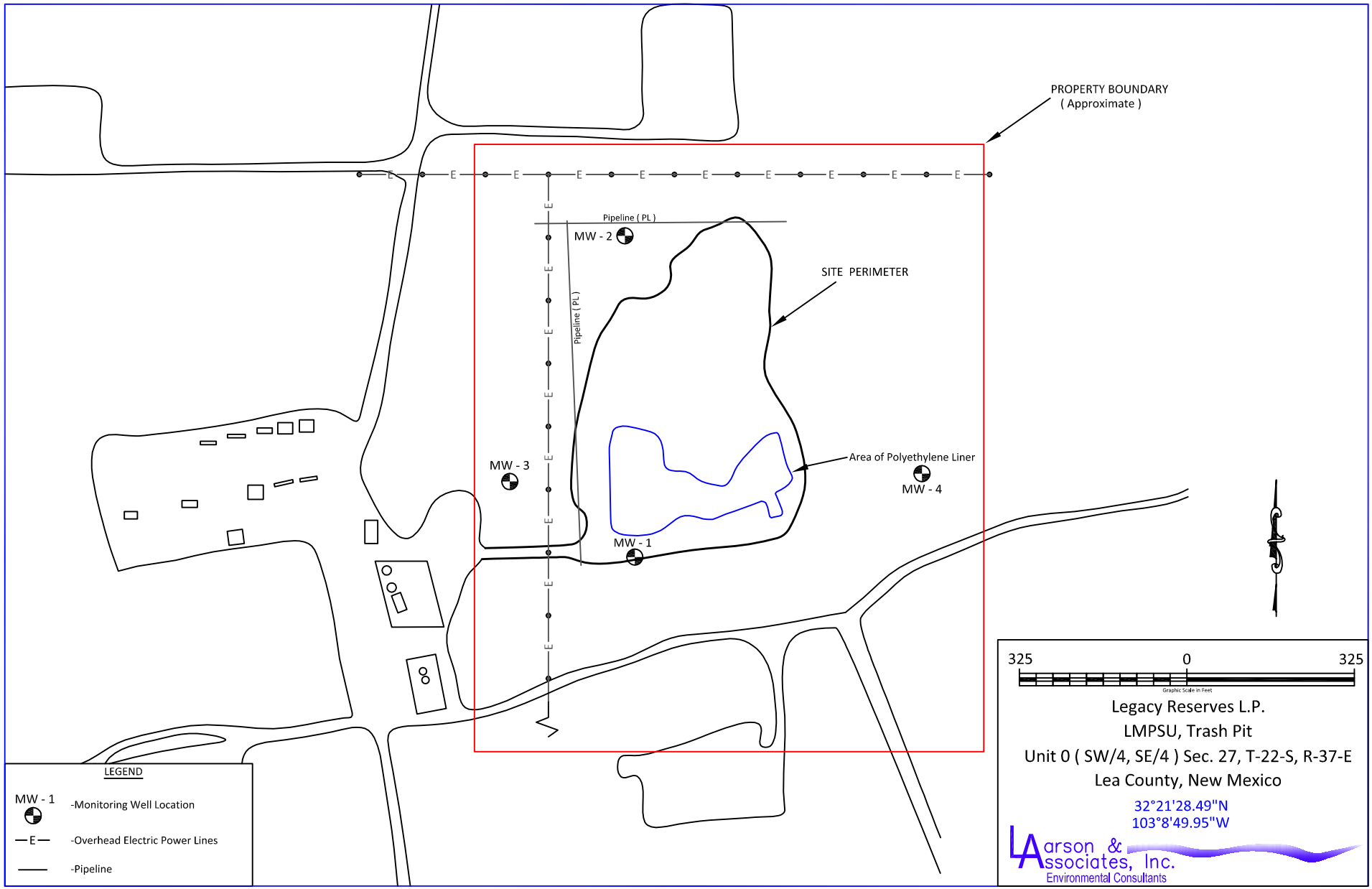


Figure 3 - Site Map

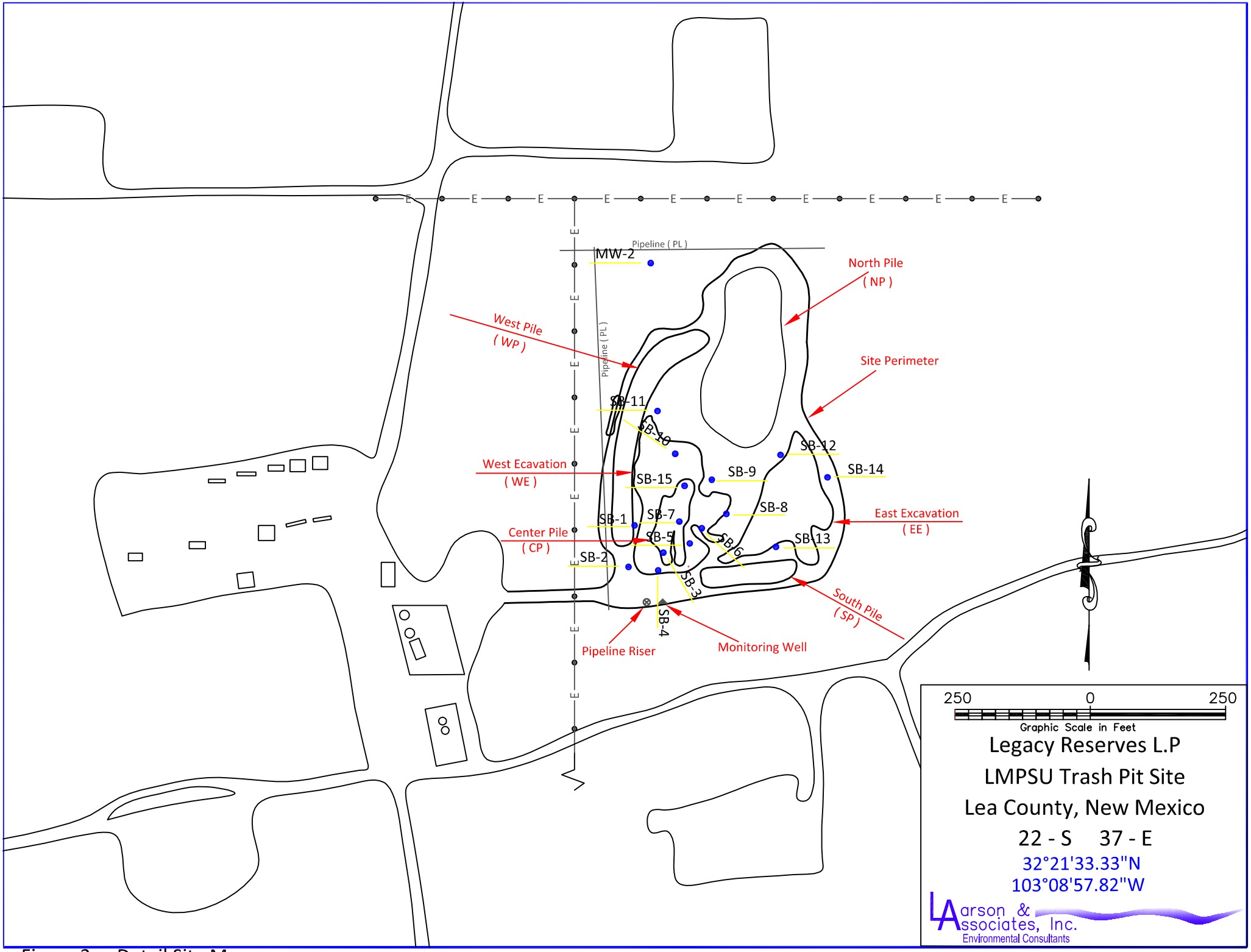
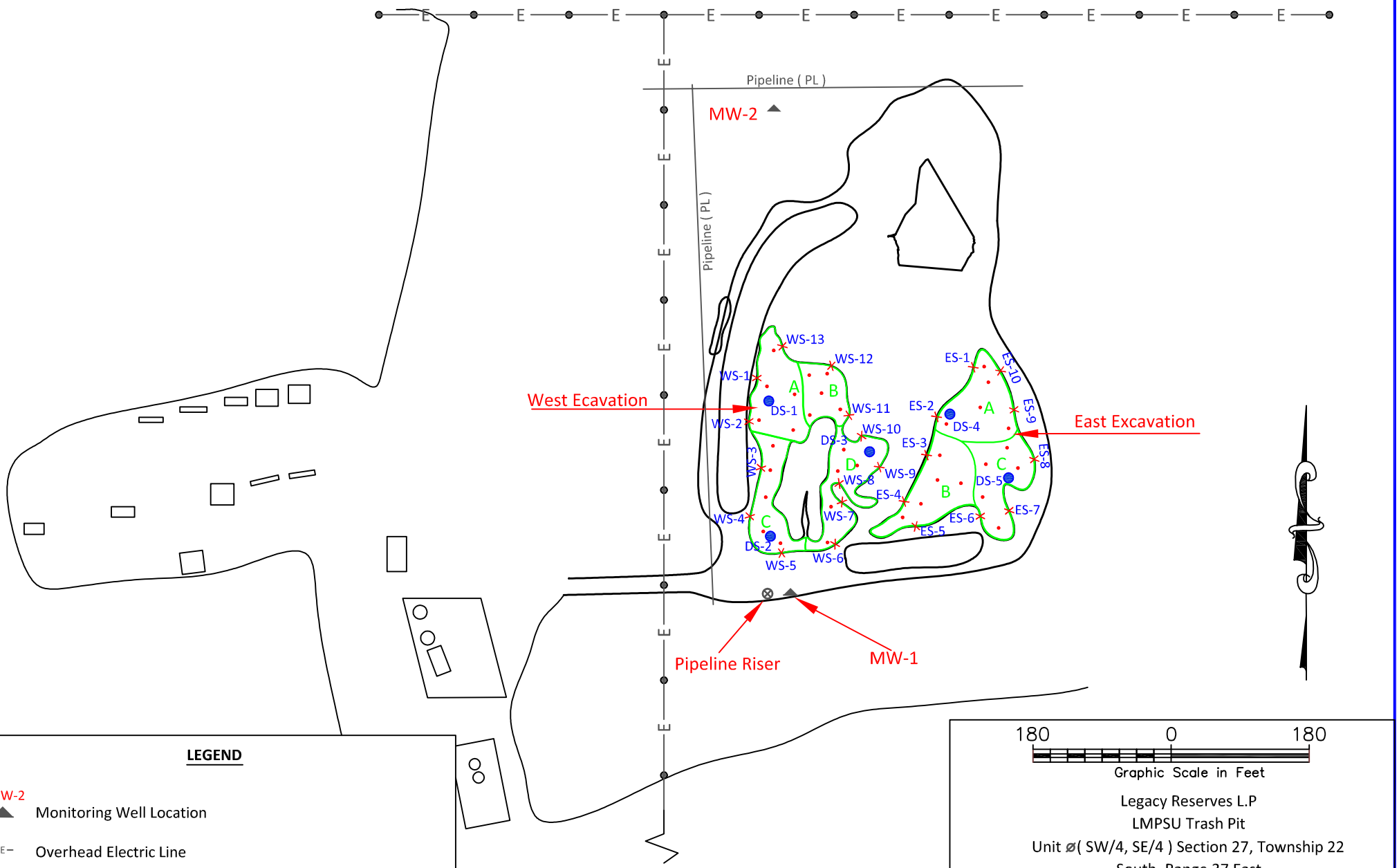


Figure 3a - Detail Site Map



LEGEND

MW-2 ▲ Monitoring Well Location

–E– Overhead Electric Line

WS-1 X Sidewall Discrete Sample Location (Approximate)

WEA (A) Bottom Composite (5 Spot) Sample Location (Approximate)

● OCD Bottom Sample Location (Approximate) per

180 0 180

Graphic Scale in Feet

Legacy Reserves L.P
LMPSU Trash Pit
Unit ⌀(SW/4, SE/4) Section 27, Township 22
South, Range 37 East
Lea County, New Mexico

32°21'33.33"N
103°08'57.82"W

Larson & Associates, Inc.
Environmental Consultants

Figure 3b - Excavation Soil Sample Location Map

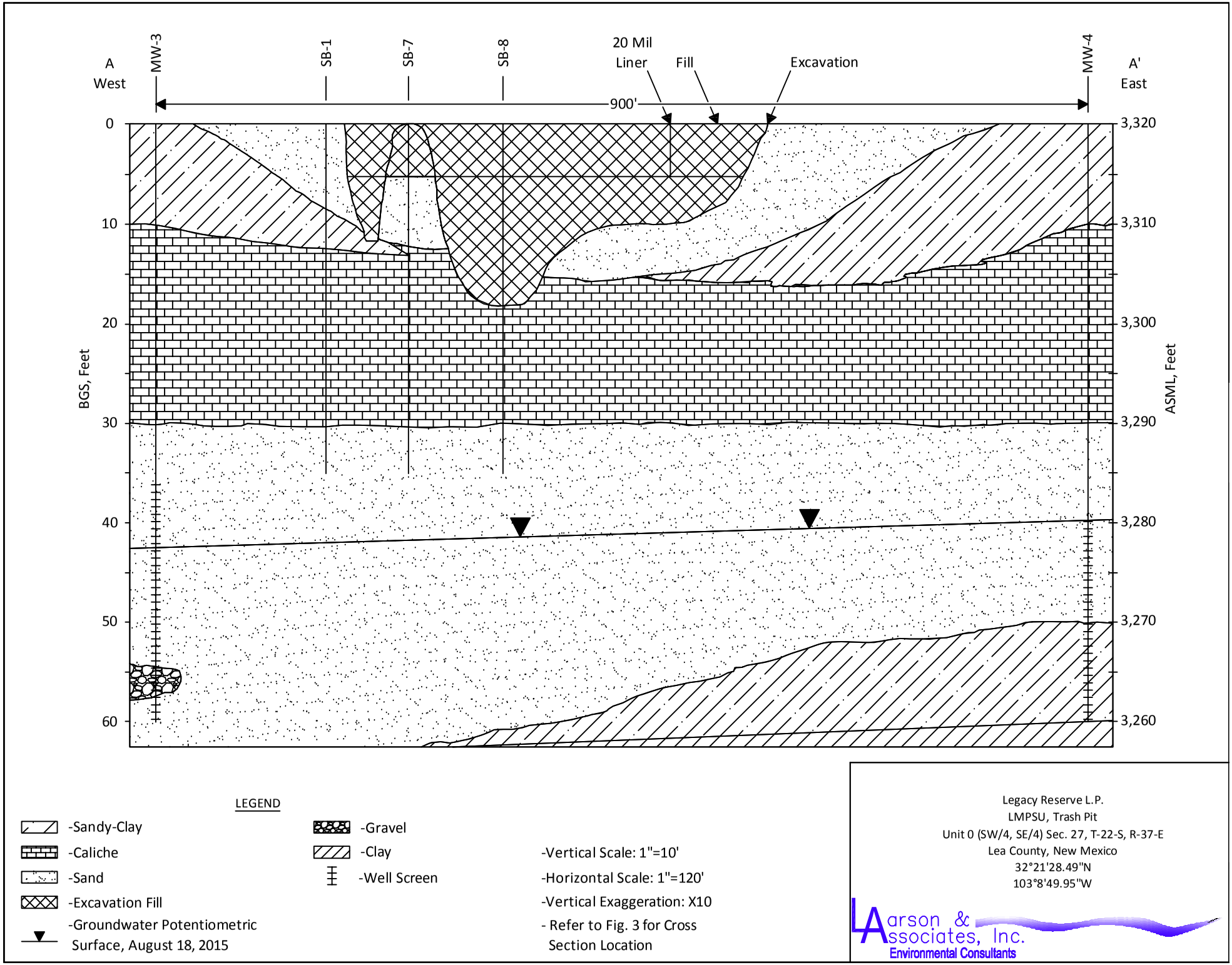
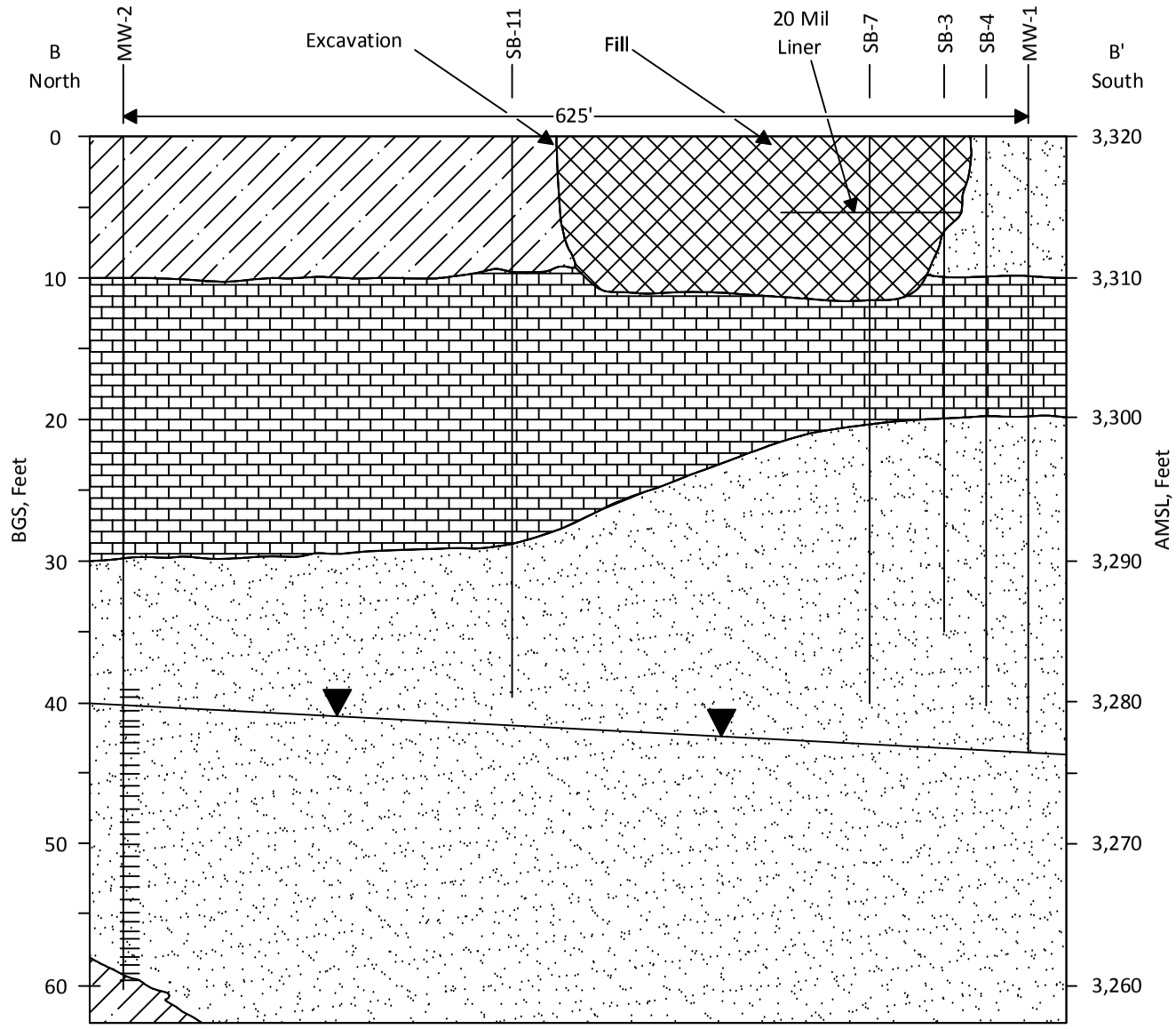


Figure 4a - Geological Cross Section A-A'



LEGEND

-Sandy-Clay

-Caliche

-Sand

-Groundwater Potentiometric Surface, August 18, 2015

-Excavation Fill

-Well Screen

-Vertical Scale: 1"=12'

-Horizontal Scale: 1"=120'

-Vertical Exaggeration: X10

-See Fig. 3 for Cross Section Location

Legacy Reserve L.P.
LMPSU, Trash Pit
Unit O (SW/4, SE/4) Sec. 27, T-22-S, R-37-E
Lea County, New Mexico
32°21'28.49"N
103°8'49.95"W

Larson & Associates, Inc.
Environmental Consultants

Figure 4b - Geological Cross Section B-B'

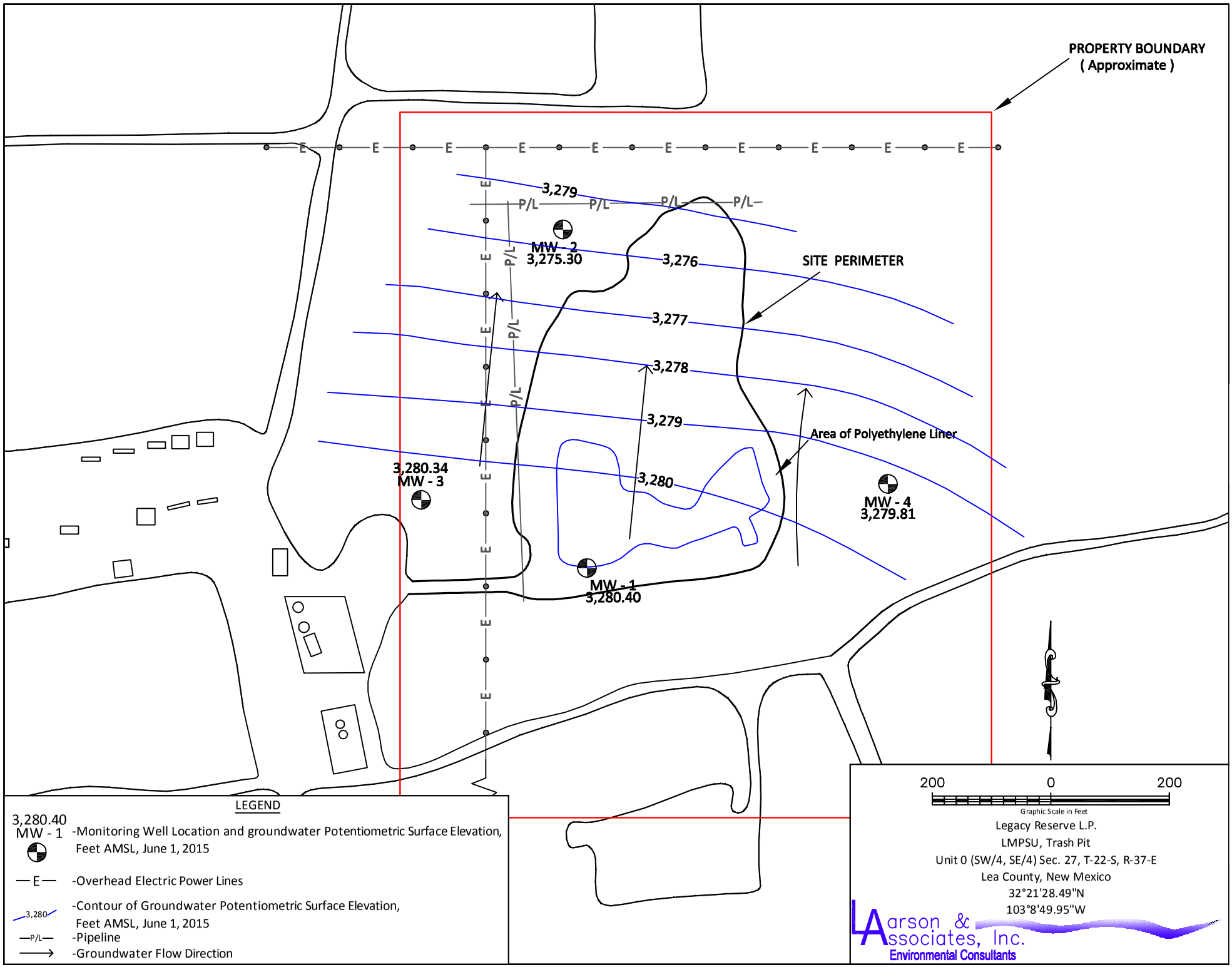


Figure 5a - Groundwater Potentiometric Map, June 1, 2015

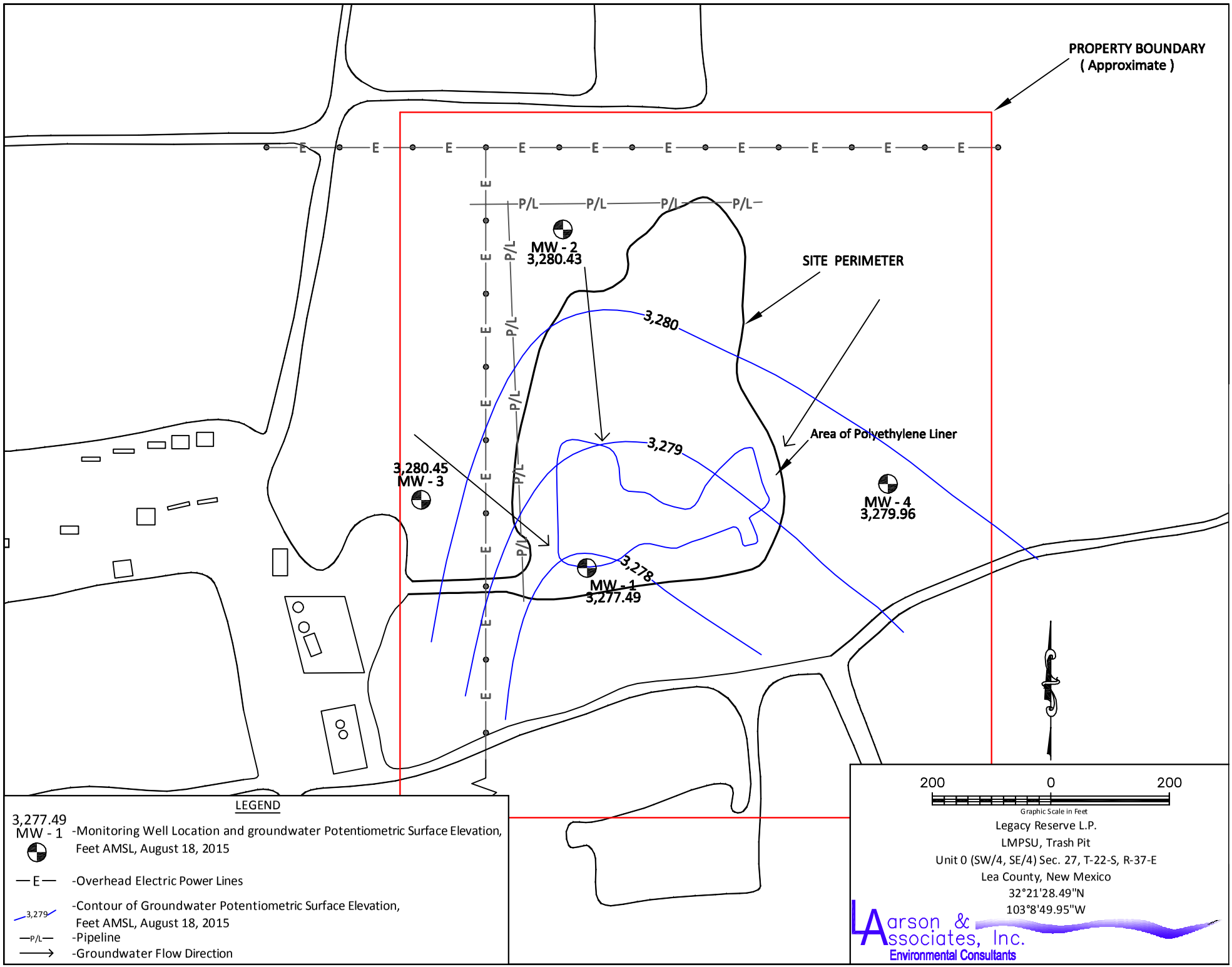


Figure 5b - Groundwater Potentiometric Map, August 18, 2015

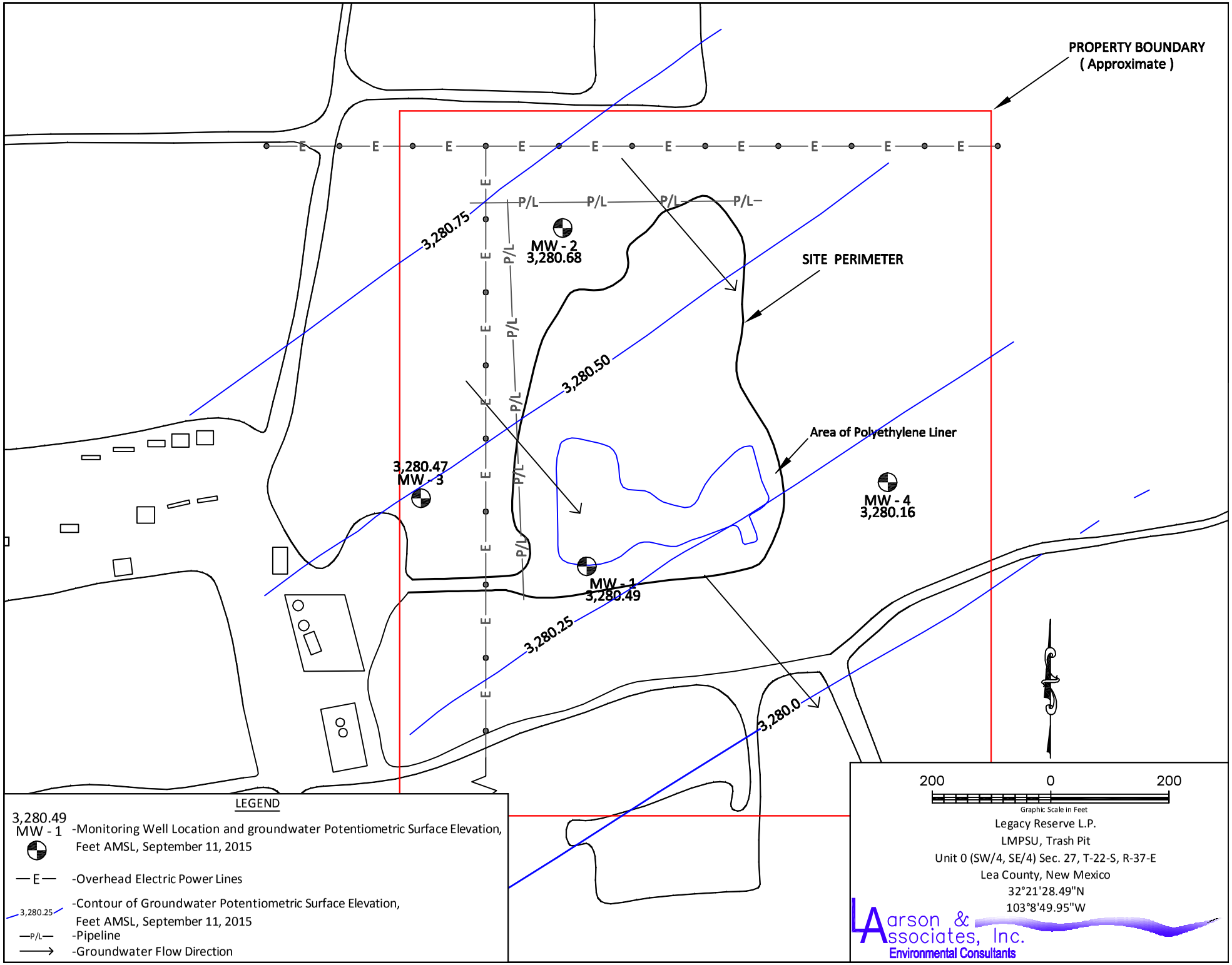


Figure 5c - Groundwater Potentiometric Map, September 11, 2015

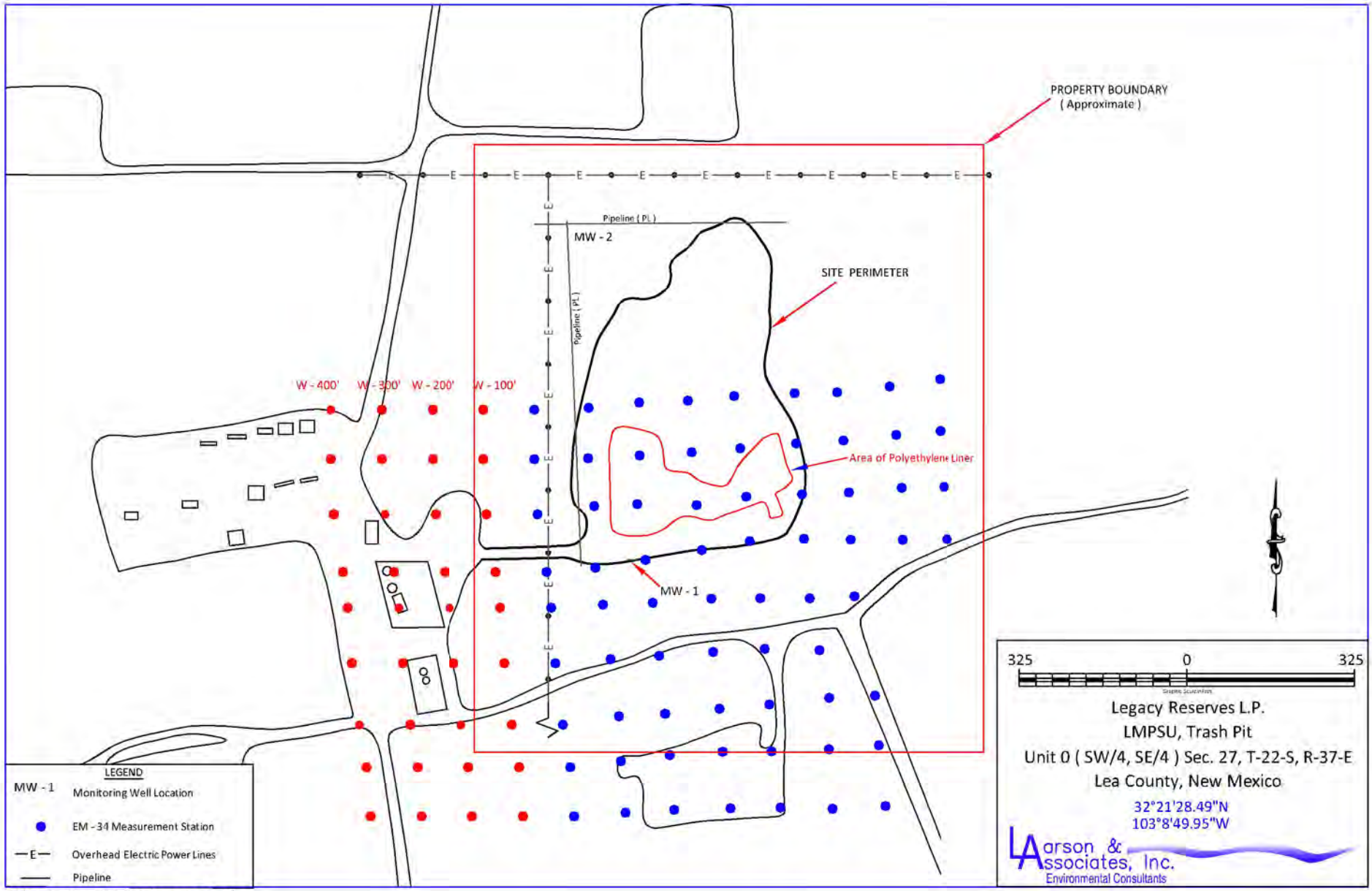


Figure 6 - EM-34 Survey Grid

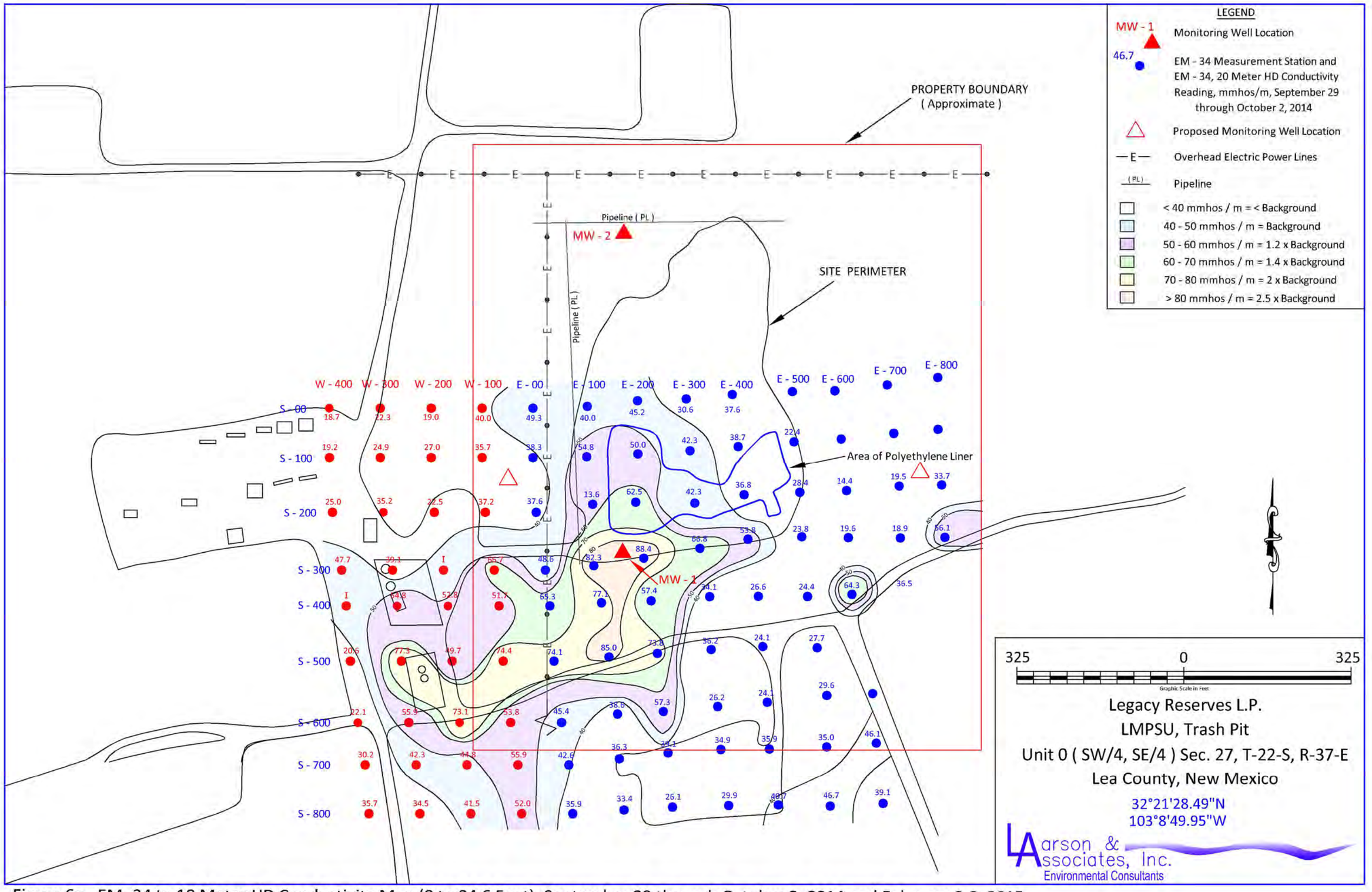


Figure 6a - EM- 34 to 10 Meter HD Conductivity Map (0 to 24.6 Feet), September 29 through October 2, 2014 and February 2-3, 2015

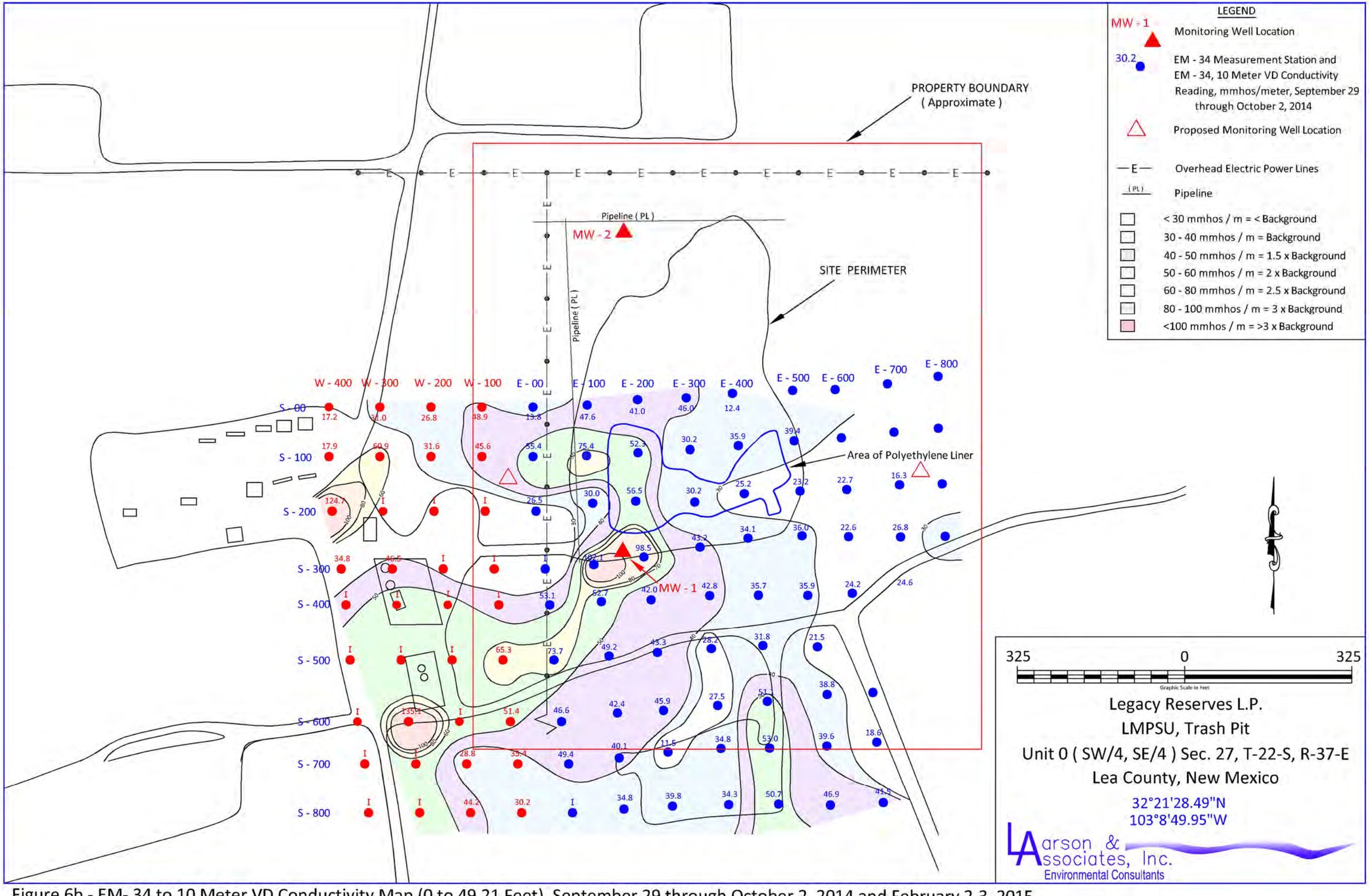


Figure 6b - EM- 34 to 10 Meter VD Conductivity Map (0 to 49.21 Feet), September 29 through October 2, 2014 and February 2-3, 2015

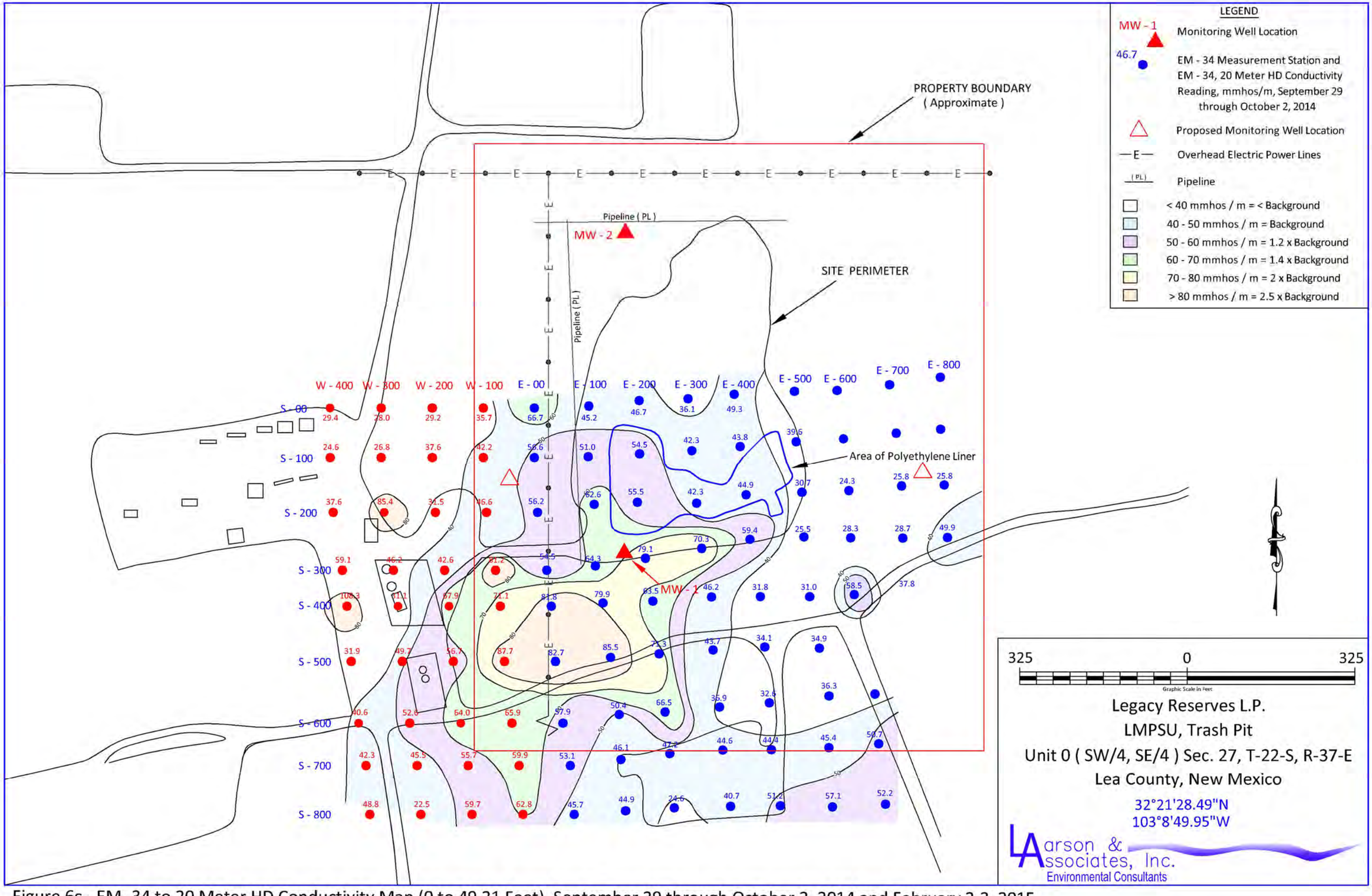


Figure 6c - EM- 34 to 20 Meter HD Conductivity Map (0 to 49.21 Feet), September 29 through October 2, 2014 and February 2-3, 2015

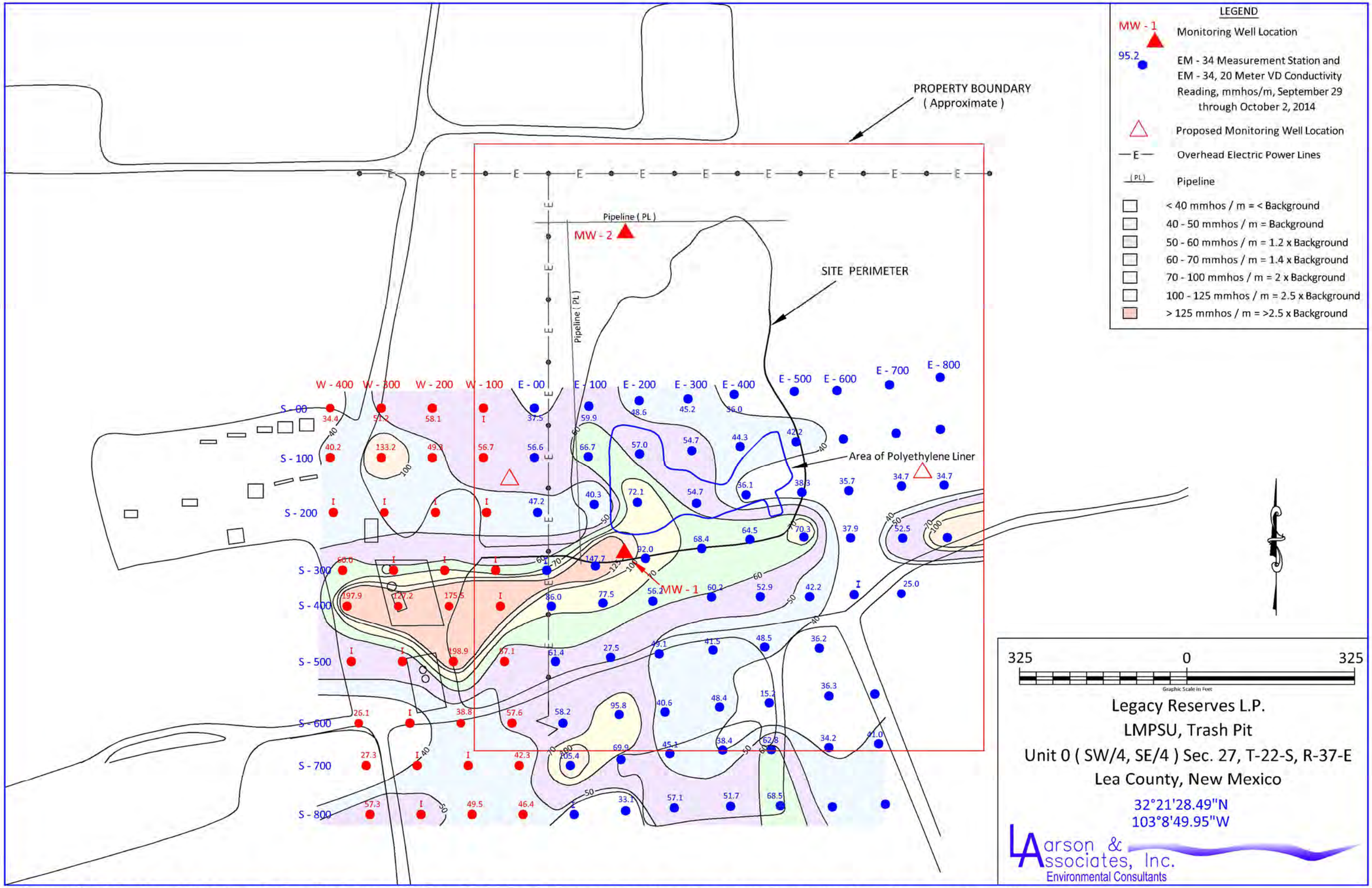


Figure 6d - EM- 34 to 20 Meter VD Conductivity Map (0 to 98.41 Feet), September 29 through October 2, 2014 and February 2-3, 2015

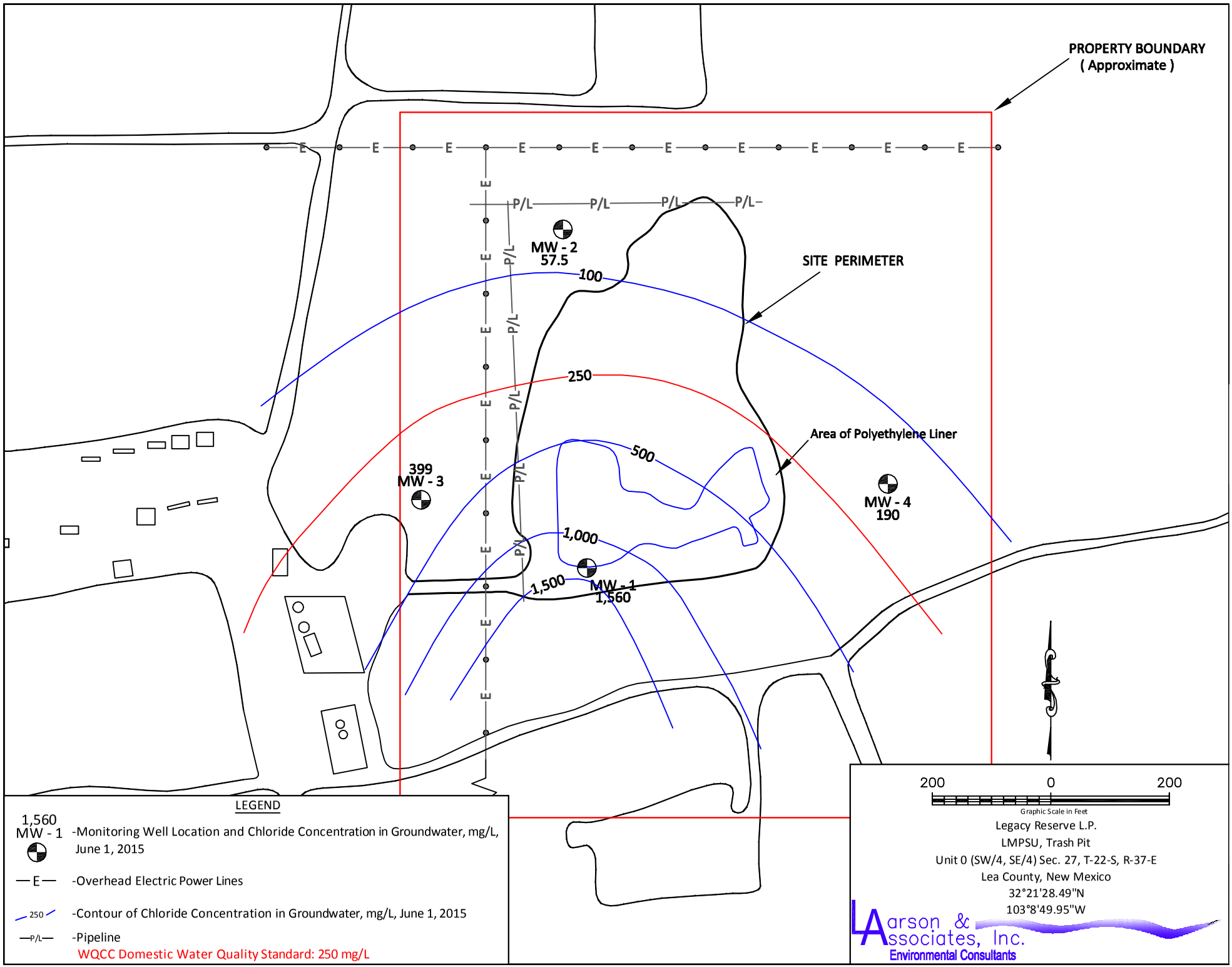


Figure 7a - Chloride Concentration in Groundwater, June 1, 2015

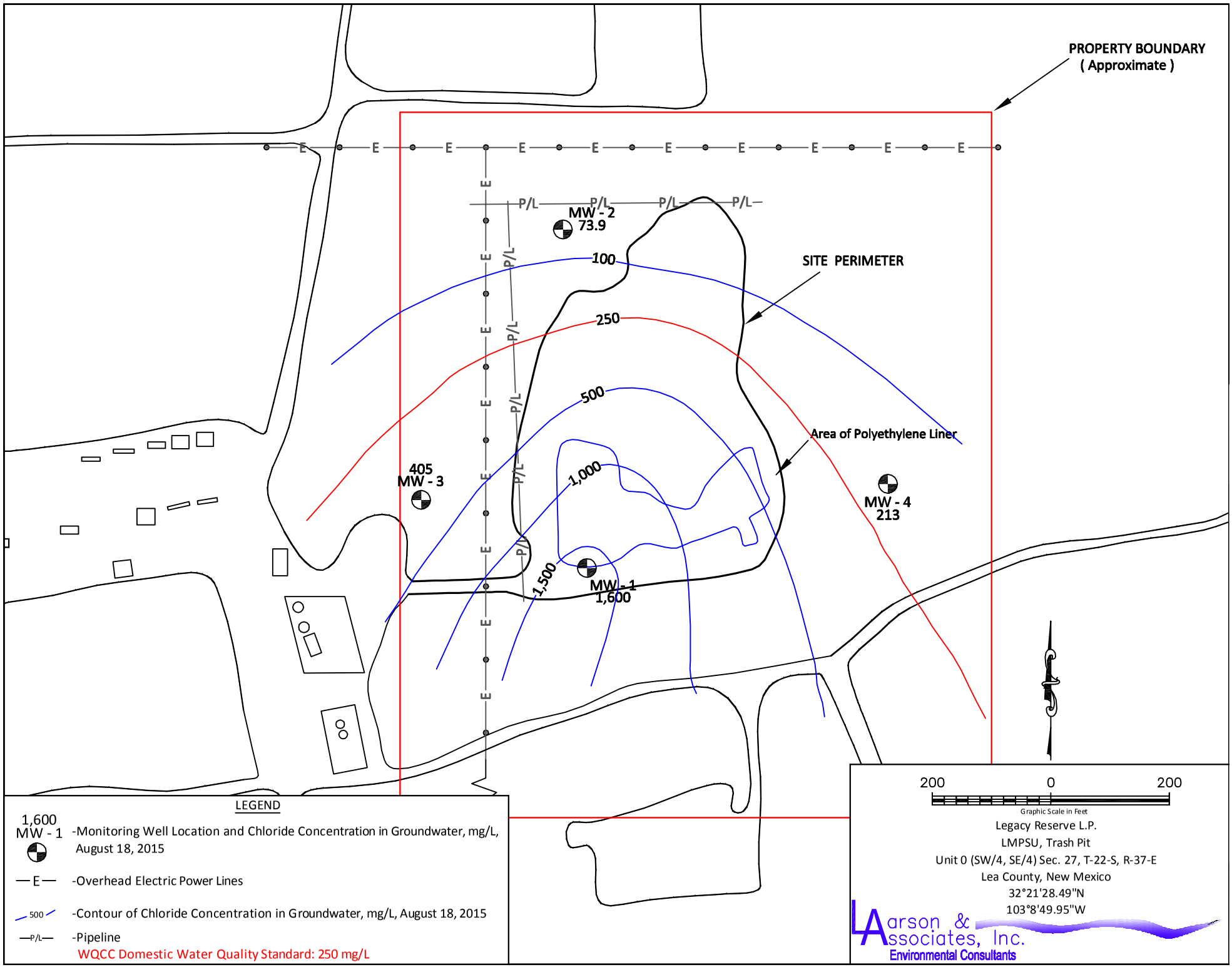


Figure 7b - Chloride Concentration in Groundwater, August 18, 2015

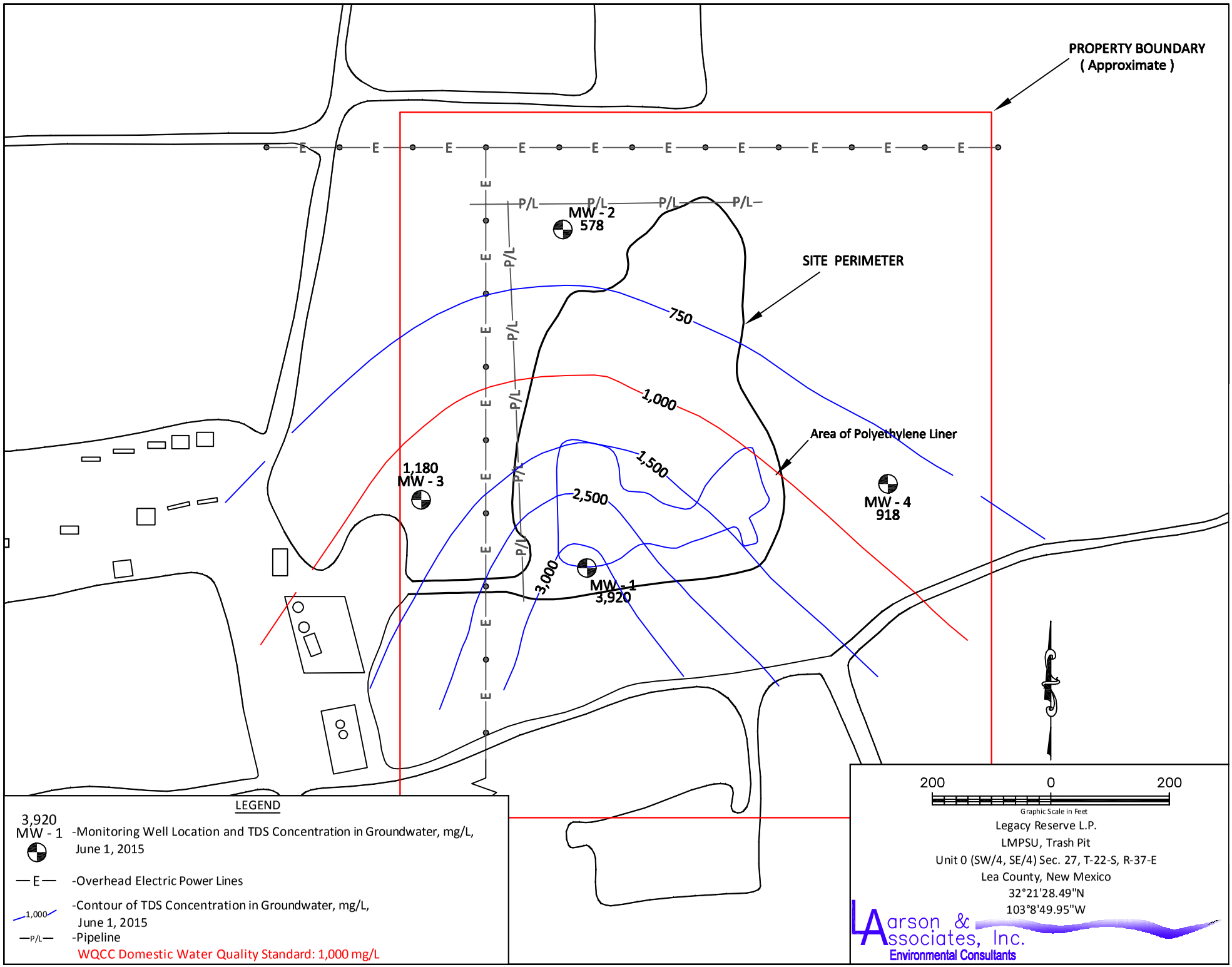


Figure 8a - TDS Concentration in Groundwater June 1, 2015

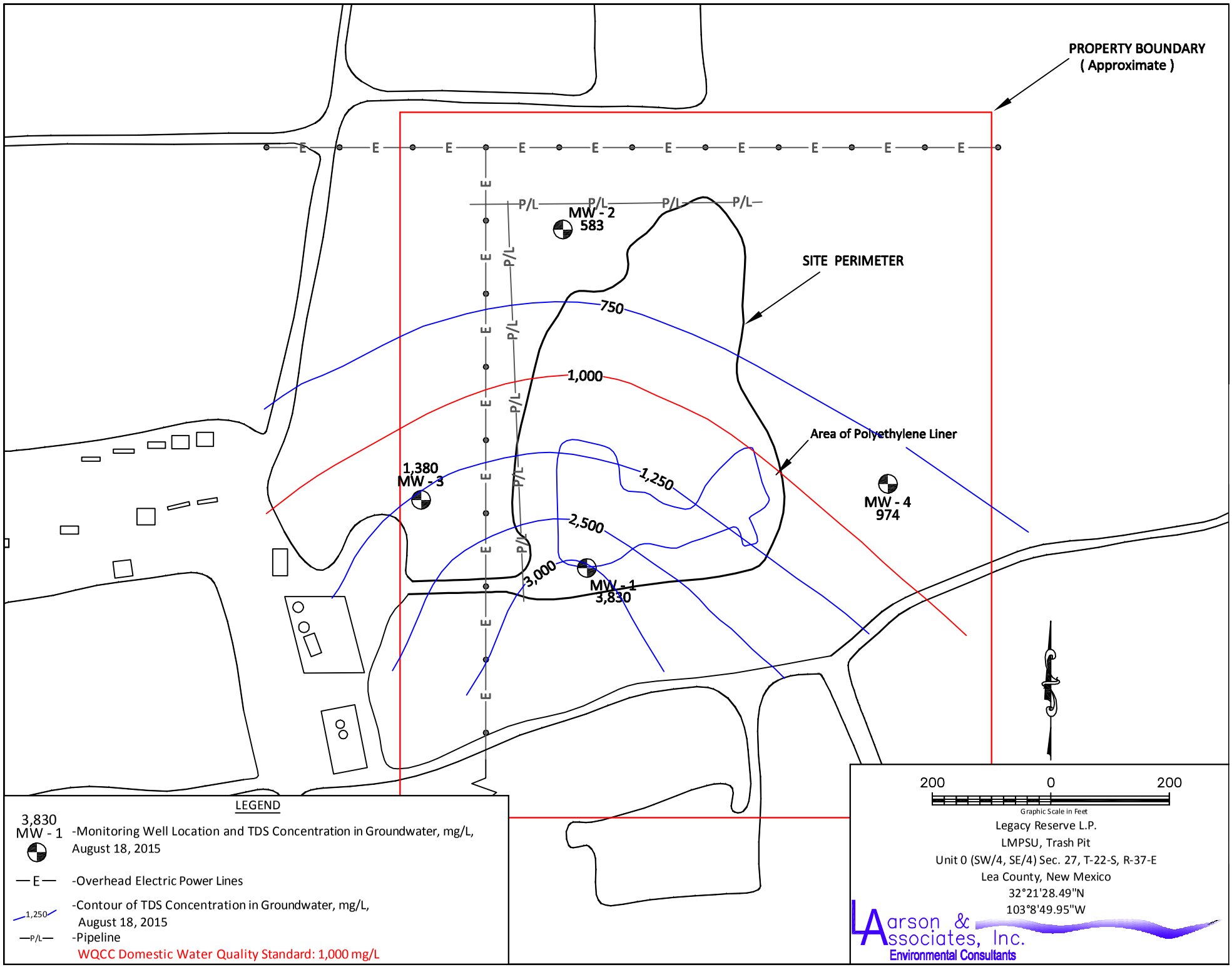


Figure 8b - TDS Concentration in Groundwater August 18, 2015

APPENDIX A

OCD Correspondence

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

May 16, 2011

Behind Plant 1
(100 yds - E of Plant 1)

Whole 158 steps 475' E of 201
E hole additional 50'

Legacy Reserves Operating LP
Attn: Paul T. Horne
P.O. Box 10848
Midland, TX 79702

Email: phorne@legacylp.com

Legacy Reserves Operating LP
303 W. Wall
Suite 1400
Midland, TX 79701

Moriah Resources, Inc.
P.O. Box 5562
Midland, TX 79704

Moriah Resources, Inc.
303 W. Wall
Suite 1500
Midland, TX 79701

Moriah Resources, Inc.
Attn: Alan J. Brown
300 North Marienfeld
Suite 700
Midland, TX 79701

Moriah Resources, Inc.
C/O James Bruce
P.O. Box 1056
Santa Fe, NM 87504-1056

Email: jamesbruc@aol.com

Pecos Production Company
400 W. Illinois
Suite 1070
Midland, TX 79701

Pecos Production Company
400 W. Illinois
Suite 1210
Midland, TX 79701

Re: Buried Oilfield Waste
Location: O-27-22S-37E, Lea County, New Mexico
Lease Operators: Legacy Reserves Operating LP, OGRID 240974
Moriah Resources, Inc., OGRID 224376
Pecos Production Company, OGRID 215758
Anadarko Petroleum Corporation, OGRID 817

Dear Operators of the Above Lease Location:

The Oil Conservation Division (OCD) is investigating a complaint by a landowner that oilfield waste is buried at the above lease location. The OCD is contacting the operator of the lease, identified in OCD records as Legacy Reserves Operating LP (Legacy), and all prior operators of the lease, identified in OCD records as Moriah Resources Inc. (Moriah), Pecos Production Company (Pecos), and Anadarko Petroleum Corporation (Anadarko), to discuss the matter. Barrels, PVC pipes, metal pipes, buckets, rags, and other oilfield wastes were unearthed during a recent excavation of the site. Pictures of the site are enclosed in the attached letter that was sent to Anadarko early on in the OCD's investigation of this matter.

Please contact me at (505) 476-3493 or daniel.sanchez@state.nm.us ***within 10 days*** of receipt of this letter so that I can set up a meeting where we can discuss the matter further.

Your prompt attention to this matter would be greatly appreciated.

Sincerely yours,

Daniel Sanchez
OCD Enforcement & Compliance Manager

cc: Jami Bailey, OCD Director
Geoff Leking, Environmental Specialist, OCD District 1
Larry "Buddy" Hill, Supervisor, OCD District 1
E.L. Gonzales, OCD District 1
Glenn von Gonten, Acting OCD Environmental Bureau Chief
Bill Sims, Landowner
Linda S. Kuhn, Anadarko Petroleum Corporation
Sonny Swazo, OCD Assistant General Counsel

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Daniel Sanchez
Acting Division Director
Oil Conservation Division

March 29, 2011

Linda S. Kuhn, Sr. Counsel
Anadarko Petroleum Corporation
1201 Lake Robbins Drive
The Woodlands, TX 77380

Certified Mail: 7008 3230 0000 2318 8588

Anadarko Petroleum Corporation
P.O. Box 2497
Midland, Texas 79702

Certified Mail: 7008 3230 0000 2318 8595

Anadarko Petroleum Corporation
P.O. Box 1330
Houston, TX 77251

Certified Mail: 7008 3230 0000 2318 8601

Anadarko Petroleum Corporation
c/o CT Corporation System
123 E. Marcy St.
Santa Fe, NM 87501

Certified Mail: 7008 3230 0000 2318 8618

Anadarko Petroleum Corporation
1209 Orange Street
Wilmington, DE 19801

Certified Mail: 7008 3230 0000 2318 8625

Re: **Buried Oilfield Waste**
Operator: Anadarko Petroleum Corporation, OGRID 817
Location: O-27-22S-37E, Lea County, New Mexico

Dear Operator:

The Oil Conservation Division (OCD) is investigating a complaint by landowner Bill Sims that Anadarko Petroleum Corporation (Anadarko) buried oilfield waste in a trench at the above location while Anadarko was the lease operator.

Mr. Sims unearthed barrels, PVC pipes, metal pipes, buckets, rags, and other oilfield wastes when he recently excavated a portion of the trench. Pictures of the site are enclosed.

Mr. Sims and his family have lived and ranched in the area for generations. According to Mr. Sims, Anadarko had a service yard at the location which it used to service its surrounding wells. Anadarko stockpiled barrels, junk and other items at the service yard. Around 1993, Mr. Sims saw a bulldozer dig a big trench immediately adjacent to the stockpiled barrels and other items at the service yard. A day or two later, Mr. Sims noticed that the stockpiled barrels, junk and other items were gone and the trench had been filed in. OCD records show Anadarko as the lease operator around the time of the incident.

Mr. Sims never saw any excavation or other activity at the location either before or after the incident. According to Mr. Sims, Anadarko had leased the location for decades prior to the incident and continued to lease the location for years after the incident. OCD records show that Anadarko operated the lease as late as 2003.

Section 70-2-12(B)(21) NMSA 1978, gives the OCD the authority to regulate the disposition of nondomestic wastes resulting from the exploration, development, production or storage of crude oil or natural gas to protect public health and the environment.

Section 70-2-12(B) (22) NMSA 1978, gives the OCD the authority to regulate the disposition of nondomestic wastes resulting from the oil field service industry, the transportation of crude oil or natural gas, the treatment of natural gas or the refinement of crude oil to protect public health and the environment, including administering the Water Quality Act [74-6-1 NMSA 1978] as provided in Subsection E of Section 74-6-4 NMSA 1978.

OCD Rule 19.15.34.11 NMAC prohibits the disposal of oilfield waste on or below the surface of the ground, or in another place or in a manner that may constitute a hazard to fresh water, public health, safety or the environment.

Oil field waste is "waste generated in conjunction with the exploration for, drilling for, production of, refining of, processing of, gathering of or transportation of oil, gas or carbon dioxide; waste generated from oil field service company operations; and waste generated from oil field remediation or abatement activity regardless of the date of release." OCD Rule 19.15.2.7.O(3) NMAC.

The buried items are oilfield waste and may constitute a hazard to fresh water, public health, safety or the environment, especially since many of the buried items were items that contained chemicals (such as barrels, buckets, and rags), or transported or could have transported chemicals (such as pipes). The location must be investigated to determine if there has been any unauthorized release to the environment that has contaminated soil and/or ground water.

OCD Rule 19.15.29.11 NMAC requires the responsible person to complete OCD approved corrective action for releases that endanger public health or the environment. OCD Rule 19.15.29.11 NMAC requires the responsible person to address releases in accordance with a remediation plan submitted to and approved by the OCD.

Anadarko must submit a remediation plan pursuant to 19.15.29 NMAC to the OCD. Based on the results of the investigation, OCD will determine what remediation Anadarko must implement if any.

OCD Rule 19.15.34.13 NMAC requires persons to dispose of oilfield wastes that is not produced water by transferring the wastes to an appropriate permitted or registered surface waste management facility.

Anadarko must excavate the oilfield waste and properly dispose of it at an appropriate permitted or registered surface waste management facility.

Please contact me at (505) 476-3493 or daniel.sanchez@state.nm.us within 10 days of receipt of this letter to schedule a compliance conference with me at the OCD's Santa Fe Office. OCD legal counsel may be present at the conference. You may have counsel participate in the conference if you wish.

Section 70-2-12(A), NMSA 1978, gives the OCD the power to collect data; make investigations and inspections; and to examine properties, leases, papers, books and records.

Anadarko must bring the following to the conference:

- the approximate date of the service yard's operation from beginning to end;
- a list of all items and chemicals that passed through the service yard during its operation;
- copies of any permit or other document that purportedly gave Anadarko the authority to bury items at the site;
- a remediation plan to delineate and remediate the site;
- a written explanation and records of what Anadarko did with the oilfield waste at the service yard;
- a written explanation and records of what Anadarko did with the items at the service yard;
- any other information pertinent to this case.

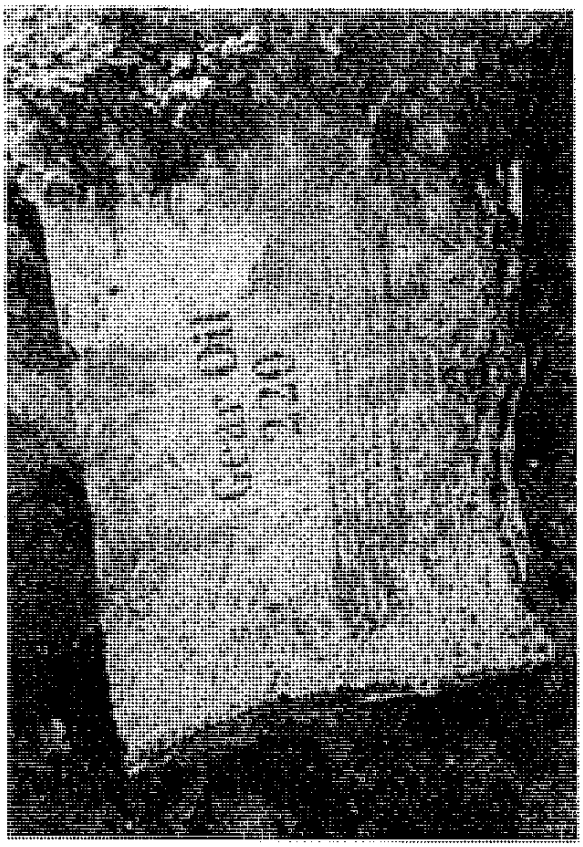
Anadarko's prompt attention to this matter would be greatly appreciated.

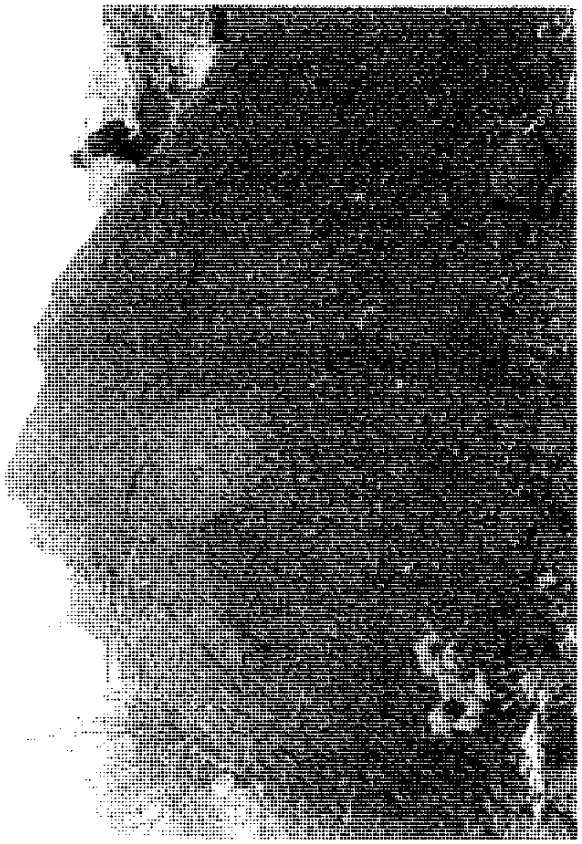
Sincerely,

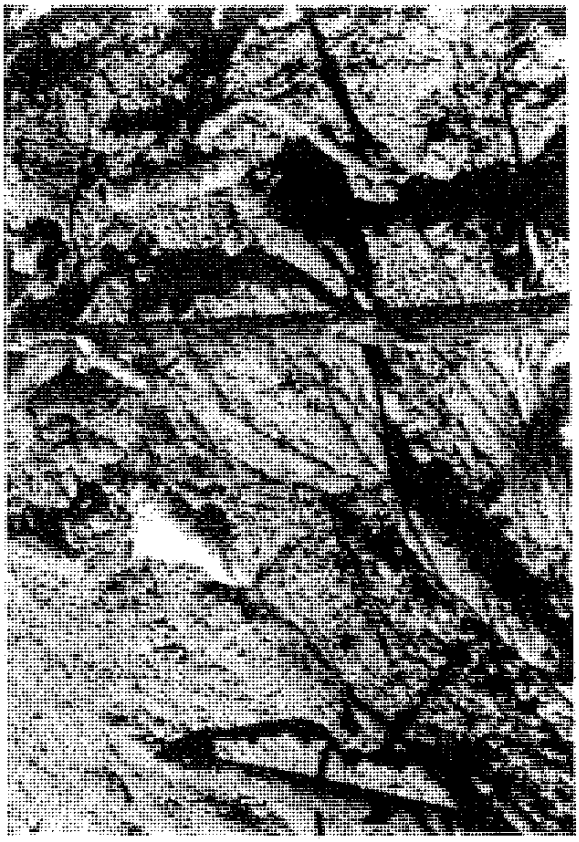
Daniel Sanchez
Acting Division Director
Division Enforcement & Compliance Manager

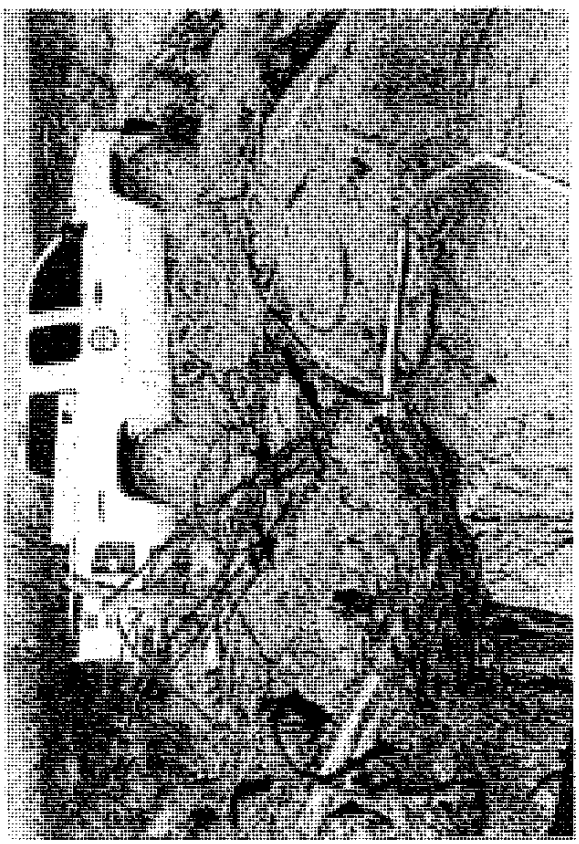
cc: John H. Bemis, EMNRD Cabinet Secretary-Designate

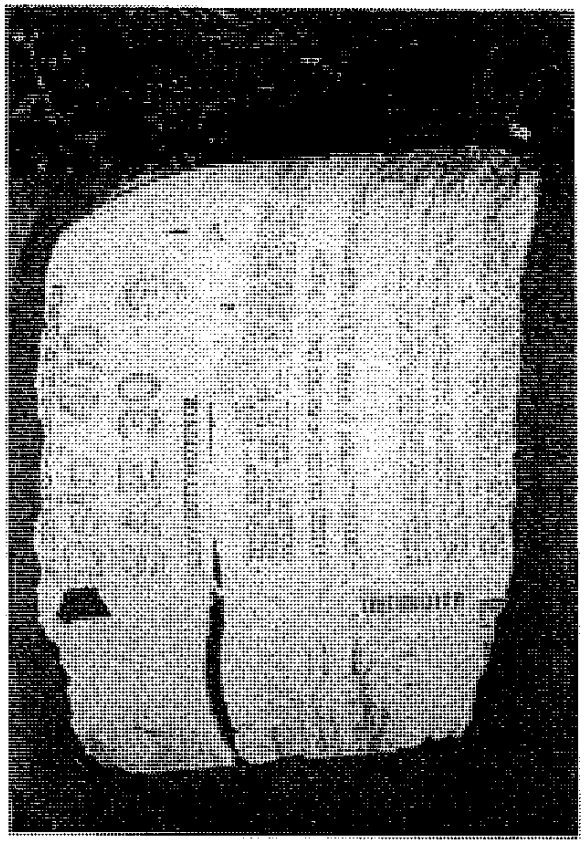
Bill Brancard, EMNRD General Counsel
Sonny Swazo, OCD Assistant General Counsel
Geoff Leking, Environmental Specialist, OCD District 1
Larry "Buddy" Hill, Supervisor, OCD District 1
Glenn von Gonten, Acting OCD Environmental Bureau Chief
Bill Sims, Landowner
Auralie Ashley-Marx, NMED Solid Waste Bureau Chief

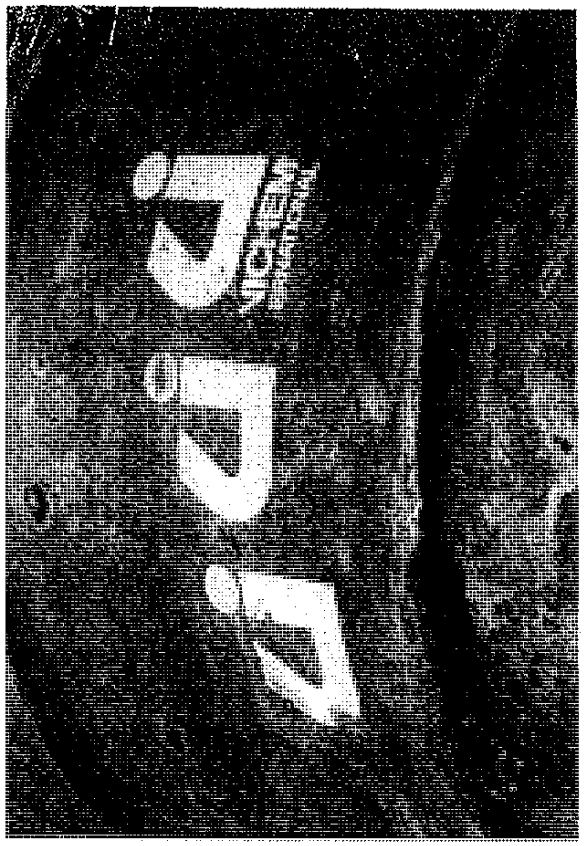


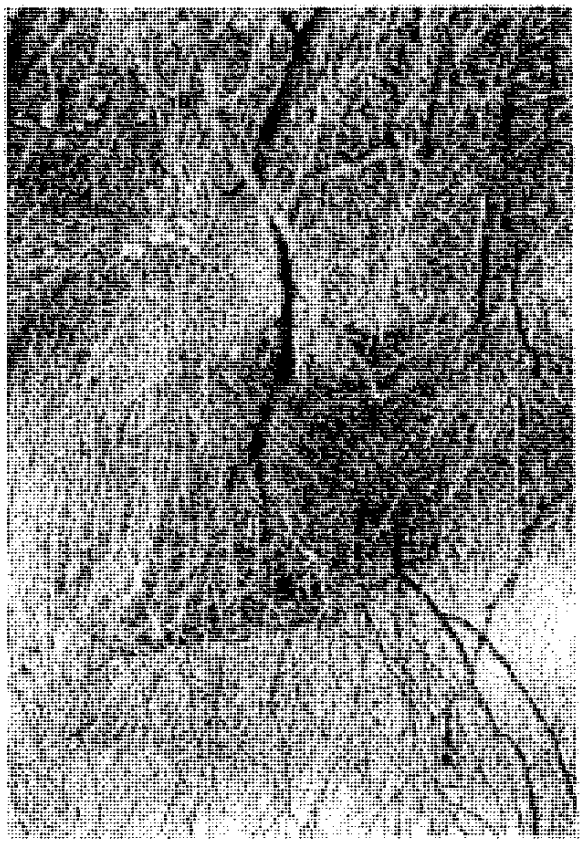


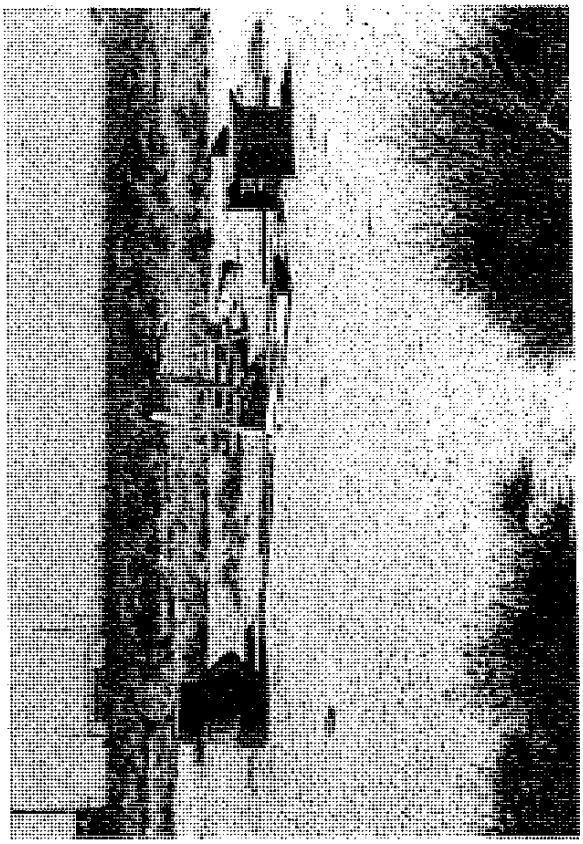


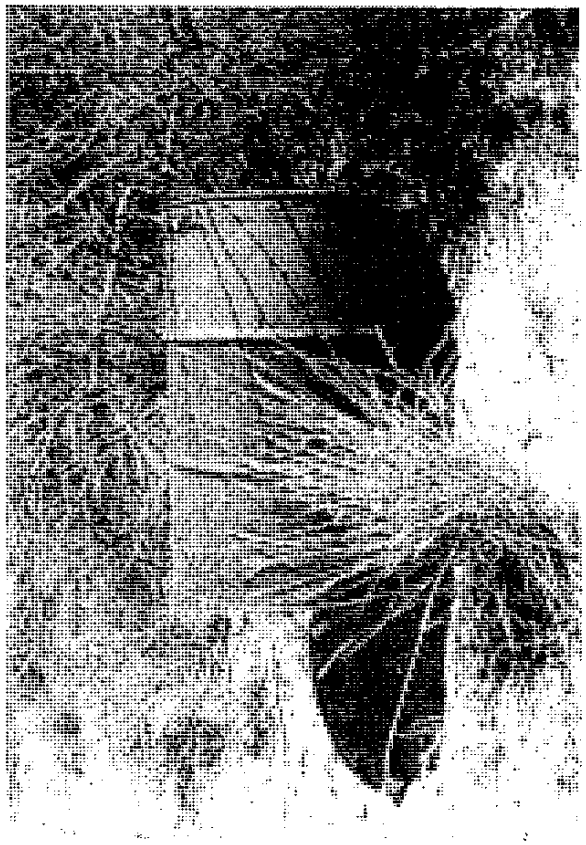


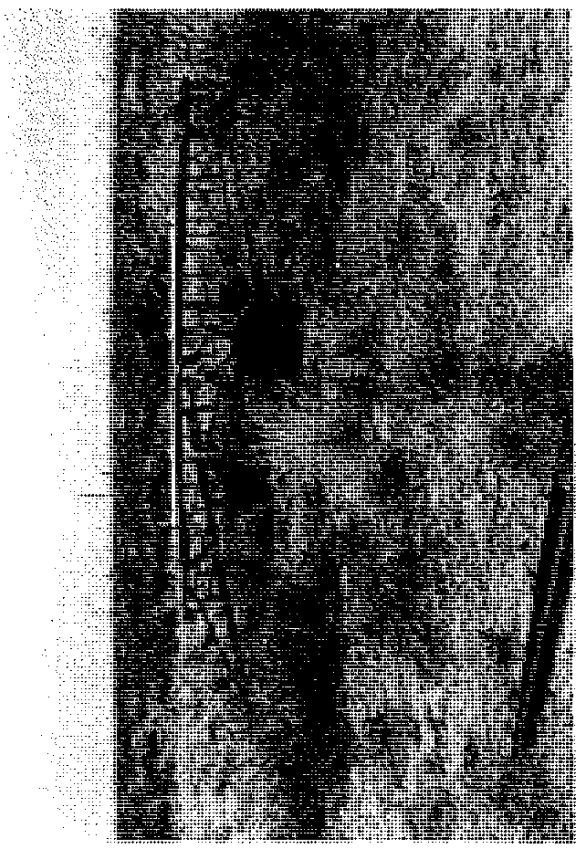


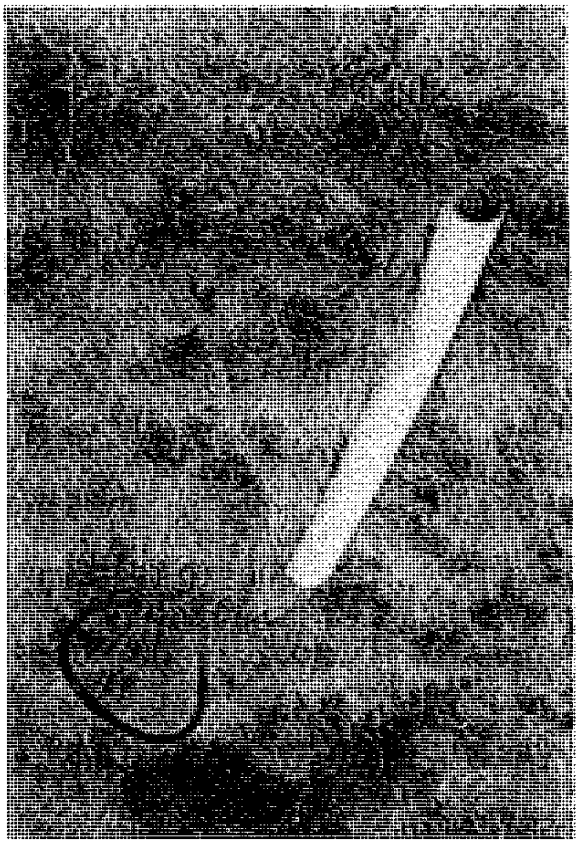


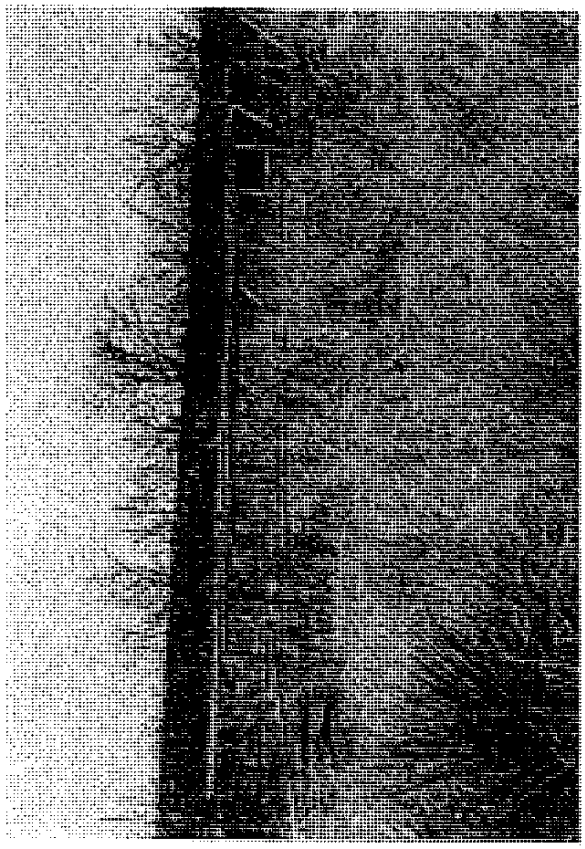


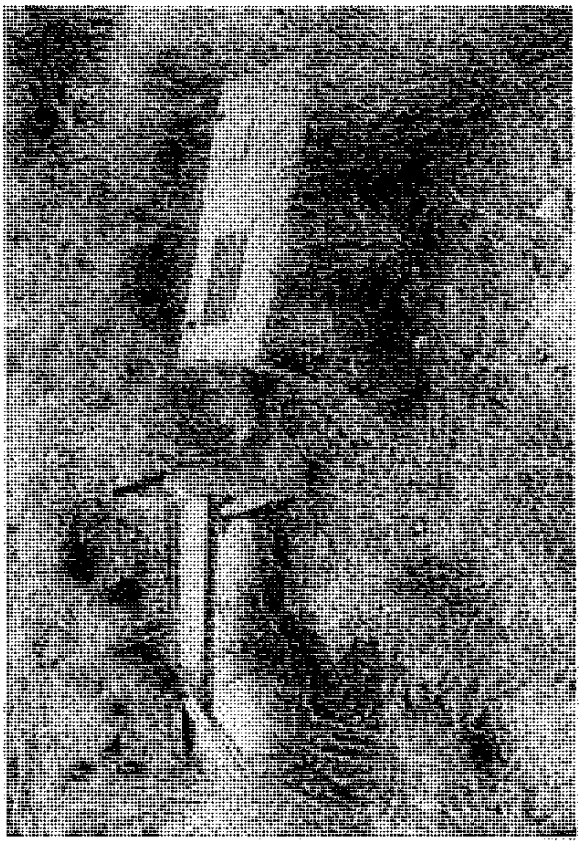












Berry Johnson

From: Paul Horne
Sent: Wednesday, May 18, 2011 11:22 AM
To: Cary Brown; Steve Pruett; Kyle McGraw; Bill Morris
Cc: Ernie Hanson; Berry Johnson
Subject: FW: Anadarko Petroleum Corporation Buried Oilfield Waste

Attachments: 2011 5-16 Letter.pdf

2011 5-16 Letter.pdf (10 MB)

Please read attached letter from NMOCD. This is on the LMPSU. We were aware that the landowner, Bill Simms, was out doing some digging and taking pictures. We believe that someone else had a leak and while digging it up, encountered a bunch of junk and Bill wouldn't let them cover it up. He has not contacted us or asked us to do anything. He has told the NMOCD that Anadarko did this and the NMOCD is investigating. We need to discuss next steps. They are asking us to contact them to setup a meeting. I suggest we might want legal present...Alan Brown?

Paul T. Horne
Legacy Reserves
EVP - Operations
Office(432)-689-5200
Cell(432)559-8473
Fax(432)686-8318

-----Original Message-----
From: Duran-Saenz, Theresa, EMNRD [mailto:Theresa.Duran-Saenz@state.nm.us]
Sent: Monday, May 16, 2011 12:30 PM
To: Paul Horne; jamesbruc@aol.com
Cc: Bailey, Jami, EMNRD; Leking, Geoffrey R, EMNRD; Hill, Larry, EMNRD; Gonzales, Elidio L, EMNRD; VonGonten, Glenn, EMNRD; Linda.Kuhn@anadarko.com; Swazo, Sonny, EMNRD; Sanchez, Daniel J., EMNRD
Subject: Anadarko Petroleum Corporation Buried Oilfield Waste

Dear Operators,

The original letter with attachments is to follow via U.S. Mail.

The message is ready to be sent with the following file or link attachments:

2011 5-16 Letter

Adrian Jackson

From: Mark Larson
Sent: Friday, August 01, 2014 8:53 AM
To: Heath Loftin
Cc: Adrian Jackson
Subject: FW: Legacy Reserves, L.P., LMPSU Trash Pit Remediation

Heath,
Approved! Here's OCD's approval to proceed with lining and filling the trash pit excavations at LMPSU. We will get this on the schedule. The work will involve grading the bottoms of the excavations, installing the 20 mil liners and filling with soil from the soil piles. We will compact the soil while filling the excavations to minimize settling. As I stated earlier it may be necessary to acquire additional soil to complete filling the excavations to replace soil hauled to disposal and debris removed from the pits. It may be beneficial to acquire the extra soil from the adjoining landowner to the south (Sims?) since it will require landowner approval to access the adjoining property for delineating the groundwater including installing monitoring wells. I will let you know when we are ready to begin. Please contact me if you have questions.
Mark

From: Oberding, Tomas, EMNRD [mailto:Tomas.Oberding@state.nm.us]
Sent: Friday, August 01, 2014 8:35 AM
To: Mark Larson
Subject: RE: Legacy Reserves, L.P., LMPSU Trash Pit Remediation

Aloha and good morning Mark,

Thank you again for coming into the office yesterday. I appreciate the summary of our discussion.
Please consider this the official notice of receipt of these files.
The OCD has no problems with the proposed work plan for this site.
Please also consider this the official notice of clearance (stamp of approval) from OCD to continue along this path in the cleanup of this site.

Please let me know if you have any questions, also please keep me informed as the situation warrants.
Hope you and the entire crew have a wonderful Friday and weekend (enjoy the cooler temps a bit!)
Mahalo
-Doc

Tomáš 'Doc' Oberding, PhD
Environmental Specialist – New Mexico Oil Conservation Division
Energy, Minerals and Natural Resources Department
1625 N. French Dr.
Hobbs, NM 88240
(O): (575) 393-6161 ext 111
(C): 575-370-3180
(F): (575) 393-0720
E-Mail: tomas.oberding@state.nm.us
Website: **MailScanner has detected a possible fraud attempt from "webmail.state.nm.us" claiming to be** http://www.emnrd.state.nm.us/ocd/

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Thursday, July 31, 2014 4:11 PM
To: Oberding, Tomas, EMNRD

Cc: Heath Loftin
Subject: Re: Legacy Reserves, L.P., LMPSU Trash Pit Remediation

Hello Tomáš,
This email summarizes our meeting yesterday and requests approval to proceed with the remediation approach discussed during the meeting.

1. The LMPSU trash pit is the location of two historic unlined oil and gas disposal pits and area where a former operator disposed of miscellaneous oilfield material including empty drums, pipe, etc.
2. Groundwater occurs at approximately 42 feet below ground surface (bgs);
3. Legacy excavated between about 7,500 and 12,000 cubic yards of soil during removal of buried debris and disposal pits;
4. Soil was retained on location in 4 piles (west, north, south and center);
5. The center pile was hauled to Sundance due to elevated TPH;
6. LAI personnel collected composite and discrete samples from the excavation and soil piles and from 15 borings drilled in and around the excavations (west and east);
7. The analytical results of borehole samples showed the highest TPH and chloride in boring SB-3, located near south end of west pit;
8. TPH in boring SB-3 decreased below 100 mg/Kg at approximately 25 feet bgs;
9. Chloride in boring SB-3 suggests migration to groundwater as the concentration reported at 3,530 mg/Kg at 35 feet bgs;
10. Groundwater samples from monitoring well (MW-1) located about 50 feet south (down gradient) of the west excavation reported chloride at 2,720 mg/L;
11. The background chloride concentration (MW-2) is 58.8 mg/L;
12. Analysis by synthetic precipitation leaching procedure (TCLP) reported no benzene (<-0.001 mg/L), BTEX (<0.005 mg/L) or TPH (<3.0 mg/L) in composite samples from the soil piles (west, north and south);
13. SPLP chloride results from the soil piles were 7.96 mg/L 9north and south piles) and 36 mg/L (west pile (refer to attached analytical summary);
14. Legacy is the owner of the approximate 40-acre tract encompassing the site.

Per the meeting on July 30, 2014, Legacy proposes the following:

Excavation Closure Plan

1. Remove remaining debris from Site for disposal at Sundance Services, located east of Eunice, New Mexico;
2. Grade bottom of west and east excavations to a level depth of at least 4 feet bgs;
3. Install 20ml liner in bottom of both excavations (refer to attached drawing showing proposed locations for liners);
4. Fill excavations with soil from west, north and south piles and top off with clean topsoil and seed;
5. Submit report to OCD District I and Santa Fe following closure of the excavation;

Groundwater Delineation Plan

6. Submit plan to OCD in Santa Fe and Hobbs for delineate elevated chloride in groundwater south of the site;
7. Delineation to include electromagnetic terrain (EM) conductivity survey and monitoring wells.

You approval of the excavation closure plan is requested . Please contact me if you have questions.
Sincerely,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 200
Midland, Texas 79701
Office – 432-687-0901
Cell – 432- 556-8656
Fax – 432-687-0456
mark@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

From: Oberding, Tomas, EMNRD [mailto:Tomas.Oberding@state.nm.us]
Sent: Wednesday, July 30, 2014 11:25 AM
To: Mark Larson; Adrian Jackson
Subject: 7-30 meeting

Aloha Mark and Adrian,

Was nice getting to see you (and meet you Adrian) in the office this morning. I'll await the summary mail for the official confirmation of approval, but based on the discussions, all looks ok to finish these sites with liners and backfill.
One note- the C-141 for the Gas plant site 1RP-3190 is online and can be found at:

http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx

enter 3190 and it is the first link
(you can search all the files by RP that way, as well as by API)-

http://ocdimage.emnrd.state.nm.us/Imaging/FileStore/santafeadmin/ao/256870/pto1419947681_1_ao.pdf

I look forward to working with you. Wishing you both a wonderful afternoon and please let me know if I can help.

Mahalo
-Doc

PS- spent 9 years from 2002-2011 in Hawaii before heading to VietNam and Japan for the past 3 years, so it's been a while since I lived on the mainland. Cheers!

Tomáš 'Doc' Oberding, PhD
Environmental Specialist – New Mexico Oil Conservation Division
Energy, Minerals and Natural Resources Department
1625 N. French Dr.
Hobbs, NM 88240
(O): (575) 393-6161 ext 111
(C): 575-370-3180
(F): (575) 393-0720
E-Mail: tomas.oberding@state.nm.us
Website: **MailScanner has detected a possible fraud attempt from "webmail.state.nm.us" claiming to be** http://www.emnrd.state.nm.us/ocd/

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This message has been scanned for viruses and dangerous content by **MailScanner**, and is believed to be clean.

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

1RP-3360

State of New Mexico
Energy Minerals and Natural Resources

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

HOBBS OCD

SEP 29 2014

RECEIVED

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

OPERATOR

☒ Initial Report ☒ Final Report

Name of Company: Legacy Reserves, L.P.	Contact: Heath Loftin, Production Superintendent
Address: 303 West Wall St., Ste. 1800, Midland, TX 79701	Telephone No.: (432) 689-5200
Facility Name: LMPSU Trash Pit	Facility Type: Unauthorized Solid Waste Disposal Pit

Surface Owner: Legacy Reserves, L.P.	Mineral Owner	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County: Lea
O	27	22S	37E	640	South	2,080	East	

Latitude 32° 21' 28.40" **Longitude** 103° 8' 50.07"

NATURE OF RELEASE

Type of Release: Produced water (historic)	Volume of Release: Unknown	Volume Recovered: N/A
Source of Release: Unlined disposal pit (historic)	Date and Hour of Occurrence Unknown	Date and Hour of Discovery: May 5, 2014
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom?	
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.* A compliant from an adjoining landowner identified the LMPSU as the location of an unauthorized trash pit that was used by a previous operator and buried in the early 2000's. Legacy Reserves, L.P., as current operator of the LMPSU, was informed of the trash pit in a letter from OCD in May 2011. Legacy contract with Etech to excavate the trash pit. While excavating the trash pit the contractor uncovered tow (2) historic unlined disposal pits that received produced water and hydrocarbons from the lease tank battery. The pits are visible in a historic aerial photograph dated February 4, 1968. The pits appeared covered in a later photograph (June 3, 1983).

Describe Area Affected and Cleanup Action Taken.* The trash and historic disposal pits are located about 500 feet northeast of the LMPSU tank battery. Etech excavated soil, trash and debris between about 4 and 20 feet below ground surface. The waste was segregated from the soil and hauled to a permitted disposal facility. Approximately 7,000 to as much as 9,000 cubic yards of soil was excavated and retained on location in 4 piles (west, north, south and center). The center pile, approximately 1,640 cubic yards, contained elevated concentrations of total petroleum hydrocarbons (YPH) and chloride and was hauled to Sundance Services, east of Eunice, New Mexico. Upon delineating the chloride and TPH in the vadose zone and a determination of leaching potential (SPLP) OCD approved closing the excavations by installing a 20 mil thickness liner in the bottom and covering with soil from the onsite piles. The disposal pits are located near the west side of the site. Two (2) monitoring wells (MW-1 and MW-2) were installed south and north of the disposal pits, respectively. Laboratory results of groundwater samples from well MW-2 reported chloride and total dissolved solids at 2720 mg/L and 6700 mg/L, respectively. Legacy will delineate the groundwater impact.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD 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 NMOCD 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, NMOCD 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: Heath Loftin	OIL CONSERVATION DIVISION 1RP-3360 Approved by Environmental Specialist:	
Printed Name: Heath Loftin		
Title: Production Superintendent	Approval Date: 9-29-14	Expiration Date:
E-mail Address: hloftin@legacylp.com	Conditions of Approval:	Attached ☐
Date: September 29, 2014 Phone: (432) 689-5200		

* Attach Additional Sheets If Necessary

Ogrid 240974
F10 1427359851
N70 1427 254875
P70 1427 255423

APPENDIX B

Boring Logs and Monitoring Well Completion Records

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	9 : 10				PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	7.5YR5/4 Brown organic smell, organic rich sandy soil, moist					
	5		SW				9:12 0.0 ppm
	10	7.5YR6/4 light brown sand v. fine - fine grains moist					9:13 0.0 ppm
	15	10YR7/3 v. pale brown, sandy clay v. fine to med grains, moist <5% chert	CL				9:14 0.0 ppm
	20	7.5YR8/5 pink caliche v. fine - fine sand grains friable	SW				9:17 0.0 ppm
	25	10YR7/4 v. pale brown, sand v. fine - fine grains, <2% chert					9:19 0.0 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : West of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 1

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING SOIL : ____ PPM SOIL : ____ PPM)
	26	<2% chert	SW				
	30	SAA					9:21 0.0 ppm
	35	SAA					9:21 0.0 ppm
	40	5YR5/6 yellowish red sand, river bed material					9:22 0.0 ppm
		TD : 40' Groundwater Not Observed					
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : West of West Excavation

LAI GEOLOGIST : AJ

DRILLING CONTRACTOR : SPC

DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 1

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	9 : 31				PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	7.5YR6/3 light sandy soil organic fine grain and small <2% amount of clay damp	SW				
	5						9:36 0.0 ppm
	10	clayey sand odor, damp	SM				9:40 0.0 ppm
	15	10YR7/1 light gray sand v. fine - med. strong odor moist	SW				9:41 0.0 ppm
	20	SAA <5% chert damp					9:43 2.6 ppm
	25						9:51 2.6 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South West of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 2

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____)	SAMPLE	REMARKS (BACKGROUND PID READING)
	26	7.5 YR8/3 Pink Sand v. fine - fine damp - no odor					9:51 2.6 ppm
	30	7.5YR2/4 pink	SW				9:53 2.6 ppm
	35	SAA damp increasing in cherty gravels					9:55 2.6 ppm
	40	7.5YR6/2 pinkish gray sand, odor, moist, chert gravel					9:56 0.0 ppm
		TD : 40' Groundwater Not Observed					
	45						
	50						

PID READING scale: 2 4 6 8 10 12 14 16 18

SOIL : _____ PPM

SOIL : _____ PPM

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : South West of West Excavation

LAI GEOLOGIST : AJ

DRILLING CONTRACTOR : SPC

DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 2

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC (11 : 37)	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 25)	SAMPLE	REMARKS (BACKGROUND PID READING)
	1	Soil Excavated to 10'					
	5						
	10	10YR7/3 v. pale brown, caliche friable damp	Caliche				
	15	10YR7/1 light gray caliche, friable strong odor damp					11:40 2.76 ppm
	20	10YR7/1 light gray sand v. fine - fine, 10YR7/1 light gray sand v. fine - fine, strong odor strong odor SAA	SW				11:42 1.28 ppm
	25						11:44 11.5 ppm

SOIL : _____ PPM
SOIL : _____ PPM

PID READING scale: 2 4 6 8 10 12 14 16 18

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South Bottom of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 3

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____) 2 4 6 8 10 12 14 16 18	SAMPLE	REMARKS: BACKGROUND PID READING (SOIL: _____ PPM; SOIL: _____ PPM)
	26	SAA					
		damp, odor					
	30	10YR6/2 light brownish gray, sand v. fine to fine	SW				11:45 2.6 ppm
		damp - moist odor 10% chert					
	35	TD : 35' Groundwater Not Observed					11:49 7.9 ppm
	40						
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : South Bottom of West Excavation

LAI GEOLOGIST : AJ

DRILLING CONTRACTOR : SPC

DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 3

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	8 : 48				PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	5YR5/6 yellowish red sand moist	SW				
	5						8:50 0.0 ppm
	10	10YR8/2 v. pale brown caliche, damp	Caliche				8:52 0.0 ppm
		50% chert, harder more consolidated layer					
	15	10YR8/3 v. pale brown sand, moist 10% chert	SW				8:54 0.0 ppm
	20	10YR7/4 v. pale brown sand					8:55 0.0 ppm
		<10% chert					
		damp					
	25	5YR5/6 yellowish red					8:58 0.0 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 4

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	26	sand			PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
							12:35 0.0 ppm
	30	SAA more hard, chert modules, 50% more	SW				8:59 0.0 ppm
	35	SAA less chert about 10% not as much river bed material as SB - 13					9:01 0.0 ppm
	40	TD : 40' Groundwater Not Observed					9:03 0.0 ppm
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 4

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
		11 : 55			PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	Soil Excavated to 5'					
	5						
	10	7.5YR7/4 pink sand odor	SW				12:02 2.6 ppm
	15	SAA					12:03 0.0 ppm
		odor					
	20	5YR5/6 yellowish red					12:05 0.0 ppm
		SAA moist odor					
	25	sand fine to v. fine moist, odor					12:07 2.6 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South East Corner of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 5

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____)	SAMPLE	REMARKS (BACKGROUND PID READING)
	26	SAA <15% chert	SW				12:07 2.6 ppm
	30	TD : 30' Groundwater Not Observed					12:09 2.6 ppm
	35						
	40						
	45						
	50						

PID READING scale: 2 4 6 8 10 12 14 16 18

REMARKS — BACKGROUND PID READING
SOIL : _____ PPM
SOIL : _____ PPM

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South East of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 5

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
		12 : 25			PPM X _____ 2 4 6 8 10 12 14 16 18		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	Soil Excavated to 10'					
	5						
	10	5YR5/6 yellowish red moist sandy clay v. fine - fine	CL				12:29 0.8 ppm
	15	10YR7/1 light gray clayey / snady fine v. fine moist	SM				12:30 0.8 ppm
	20	7.5YR8/5 pink caliche v. fine - fine sand grains friable	Caliche				12:31 0.0 ppm
	25						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 6

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	26	7.5 YR7/4 Pink Sand	SW		PPM X _____ 2 4 6 8 10 12 14 16 18		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
							12:35 0.0 ppm
	30	7.5YR6/4 light brown sand v.fine - fine					12:38 0.0 ppm
		TD : 30' Groundwater Not Observed					
	35						
	40						
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 6

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	10 : 40				PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	7.5YR5/8, strong brown sand, fine v. fine <2% chert					
	5						10:44 0.0 ppm
	10	SAA	SW				10:46 0.0 ppm
	15	7.5YR7/4 pink SAA Increased chert					10:48 0.0 ppm
	20	7.5YR5/8 strong brown					10:49 0.0 ppm
	25	SAA					

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : Center of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 7

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM SOIL : _____ PPM
	26	5YR5/6 Yellowish Red, moist sand clay v. fine - fine					
	30	SAA <5% chert					10:55 0.0 ppm
			SW				
	35	SAA					10:56 0.0 ppm
		Riverbed gravel SAA chert agate chalcedony					
	40	TD : 40' Groundwater Not Observed					10:58 0.0 ppm
	45						11:00 0.0 ppm
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : Center of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014
BORING NUMBER : SB - 7

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC (12 : 47)	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM)
	1						
	5	Soil Excavated to 20'					
	10						
	15						
	20	7.5YR 8/2 pinkish white caliche v. fine - sand, moist	Caliche				12:50 0.0 ppm
		7.5YR8/4 pink caliche with more consolidated sand (25 Ft.) moist					
	25						12:51 0.0 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 8

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM SOIL : _____ PPM
	26		Caliche				
	30	5YR5/6 Yellowish Red Sand Moist	SW				12:52 0.0 ppm
	35	SAA					12:53 0.0 ppm
	40	SAA TD : 40' Groundwater Not Observed					12:54 0.0 ppm
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : East of West Excavation

LAI GEOLOGIST : ANJ

DRILLING CONTRACTOR : SPC

DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 8

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	1 : 20				PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM
							SOIL : _____ PPM
	1	7.5 YR 6/6 reddish yellow SAA SB - 11					
	5		SW				1:22 0.8
	10	10YR v. pale brown sand very fine sand unconsildated damp					1:24 2.6
	15	7.5YR8/2 pinkish white caliche damp	Caliche				1:25 0.8
	20	7.5YR 7/4 pink sandy caliche 10% chert modules damp	SW				1:29 0.8
	25	SAA damp					1:32 2.6

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 9

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING SOIL: ____ PPM; SOIL: ____ PPM)
	26						
	30	5YR 4/6 yellowish red sand fine to v. fine grained sand unconsolidated moist	SW				1:35 2.6
	35	SAA					1:42 2.6
	40	5YR 4/6 yellowish red course to fine grain river channel deposit sand grains and chert v. moist agate					1:45 2.6
		TD : 40' Groundwater Not Observed					
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : East of West Excavation

LAI GEOLOGIST : AJ

DRILLING CONTRACTOR : Scarborough

DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 9

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
		12 : 40			PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM
							SOIL : _____ PPM
	1	7.5 YR 6/6 reddish yellow					
	5	Clayey sand with colored slight odor fine to red well rounded consolidated medium stiff clay	CL				12:47 0.8
	10	10YR 8/3 v. pale brown sandy clay moist semi consolidated 90% fine medium grains	CL				12:52 6.1
	15	7.5YR 8/2 pinkish white caliche					12:56 0.8
	20	7.5YR 8/4 pink	Caliche				1:00 0.8
	25						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 10

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____) 2 4 6 8 10 12 14 16 18	SAMPLE	REMARKS: BACKGROUND PID READING (SOIL: _____ PPM; SOIL: _____ PPM)
	26	5YR 8/3 pink sand - fine very fine grained, well rounded etc.	SW				1:02 0.8
	30	5YR 8/2 pinkish, caliche, friable	Caliche				1:06 0.8
	35	SAA	SW				1:08 0.8
		5YR 4/6 yellowish red sandy clay v. fine to medium unconsildated v. moist	CL				1:10 0.8
	40	TD : 40' Groundwater Not Observed					
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 10

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
		10 : 53			PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	7.5 YR 6/6 reddish yellow clayey sand, multi came out as core,					
	5	slight odor damp fine to med. well rounded grains consolidated medium stiff clay 10YR8/3 very pale brown friable,	SW				10:56 0.8
	10	20% course grains fine - medium sand grains unconsolidated damp slight odor chart molecules <5% SAA					11:00 0.8
	15						11:04 0.8
	20	7.5YR8/3 pink sand with fires					11:12 0.8
	25	5YR6/6 reddish yellow <10% chest modules fine med grained sand rounded unconsolidated damp, slight odor					11:18 0.8

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : East of West Excavation

LAI GEOLOGIST : ANJ

DRILLING CONTRACTOR : SPI

DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 11

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING; SOIL : ____ PPM; SOIL : ____ PPM)
	26						
	30	SAA	SW				11:20 0.8
		very moist					
	35	5YR 4/6 yellowish red					11:21 0.8
		SAA					
		moist					
		< 20% clay					
		5YR6/6 yellowish brown fin - ned grains cementation of calcite friable with consolidated					
	40	50% moist					11:27 0.8
		TD : 40' Groundwater Not Observed					
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : ____
LOCATION : Legacy Trash Pit
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : SPI
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014
BORING NUMBER : SB - 11

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC (1 : 55)	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING SOIL : ____ PPM SOIL : ____ PPM)
	1	Soil Excavated to 3'					
	5	7.5 YR 8/2 pinkish white Caliche friable, caliche cement, damp					2:03 0.8
	10	SAA	Caliche				2:05 0.8
	15	5YR8/3 pink, caliche more sand v. fine less consolidated damp					2:10 0.8
	20	5YR6/6 reddish yellow sand, <10% chart modules v. fine to fine grains sand	SW				2:15 0.8
	25						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North West of East Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPI
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 12

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____)	SAMPLE	REMARKS (BACKGROUND PID READING)
	26	5YR7/4 pink caliche v. fine - coarse grains unconsolidated	Caliche				2:20 0.8
	30	5YR6/6 reddish yellow sand <10% chert v. fine to fine grain sand	SW				2:23 0.8
	35						2:25 0.8
	40	5YR4/6 yellowish red over bed sands chert, agate, chalcedony TD : 40' Groundwater Not Observed					2:28 0.8
	45						
	50						

PID READING scale: 2 4 6 8 10 12 14 16 18

BACKGROUND PID READING
SOIL : _____ PPM
SOIL : _____ PPM

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North West of Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPI
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 12

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
		8:20			PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	5YR5/6 yellowish red sandy clay v. fine to fine grains					
	5	Caliche SA Before	CL				8:24 0.0
	10	10YR8/2 very pale brown, caliche 30% chert modules					8:26 0.0
	15	Caliche more fine grains no chert very friable	Caliche				8:27 0.0
	20	Caliche					8:28 0.0
	25		SW				

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South of East Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014
BORING NUMBER : SB - 13

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	26	10YR7/3 v. pale brown sand, <2% chert	SW				8:31 0.0
	30	10YR8/2 v. pale brown, caliche, friable					8:34 0.0
	35	5YR5/6 yellowish red sand v. fine - fine SAA Riverbed, chert, agate chalcedony					8:35 0.0
	40	TD : 40' Groundwater Not Observed					8:36 0.0
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : South of East Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPI
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014
BORING NUMBER : SB - 13

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC (2 : 40)	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____ ; 2 4 6 8 10 12 14 16 18)	SAMPLE	REMARKS (BACKGROUND PID READING SOIL : ____ PPM SOIL : ____ PPM)
	1	5YR 8/2 pinkish white					
	5	Caliche SA Before					2:45 0.8
			Caliche				
	10	Caliche					2:48 0.8
	15	SAA But harder and more consolidated chert					2:53 0.8
	20	SAA	SW				2:58 0.8
	25	SAA <10% chert models					3:01 0.8

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : East of East Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 14

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM SOIL : _____ PPM
	26						
		Really Hard					
		quartz stringer					
	30	5YR5/6 yellowish red					3:05 0.8
			SW				
	35	SAA					3:08 0.8
		SAA					
	40	TD : 40' Groundwater Not Observed					3:11 0.8
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER (TONS/ SQ. FT)

NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01

HOLE DIAMETER : 5"

LOCATION : East of East Excavation

LAI GEOLOGIST : AJ

DRILLING CONTRACTOR : SPI

DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : SB - 14

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
	10 : 15				PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	Soil Excavated to 2'					
	5	7.5YR7/4 pink sandy clay, friable, v. fine - fine grians	CL				10:17 0.0 ppm
	10	5YR5/6 yellowish red sand v. fine - fine, moist, no odor	SW				10:18 0.0 ppm
	15	5YR8/2 pinkish white, caliche, friable	Caliche				10:20 0.0 ppm
	20	5YR7/4 pink sand v. fine - fine moist, no odor	SW				10:22 0.0 ppm
	25	SAA					10:26 0.0 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : West of West Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPI
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : SB - 15

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____		BACKGROUND PID READING
					2 4 6 8 10 12 14 16 18		SOIL : _____ PPM SOIL : _____ PPM
	26						
	30	7.5YR6/4 light brown SAA, increased moister causing darker pink	SW				10:29 0.0 ppm
	35						10:30 0.0 ppm
		SAA with the addition of river bed gravels chert, agate, chalcedony					
	40	TD : 40' Groundwater Not Observed					10:32 0.0 ppm
	45						
	50						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North Center of West Excavation
LAI GEOLOGIST : ANJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 13 - 2014
BORING NUMBER : SB - 15

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X _____) 2 4 6 8 10 12 14 16 18	SAMPLE	REMARKS: BACKGROUND PID READING (SOIL: _____ PPM; SOIL: _____ PPM)
	1	7.5YR5/6 Strong brown, sandy clay, fine-med grain					
	5		CL				9:40 0.8 ppm
	10	10YR8/2 very pale caliche friable, dry chert modules fine sand grains, caliche concentration					9:46 0.8 ppm
	15	5YR7/6 Caliche, reddish yellow very grained sand less than 10% chert modules, slightly moist	Caliche				9:51 0.8 ppm
	20	SAA more chert modules and larger size					9:56 0.8 ppm
	25	Caliche 7.5YR8/2 pinkish white, friable, very fine grains, dry caliche concentration consolidated 50% coarse grains					9:58 0.8 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North of Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : Scarborough
DRILLING METHOD : AR

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 6 - 12 - 2014

BORING NUMBER : MW-2

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X ____) 2 4 6 8 10 12 14 16 18	SAMPLE	REMARKS: BACKGROUND PID READING (SOIL: ____ PPM; SOIL: ____ PPM)
	26		Caliche				
							10:00 0.8 ppm
	30	5YR6/6 reddish yellow very fine to med grained sand chert, Pink 5YR8/4, damp					
							10:02 0.8 ppm
	35	more moist SAA	SW				
	40	<2% chert very moist SAA					10:06 0.8 ppm
	45						
	50						10:15 0.8 ppm

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
LABORATORY TEST LOCATION
PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North of Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : MW-2

BORING RECORD

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING	SAMPLE	REMARKS
					PPM X _____ (2 4 6 8 10 12 14 16 18)		BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
43.27 ▽	51	5YR4/6 SAA, yellowish reddish fine med grained, very moist well rounded, sand grains	SW				10:15 0.8 ppm
	55						
		5YR4/6 yellowish reddish med grains sand sandy clay (no ribbon)					
		balled up very moist					
	60						10:24 0.8 ppm
		TD : 60' Groundwater Not Observed					
	65						
	70						
	75						

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : 14 - 0107 - 01
HOLE DIAMETER : 5"
LOCATION : North of Excavation
LAI GEOLOGIST : AJ
DRILLING CONTRACTOR : SPC
DRILLING METHOD : AR

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 6 - 13 - 2014

BORING NUMBER : MW-2

SUBGRADE - MONITORING WELL INSTALLATION RECORD

CASING STICKDOWN_____ FEET

TOP of CASING ELEVATION _____ FEET AMSL

GROUND LEVEL ELEVATION _____ FEET AMSL

TIME WELL INSTALLATION BEGAN:_____

TIME DRILLED STOPPED:_____

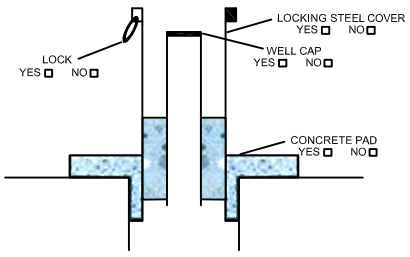
TIME WELL INSTALLATION FINISHED:_____

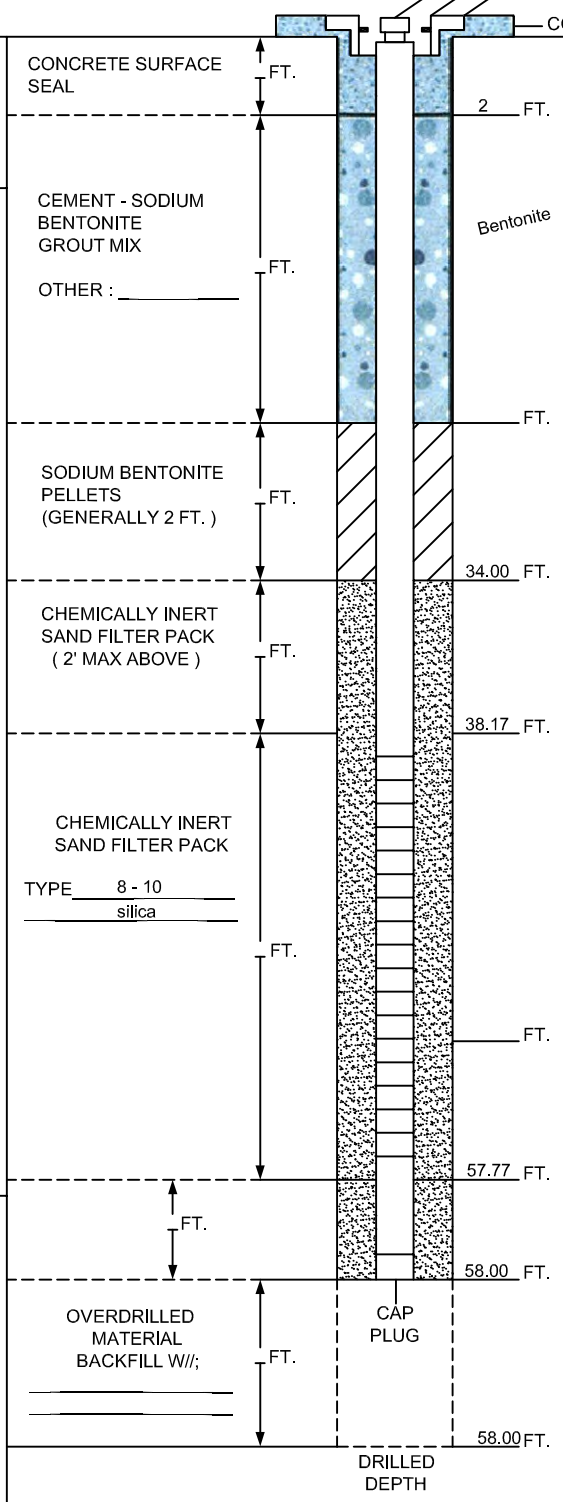
OBSERVATIONS

SUMP - 0.52

SCREEN - 9.73

ABOVE GRADE
MONITORING WELL INSTILLATION RECORD





SPECIFICATIONS

WATER TIGHT COVER : YES ☐ NO ☐

COMPRESSION CAP WITH LOCK : YES ☐ NO ☐

NEOPRENE WATER TIGHT GASKET : YES ☐ NO ☐

FLUSH WATER TIGHT PROTECTOR : YES ☐ NO ☐

CONCRETE PAD : YES ☐ NO ☐ SIZE_____

1. TYPE OF CASING: PVC ☐ GALVANIZED ☐ TEFLON ☐
2. TYPE OF CASING/SCREEN JOINTS: SCREW COUPLE ☐ OTHER:_____ ☐
3. TYPE OF WELL SCREEN: PVC ☐ GALVANIZED ☐ TEFLON ☐ OTHER_____ ☐
4. DIAMETER OF RISER AND WELL SCREEN (I.D.) RISER_____INCHES, SCREEN_____INCHES
5. SLOT SIZE OF SCREEN:_____
6. TYPE OF SCREEN PERFORATION: FACTORY SLOTTED ☐ OTHER_____ ☐
7. BOREHOLE DIAMETER=_____INCHES
8. WERE DRILLING ADDITIVES USED: YES ☐ NO ☐ BENTONITE ☐ WATER ☐ AIR ☐ GALLON / VOLUME USED:_____
9. WAS CASING USED: YES ☐ NO ☐ TYPE OF CONDUCTOR CASING? STEEL ☐ PVC ☐ DEPTH:_____TO_____ FEET DIAMETER OF CONDUCTOR CASING:_____
10. INTAL WATER LEVEL: 43.14 Ft. BGS
11. STABILIZED WATER LEVEL:_____
12. HOW WAS WELL DEVELOPED? BAILING PUMPING ☐ AIR SURGING (AIR or NITROGEN) ☐ OTHER_____ ☐
13. TIME SPENT on WELL DEVELOPMENT? _____ / _____MINUTES / HOURS
14. APPROXIMATE WATER VOLUME REMOVED: _____GALLONS
15. WATER CLARITY BEFORE DEVELOPMENT? CLEAR ☐ TURBIO ☐ OPAQUE ☐
16. WATER CLARITY AFTER DEVELOPMENT? CLEAR ☐ TURBIO ☐ OPAQUE ☐
17. WATER ODOR? IF YES, DESCRIBE_____
18. WATER COLOR? IF YES, DESCRIBE_____
19. WATER LEVEL SUMMARY (FROM TOP of CASING) BEFORE DEVELOPMENT _____FT. DATE_____ AFTER DEVELOPMENT _____FT. DATE_____ WATER LEVEL_____FT. DATE_____
20. SAMPLING METHOD_____

WELL COMPLETION MATERIALS :

LENGTH OF SCREEN USED : 20 FT.

LENGTH OF RISER USED : 40 FT.

AMOUNT OF BENTONITE USED : _____FT.

AMOUNT OF SAND FILTER USED : _____FT.

AMOUNT OF CEMENT USED : _____FT.

AMOUNT OF CONCRETE USED : _____FT.

LA arson & Associates, Inc.
Environmental Consultants

WELL NUMBER : MW - 2 (DPW - 2)

JOB NAME / NUMBER Legacy / 14 - 0107 - 01

LOCATION : N. of Location

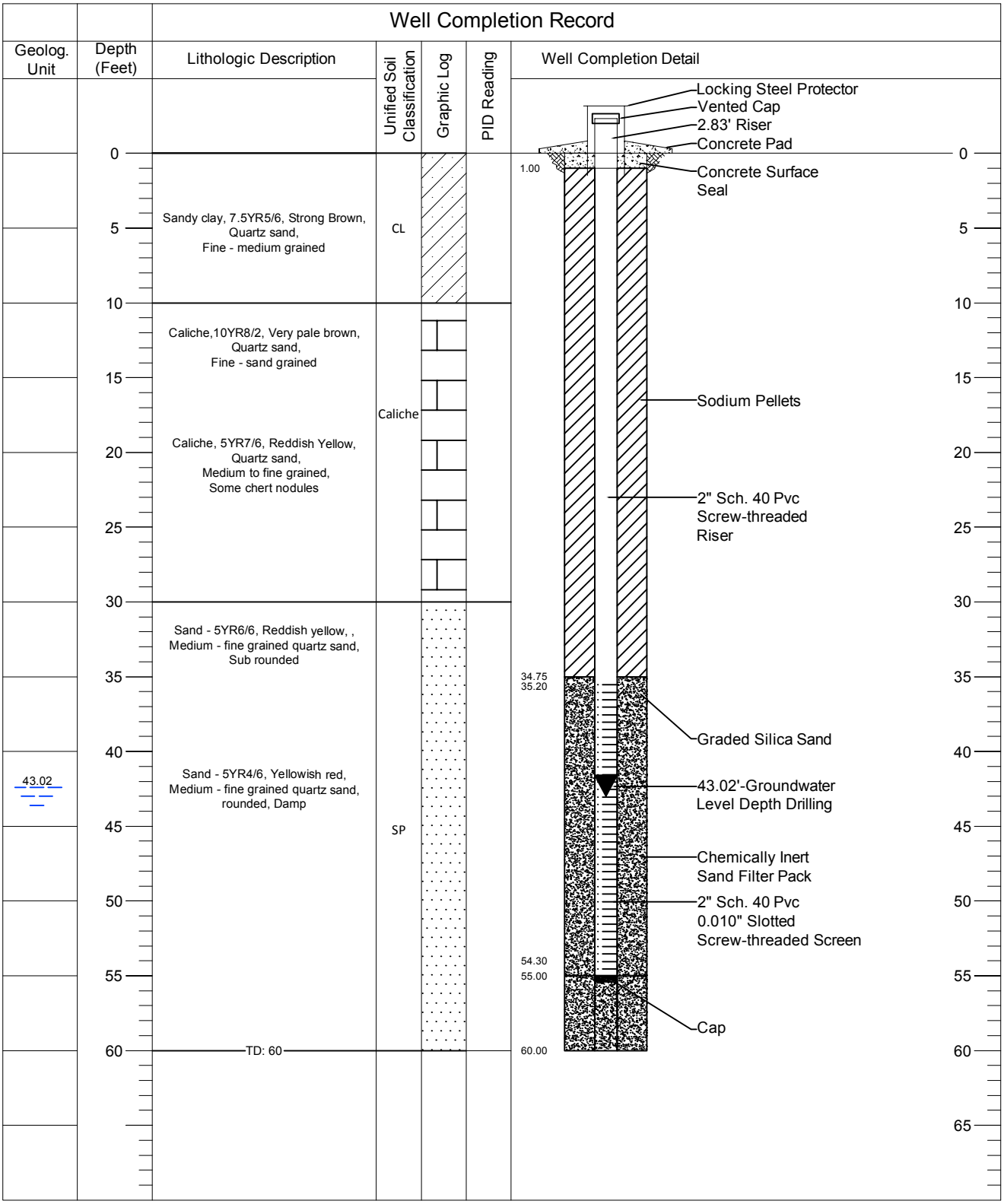
INSTALLATION DATE : 6 - 12 - 2014

LA GEOLOGIST : AJ

DRILLING CONTRACTOR : ADI

DRILLING METHOD : DR

Well Completion Record



Legend

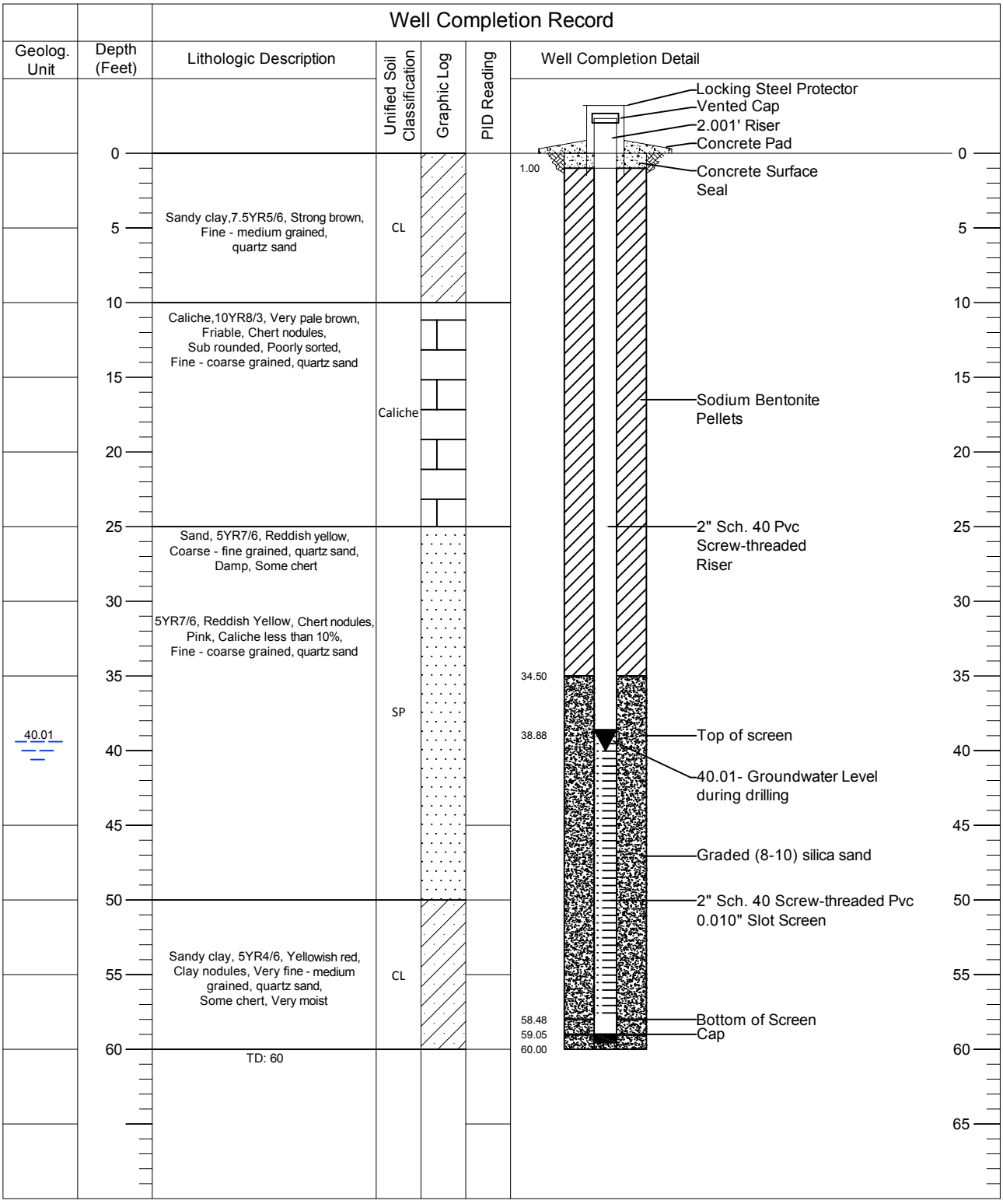
- Water Table (Time of Boring)

Date Drilled - 04/15/15
Drilling Method - Air Rotary
Drilled By - Scarborough Drilling Inc.
Logged By - KH
Checked By - -

Legacy Reserves, LP
Lea County, New Mexico
-
-
-

Larson & Associates, Inc.
Environmental Consultants

Well Completion Record



Legend

- Water Table (Time of Boring)

Date Drilled - 04/15/15
Drilling Method - Air Rotary
Drilled By - Scarborough Drilling Inc.
Logged By - KH
Checked By - -

Legacy Reserves, LP
Lea County, New Mexico

Larson & Associates, Inc.
Environmental Consultants

APPENDIX C

Historical Aerial Photographs

Historical Aerial Photographs

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000075032

Click on link above to access the map and satellite view of current property

Target Property:

Legacy Reserves, L.P., LMPSU Trash Pit Site
SW/4, SE/4, Section 27, Township 22 South, Range 37 East
Lea County, New Mexico 88231

Prepared For:

Larson & Associates

Order #: 33762
Job #: 75032
Project #: 14-0107-01
Date: 03/17/2014

phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.com

TARGET PROPERTY SUMMARY

Legacy Reserves, L.P., LMPSU Trash Pit Site
SW/4, SE/4, Section 27, Township 22 South, Range 37 East
Lea County, New Mexico 88231

USGS Quadrangle: ***Rattlesnake Canyon, NM***
Target Property Geometry: ***Point***

Target Property Longitude(s)/Latitude(s):
(-103.149394, 32.359258)

County/Parish Covered:
Lea (NM)

Zipcode(s) Covered:
Eunice NM: 88231

State(s) Covered:
NM

****Target property is located in Radon Zone 2.***
Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).

N
W E
S

JOB #: 75032 - 3/17/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *USDA*
DATE: *2011*
COUNTY: *LEA, NM*
SCALE: *1" = 700'*

GeoSearch

N
W E
S

JOB #: 75032 - 3/17/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *USGS*
DATE: *11-01-97*
COUNTY: *LEA, NM*
SCALE: *1" = 700'*

GeoSearch

N
W E
S

JOB #: 75032 - 3/17/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *USGS*
DATE: *06-03-83*
COUNTY: *LEA, NM*
SCALE: *1" = 1320'*

GeoSearch

N
W E
S

JOB #: 75032 - 3/18/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *USGS*
DATE: *02-04-68*
COUNTY: *LEA, NM*
SCALE: *1" = 1320'*

GeoSearch

N
W E
S

JOB #: 75032 - 3/18/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *USGS*
DATE: *02-04-68*
COUNTY: *LEA, NM*
SCALE: *1" = 700'*

GeoSearch

N
W E
S

JOB #: 75032 - 3/17/2014

SITE: *LEGACY RESERVES, L.P., LMPSU TRASH PIT SITE*
SOURCE: *AMS*
DATE: *04-28-54*
COUNTY: *LEA, NM*
SCALE: *1" = 700'*

GeoSearch

APPENDIX D

EM-34 Survey Field Sheets

Legacy Reserves, L.P.
LMPSU Trash Pit
EM-34 Terrain Conductivity Survey

Profile: S000 - S800 **Date:** 10/6/2014
Spacing: 100 ft
Direction: N-S
Operator: ML/AJ/SS

STATION	10 HD (mmhos/m)	10 VD (mmhos/m)	20 HD (mmhos/m)	20 VD (mmhos/m)	Comments
E000 S000	56.1	6.2	56.2	27.5	
E100	40.8	47.6	45.2	59.9	
E200	45.2	41.0	46.7	48.6	
E300	30.6	46.3	36.1	45.2	
E400	37.6	17.4	49.3	31.0	
E000 S100	39.1	43.4	48.6	47.7	
E100	54.8	75.4	51.0	66.7	
E200	52.0	50.3	59.5	57.0	
E300	42.3	30.2	42.3	54.7	
E400	38.7	35.9	43.8	44.3	
E500	22.4	39.4	33.6	42.2	
E000 S200	45.8	25.7	59.2	51.8	
E100	73.6	30.0	62.6	40.3	
E200	62.5	56.5	55.5	72.1	
E300	42.3	30.2	42.3	54.7	
E400	36.8	25.2	44.9	36.1	
E500	28.4	23.4	30.7	38.3	
E600	14.4	22.7	24.3	35.7	
E700	19.5	16.3	25.8	34.7	
E800	33.7	16.2	25.8	34.7	
E000 S300					interference
E100	82.3	102.7	64.3	147.7	East - West
E200	88.4	98.5	79.1	92	
E300	66.8	43.2	70.3	68.4	East - West
E400	53.8	34.1	58.4	64.5	East - West
E500	23.8	31	25.5	70.3	
E600	19.6	22.6	28.3	37.9	
E700	18.9	26.8	28.7	52.5	
E800	56.1	32.6	49.9	123.3	
E000 S400	71.7	63.3	89.0	162.0	
E100	77.1	52.7	79.9	77.5	
E200	57.4	57.8	63.5	56.2	
E300	34.1	42.8	46.2	60.2	
E400	26.6	35.7	37.8	52.9	
E500	24.4	35.9	31.0	42.2	
E600	64.3	24.2	58.5	8.4	East - West
E700	36.5	24.6	37.8	25.0	
E000 S500	74.2	50.7	87.5	51.7	
E100	85.0	49.2	85.5	7.6	Offset by 15 ft to west due to pipeline

Legacy Reserves, L.P.
LMPSU Trash Pit
EM-34 Terrain Conductivity Survey

Profile: S000 - S800 **Date:** 10/6/2014
Spacing: 100 ft
Direction: N-S
Operator: ML/AJ/SS

STATION	10 HD (mmhos/m)	10 VD (mmhos/m)	20 HD (mmhos/m)	20 VD (mmhos/m)	Comments
E200 S500	73.8	43.5	71.3	49.1	East - West
E300	36.2	28.2	43.7	41.5	
E400	24.1	31.5	34.1	49.5	
E500	27.7	21.5	34.9	36.2	
E000 S600	53.4	54.3	52.5	53.4	East - West
E100	38.6	42.4	50.4	75.8	
E200	57.3	45.9	66.5	40.6	
E300	26.2	27.5	36.9	48.4	
E400	24.1	51.1	32.6	15.2	East - West
E500	29.6	38.8	36.6	36.3	
E000 S700	47.6	47.0	53.4	112.1	
E100	36.3	40.1	46.1	69.9	East - West
E200	39.1	11.5	47.2	45.1	East - West
E300	34.9	34.8	44.6	38.4	
E400	35.9	53.8	44.4	62.8	
E500	35.0	39.6	45.4	34.2	
E600	46.1	78.6	50.7	41.0	
E000 S800	36.6	57.0	46.4	46.5	East - West
E100	33.4	34.8	44.9	33.1	
E200	26.1	39.0	24.6	57.1	
E300	29.9	34.3	40.7	51.7	
E400	40.7	56.7	51.2	68.5	
E500	46.7	46.5	57.1	42.5	
E600	39.1	41.5	52.2	46.6	

Legacy Reserves, L.P.
LMPSU Trash Pit
EM-34 Terrain Conductivity Survey

Profile: S000 - S800 **Date:** 2/2/2015 - 2/3/2015
Spacing: 100 ft
Direction: N-S
Operator: ML/KH/SS

STATION	10 HD (mmhos/m)	10 VD (mmhos/m)	20 HD (mmhos/m)	20 VD (mmhos/m)	Comments
W-100 S-000	40.0	48.9	35.7	I	
W-200	19.0	26.8	29.2	58.1	
W-300	22.3	31.0	28.0	51.2	East- West
W-400	18.7	17.2	29.4	34.4	
W-100 S-100	35.7	45.6	42.2	56.7	
W-200	27.0	31.6	37.6	49.3	
W-300	24.9	60.9	26.8	133.2	
W-400	19.2	17.9	24.6	40.2	
W-100 S-200	37.2	I	46.6	I	
W-200	22.5	I	31.5	I	East- West
W-300	35.2	I	85.4	I	
W-400	25.0	124.7	37.6	5.5	
W-100 S-300	66.7	I	81.2	I	
W-200	I	I	42.6	I	
W-300	39.1	46.5	46.2	6.2	
W-400	47.7	34.8	59.1	60.0	
W-100 S-400	51.7	I	71.1	I	
W-200	52.8	I	67.9	175.5	
W-300	54.8	I	31.1	127.2	
W-400	156.3	I	108.3	197.9	
W-100 S-500	74.4	65.3	87.7	57.1	
W-200	49.7	192.5	56.7	198.8	
W-300	77.3	I	49.7	I	
W-400	20.6	I	31.9	I	
W-100 S-600	53.8	51.4	65.9	57.6	
W-200	73.1	I	64.0	38.8	
W-300	55.9	135.1	52.6	I	
W-400	22.1	I	40.6	26.1	
W-100 S-700	55.9	35.4	59.9	42.3	
W-200	44.8	28.8	55.7	I	
W-300	42.3	I	45.5	I	
W-400	30.2	I	42.3	27.3	
W-100 S-800	52.0	30.2	62.8	46.4	
W-200	41.5	44.2	59.7	49.5	East- West
W-300	34.5	I	22.5	I	Northeast - Southwest
W-400	35.7	25.2	48.8	57.5	

APPENDIX E

NMOSE Well Permits

Scott A. Verhines, P.E.
State Engineer

Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 553903
File Nbr: CP 01410

Sep. 03, 2014

MARK J LARSON
LEGACY RESERVES LP
PO BOX 50685
MIDLAND, TX 79710-0685

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 09/15/2015, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 09/15/2015.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

D Dunaway

Deborah Dunaway
(575)622-6521

Enclosure

explore

File No. CP 1410

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER

(check applicable box):

For fees, see State Engineer website: http://www.ose.state.nm.us/ 2-34539

Purpose:	☐ Pollution Control And / Or Recovery	☐ Geo-Thermal
☐ Exploratory	☐ Construction Site De-Watering	☐ Other (Describe):
☒ Monitoring	☐ Mineral De-Watering	

A separate permit will be required to apply water to beneficial use.

☐ Temporary Request - Requested Start Date: Requested End Date:

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

1. APPLICANT(S)

Name: **Legacy Reserves, L.P.**	Name:
Contact or Agent: check here if Agent ☒ **Mark J. Larson (See attached letter from Legacy)**	Contact or Agent: check here if Agent ☐
Mailing Address: **P.O. Box 50685**	Mailing Address:
City: **Midland**	City:
State: **TX** Zip Code: **79710-0685**	State: Zip Code:
Phone: **(432) 556-8656** ☐ Home ☒ Cell Phone (Work): **(432) 687-0901**	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): **mark@laenvironmental.com**	E-mail (optional):

FOR OSE INTERNAL USE

Application for Permit, Form wr-07, Rev 4/12/12

File Number: CP 1410	Trn Number: 553903
Trans Description (optional): EXPL POD1 monitor	
Sub-Basin: N/A	
PCW/LOG Due Date: 9-15-15	

2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

☐ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☐ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☒ Lat/Long (WGS84) (to the nearest 1/10th of second)

Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
MW-2	103 8 52.3	32 21 31.9	SW/4, SE/4, S 27, T22S, R37E

NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional well descriptions are attached: ☐ Yes ☒ No **If yes, how many**_____

Other description relating well to common landmarks, streets, or other: **Well will be located approximately 585 feet northeast of Legacy Reserves LMPSU Well No. 201 with API #30-025-10471**

Well is on land owned by: **Legacy Reserves, L.P.**

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ Yes ☒ No
If yes, how many_____

Approximate depth of well (feet): **60.00**	Outside diameter of well casing (inches): **2.00**
Driller Name: **Layne Scarborough**	Driller License Number: **WD-1188**

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

The purpose of the monitoring well is to determine the background (up gradient) concentrations of constituents to determine if a release to groundwater has occurred. The expected duration of monitoring will be approximately 2 years.

FOR OSE INTERNAL USE — Application for Permit, Form wr-07

File Number:	CP 1410	Trn Number:	553903

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory:	**Pollution Control and/or Recovery:**	**Construction De-Watering:**	**Mine De-Watering:**
☐ Include a description of any proposed pump test, if applicable.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for the pollution control or recovery operation. ☐ The estimated maximum period of time for completion of the operation. ☐ The annual diversion amount. ☐ The annual consumptive use amount. ☐ The maximum amount of water to be diverted and injected for the duration of the operation. ☐ The method and place of discharge.	☐ Include a description of the proposed dewatering operation, ☐ The estimated duration of the operation, ☐ The maximum amount of water to be diverted, ☐ A description of the need for the dewatering operation, and, ☐ A description of how the diverted water will be disposed of.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for mine dewatering. ☐ The estimated maximum period of time for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the aquifer(s). ☐ The maximum amount of water to be diverted per annum. ☐ The maximum amount of water to be diverted for the duration of the operation. ☐ The quality of the water. ☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed to estimate effects on surface water rights and underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.
Monitoring: ☒ Include the reason for the monitoring well, and, ☒ The duration of the planned monitoring.	☐ The method of measurement of water produced and discharged. ☐ The source of water to be injected. ☐ The method of measurement of water injected. ☐ The characteristics of the aquifer. ☐ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ☐ Proof of any permit required from the New Mexico Environment Department. ☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	**Geo-Thermal:** ☐ Include a description of the geothermal heat exchange project, ☐ The amount of water to be diverted and re-injected for the project, ☐ The time frame for constructing the geothermal heat exchange project, and, ☐ The duration of the project. ☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	

ACKNOWLEDGEMENT

I, We (name of applicant(s)), **Mark J. Larson**
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☑ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 3rd day of September 20 14, for the State Engineer,

Scott A. Verhines, P.E., State Engineer

By: Signature — Juan Hernandez, Print

Title: District II Staff Manager

FOR OSE INTERNAL USE — Application for Permit, Form wr-07

File Number: CP 1140 — Trn Number: 553903

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

1A Depth of the well shall not exceed the thickness of the valley fill.

4 No water shall be appropriated and beneficially used under this permit.

7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.

C Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.

C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before , unless a permit to use water from this well is acquired from the Office of the State Engineer.

P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

LOG The Point of Diversion CP 01410 POD1 must be completed and the Well Log filed on or before 09/15/2015.

Trn Desc: CP 01410 POD1 File Number: CP 01410
Trn Number: 553903

Locator Tool Report

General Information:

Application ID: 29 Date: 08-28-2014 Time: 10:36:53

WR File Number: CP
Purpose: POINT OF DIVERSION

Applicant First Name: LEGACY RESERVES
Applicant Last Name: LP

GW Basin: CAPITAN
County: LEA

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

Coordinate System Details:

Geographic Coordinates:

Latitude:	32 Degrees	21 Minutes	31.9 Seconds	N
Longitude:	103 Degrees	8 Minutes	52.3 Seconds	W

Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters)	N: 3,581,722	E: 674,273
NAD 1983(92) (Survey Feet)	N: 11,751,032	E: 2,212,176
NAD 1927 (Meters)	N: 3,581,520	E: 674,320
NAD 1927 (Survey Feet)	N: 11,750,371	E: 2,212,333

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 151,276	E: 276,574
NAD 1983(92) (Survey Feet)	N: 496,312	E: 907,392
NAD 1927 (Meters)	N: 151,258	E: 264,020
NAD 1927 (Survey Feet)	N: 496,254	E: 866,207

LEGACY
RESERVES

August 24, 2014

VIA FAX: (575) 623-8559

Ms. Catherine Goetz
New Mexico State Engineer District 2
4505 W. 2nd Street
Roswell, New Mexico 88201

RE: Agent for Legacy Reserves, L.P.

Dear Ms. Goetz,

This letter authorizes Mark J. Larson to act as agent for Legacy Reserves, L.P., for the purpose of submitting applications to the Office of the State Engineer for monitoring wells. Please contact me at (432) 689-5200, if you have questions.

Sincerely,

Heath Loftin
Production Superintendent

cc: Mark Larson

STATE ENGINEER OFFICE
2014 AUG 26 PM 2:25

Legacy Reserves
303 West Wall, Suite 1400 • Midland, Texas 79701 • P.O. Box 10848 • Midland, Texas 79702
OFFICE 432-689-5200 • FAX 432-689-5297

Goetz, Catherine, OSE

From: Mark Larson [Mark@laenvironmental.com]
Sent: Thursday, August 21, 2014 3:48 PM
To: Goetz, Catherine, OSE
Subject: RE: email correction to MW request

Dear Ms. Goetz,
This message is to confirm that the request is for a permanent well rather than temporary.
Thanks,
Mark

From: Goetz, Catherine, OSE [mailto:Catherine.Goetz@state.nm.us]
Sent: Wednesday, August 20, 2014 8:40 AM
To: Mark Larson
Subject: email correction to MW request

email correction to MW request duration before we can process

Catherine Goetz

--

Larson & Associates, Inc.
Environmental Consultants

August 10, 2014

Ms. Catherine Goetz
Water Resource Specialist
Office of the State Engineer District II
19000 West Second Street
Roswell, NM 88201-1712

Re: Monitoring Well Permit Application, Legacy Reserves, L.P., LMPSU Site, Unit O (SW/4, SE/4), Section 27, Township 22 South, Range 37 East, Lea County, New Mexico

Dear Ms. Goetz,

Per our recent telephone conversation, Legacy Reserves, L.P. (Legacy) is now the owners of a 40-acres tract (SW/4, SE/4) where the referenced monitoring well will be drilled. The property was previously owned by "Graham" in Section 27, Township 22 South, Range 37 East, in Lea County, New Mexico. Larson & Associates, Inc. (LAI), as agent to Legacy, resubmits the enclosed application (Form WR-07) in triplet for a monitoring well (MW-2) at the referenced location. As we discussed another well is located on the property that was drilled under the direction of a previous consultant. During our telephone conversation you were unable to locate a record for the monitoring well on the NMOSE database. No information except that the well is constructed with 2 inch schedule 40 PVC is available. Please let me know how we should proceed with registering the well, if necessary. Please contact me at (432) 687-0901 (office) or (432) 556-8656 (cell) should you have questions.

Sincerely,

Larson & Associates, Inc.

Mark J. Larson
mark@laenvironmental.com

cc: Heath Loftin, Legacy Reserves, L.P.

STATE ENGINEER OFFICE
2014 AUG 13 AM 10:55

OFFICE OF THE STATE ENGINEER/INTERSTATE STREAM COMMISSION – ROSWELL OFFICE

OFFICIAL RECEIPT NUMBER: 2- 34539 DATE: 6/3/14 FILE NO.: Lea County

TOTAL: 5.00 RECEIVED: Five 00/100 DOLLARS CHECK NO.: 11260 CASH: _____

PAYOR: Larson & Associates, Inc ADDRESS: P.O Box 50685 CITY: Midland STATE: TX

ZIP: 79710 RECEIVED BY: AR

INSTRUCTIONS: Indicate the number of actions to the left of the appropriate type of filing. Complete the receipt information. **Original** to payor; **pink** copy to Program Support/ASD; **yellow** copy remains in district office, and **goldenrod** copy to accompany application being filed. If you make an error, void original and all copies and submit to Program Support/ASD along with other valid receipts.

A. Ground Water Rights Filing Fees

___ 1.	Declaration of Water Right	$ 1.00
___ 2.	Application to Appropriate or Supplement Domestic 72-12-1 Well	$125.00
___ 3.	Application for Stock Well	$ 5.00
___ 4.	Application to Repair or Deepen 72-12-1 Well	$ 75.00
___ 5.	Application for Replacement 72-12-1 Well	$ 75.00
___ 6.	Application to Change Purpose of Use 72-12-1 Well	$ 75.00
___ 7.	Application to Appropriate Irrig., Mun., or Comm. Use	$ 25.00
___ 8.	Application for Supplemental Non 72-12-1 Well	$ 25.00
___ 9.	Application to Change Location of Non 72-12-1 Well	$ 25.00
___10.	Application to Change Place or Purpose of Use Non 72-12-1 Well	$ 25.00
___11.	Application to Change Location of Well and Place and/or Purpose of Use	$ 50.00
___12.	Application for Extension of Time	$ 25.00
___13.	Proof of Application to Beneficial Use	$ 25.00
___14.	Application to Change Point of Diversion and Place and/or Purpose of Use from Surface Water to Ground Water	$ 50.00
1 15.	Application for Test, Expl. Observ. Well	$ 5.00
___16.	Change of Ownership of Water Right	$ 2.00
___17.	Application to Repair or Deepen Non 72-12-1 Well	$ 5.00

B. Surface Water Rights Filing Fees

___ 1.	Declaration of Water Right	$ 10.00
___ 2.	Amended Declaration	$ 25.00
___ 3.	Declaration of Livestock Water Impoundment	$ 10.00
___ 4.	Application for Livestock Water Impoundment	$ 10.00
___ 5.	Application to Appropriate	$ 25.00
___ 6.	Notice of Intent to Appropriate	$ 25.00
___ 7.	Application to Change Point of Diversion	$100.00
___ 8.	Application to Change Place and/or Purpose of Use	$100.00
___ 9.	Application to Change Point of Diversion and Place and/or Purpose of Use	$200.00
___10.	Application to Change Point of Diversion and Place and/or Purpose of Use from Ground Water to Surface Water	$200.00
___11.	Application for Extension of Time	$ 50.00
___12.	Supplemental Well to a Surface Right	$100.00
___13.	Return Flow Credit	$100.00
___14.	Proof of Completion of Works	$ 25.00
___15.	Proof of Application of Water to Beneficial Use	$ 25.00
___16.	Water Development Plan	$100.00
___17.	Change of Ownership of Water Right	$ 5.00

C. Miscellaneous Fees

___ 1.	Application for Well Driller's License	$50.00
___ 2.	Application for Renewal of Well Driller's License	$50.00
___ 3.	Application to Amend Well Driller's License	$50.00

D. Reproduction of Documents

_____ @ 0.25¢/copy $_____

_____ Map(s) $_____

E. Certification $_____

E. Other $_____

G. Comments:

Mail

_____

_____

_____

_____

_____

CASH ONLY IF ALL *CheckLock*™ SECURITY FEATURES LISTED ON BACK INDICATE NO TAMPERING OR COPYING

LARSON & ASSOCIATES, INC.
Environmental Consultants

P.O. BOX 50685
MIDLAND, TX 79710-0685
432-687-0901

WELLS FARGO BANK, NA
MIDLAND, TX 79705
37-65/1119

11260

6/1/2014

PAY TO THE ORDER OF New Mexico State Engineer $ 5.00

five + No/100 DOLLARS

▲ TAMPER RESISTANT TONER AREA ▲

PINK ICON DISAPPEARS WITH HEAT

MEMO WR-07 Permit
Legacy 14-0107

⑈011260⑈ ⑆111900659⑆ 0612947291⑈

LARSON & ASSOCIATES, INC.

11260

Copy

2014 JUN -3 AM 10:37

LARSON & ASSOCIATES, INC.

11260

017851

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER

(check applicable box):

For fees, see State Engineer website: http://www.ose.state.nm.us/

Purpose:	☐ Pollution Control And / Or Recovery	☐ Geo-Thermal
☐ Exploratory	☐ Construction Site De-Watering	☐ Other (Describe):
☒ Monitoring	☐ Mineral De-Watering	

FILE COPY

A separate permit will be required to apply water to beneficial use.

☒ Temporary Request - Requested Start Date: **June 9, 2014** Requested End Date: **June 30, 2014**

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

1. APPLICANT(S)

Name: **Legacy Reserves, L.P.**	Name:
Contact or Agent: check here if Agent ☒ **Mark J. Larson**	Contact or Agent: check here if Agent ☐
Mailing Address: **P.O. Box 50685**	Mailing Address:
City: **Midland**	City:
State: **TX** Zip Code: **79710-0685**	State: Zip Code:
Phone: **(432) 556-8656** ☐ Home ☒ Cell Phone (Work): **(432) 687-0901**	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): **mark@laenvironmental.com**	E-mail (optional):

2014 JUN 13 AM 10:37

FOR OSE INTERNAL USE Application for Permit, Form wr-07, Rev 4/12/12

File Number:	Trn Number:
Trans Description (optional):	
Sub-Basin:	
PCW/LOG Due Date:	

2. **WELL(S)** Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

☐ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☐ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☒ Lat/Long (WGS84) (to the nearest 1/10th of second)

Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range)* OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
MW-2	-103.147870	32.358867	SW/4, SE/4, S 27, T22S, R37E

NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional well descriptions are attached: ☐ Yes ☒ No If yes, how many_____

Other description relating well to common landmarks, streets, or other: **Well is located approximately 950 feet northwest of Legacy Reserves LMPSU Well No. 201 with API #30-025-10471**

ML ML

Well is on land owned by: ~~Graham~~ Legacy Reserves, L.P.

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. **Attached?** ☐ Yes ☒ No
If yes, how many_____

Approximate depth of well (feet): **60.00**	Outside diameter of well casing (inches): **2.00**
Driller Name: **Layne Scarborough**	Driller License Number: **WD-1188**

2014 JUN -3 A 10:38

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

The purpose of the monitoring well is to determine background (up gradient) concentrations of constituents to determine if a release to groundwater has occurred. The expected duration of monitoring will be approximately 2 years.

FOR OSE INTERNAL USE — Application for Permit, Form wr-07

File Number:	Trn Number:

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory:	**Pollution Control and/or Recovery:**	**Construction De-Watering:**	**Mine De-Watering:**
☐ Include a description of any proposed pump test, if applicable.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for the pollution control or recovery operation. ☐ The estimated maximum period of time for completion of the operation. ☐ The annual diversion amount. ☐ The annual consumptive use amount. ☐ The maximum amount of water to be diverted and injected for the duration of the operation. ☐ The method and place of discharge.	☐ Include a description of the proposed dewatering operation, ☐ The estimated duration of the operation, ☐ The maximum amount of water to be diverted, ☐ A description of the need for the dewatering operation, and, ☐ A description of how the diverted water will be disposed of.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for mine dewatering. ☐ The estimated maximum period of time for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the aquifer(s). ☐ The maximum amount of water to be diverted per annum. ☐ The maximum amount of water to be diverted for the duration of the operation. ☐ The quality of the water. ☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed to estimate effects on surface water rights and underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.
Monitoring: ☒ Include the reason for the monitoring well, and, ☒ The duration of the planned monitoring.	☐ The method of measurement of water produced and discharged. ☐ The source of water to be injected. ☐ The method of measurement of water injected. ☐ The characteristics of the aquifer. ☐ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ☐ Proof of any permit required from the New Mexico Environment Department. ☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	**Geo-Thermal:** ☐ Include a description of the geothermal heat exchange project, ☐ The amount of water to be diverted and re-injected for the project, ☐ The time frame for constructing the geothermal heat exchange project, and, ☐ The duration of the project. ☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	

ACKNOWLEDGEMENT

I, We (name of applicant(s)), **Mark J. Larson**
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

2014 JUN -3 AM 10:38

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☐ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this _____ day of _____ 20 _____, for the State Engineer,

_____, State Engineer

By: _____ _____
Signature Print

Title:

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

File Number:	Trn Number:

APPENDIX F

Laboratory Analytical Reports and Chain of Custody Documentation

February 05, 2015

Coty Woolf
Larson & Associates
507 N. Marienfeld #200
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456

Order No.: 1501283

RE: Legacy Trash Pit

Dear Coty Woolf:

DHL Analytical, Inc. received 2 sample(s) on 1/29/2015 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-14-13

Table of Contents

Miscellaneous Documents **3**

CaseNarrative 1501283 ..... **6**

WorkOrderSampleSummary 1501283 ..... **7**

PrepDatesReport 1501283 ..... **8**

AnalyticalDatesReport 1501283 ..... **9**

Analytical Report 1501283 ..... **10**

AnalyticalQCSummaryReport 1501283 ..... **12**

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

№ 66476

CHAIN-OF-CUSTODY

CLIENT: Larson and Associates
ADDRESS: 507 N. Marienfeld Ste. 205 Midland, TX 79701
PHONE: (432)687-0901 FAX/E-MAIL:
DATA REPORTED TO: Mark Larson
ADDITIONAL REPORT COPIES TO: Cory Wolf

DATE: 1/28/2015 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 1501293
PROJECT LOCATION OR NAME: Legacy Trash Pit
CLENT PROJECT #: 14-0107-01 COLLECTOR: Sarah Shissler

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021]	TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐	GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐	VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐	SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐	8081 PEST ☐ 608 PEST/PCB ☐ 8082 PCB ☐ 8270 PCB ☐	8270 O-P PEST ☐ 608 PEST ☐ 8082 PCB ☐ 8270 PEST ☐	8321 HERB ☐ 8330 EXPL ☐ PERCHLORATE ☐	METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐	RCRA ☐ TX11 ☐ ___ ☐	PH ☐ HEX CHROM ☐ ALKALINITY ☒	CHLORIDE ☒ ANIONS ☐	TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐	TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐	RCI ☐ TOX ☐ FLASHPOINT ☐	TDS ☒ TSS ☐ % MOISTURE ☐ CYANIDE ☐	NO5, 504, Cat, Nat, Kt, Mg ☒	FIELD NOTES
MW-2	01	1/28/15	3:00	W	Poly	1		X														X	X			X	X	X
"			↓			1				X																		
MW-1	02		2:15			1		X																				
"		↓		↓	↓	1				X																		
TOTAL																												

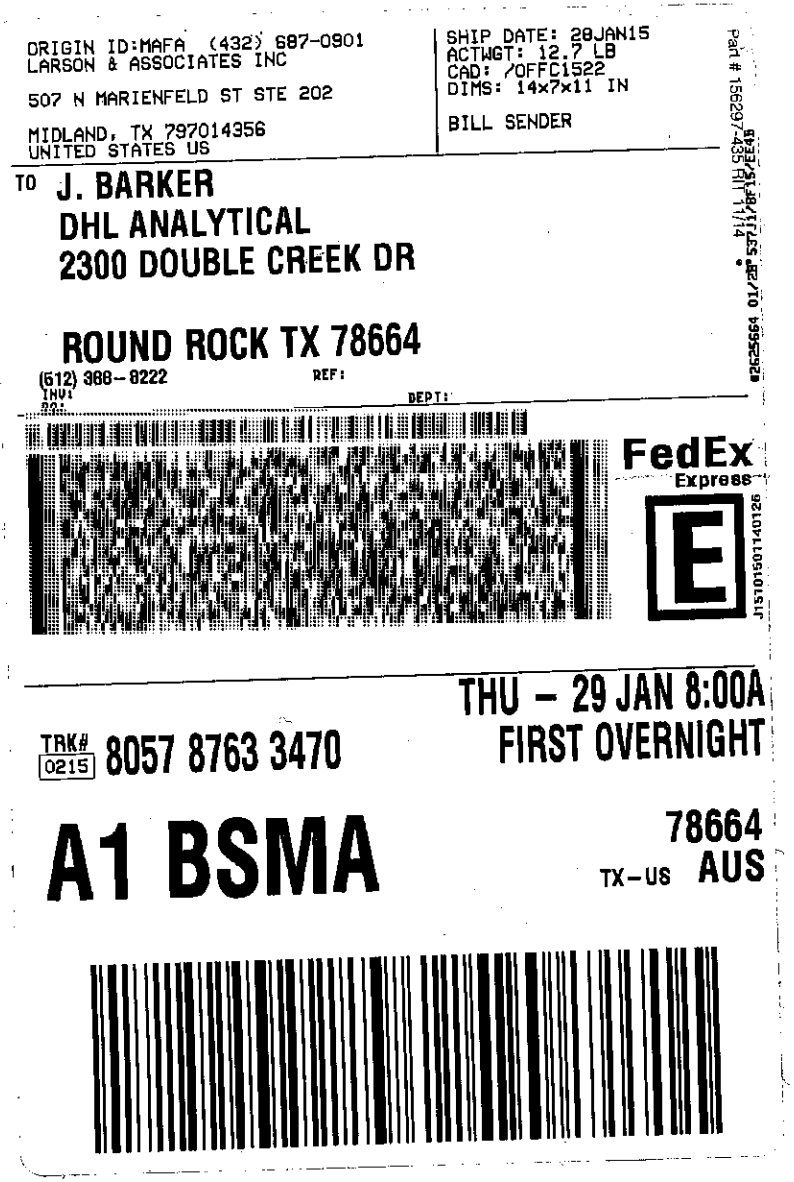
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	1/28/2015 5:00PM	[signature]
[signature]	1/29/15 830	[signature]
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

3

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☐
OTHER ☐ _____

LABORATORY USE ONLY:
RECEIVING TEMP: 0.6 THERM #: 57
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
☒ CARRIER BILL #: Fedex
☐ APC DELIVERY
☐ HAND DELIVERED


ORIGIN ID:MAFA (432) 687-0901
LARSON & ASSOCIATES INC
507 N MARIENFELD ST STE 202
MIDLAND, TX 797014356
UNITED STATES US
SHIP DATE: 28JAN15
ACTWGT: 12.7 LB
CAD: /OFFC1522
DIMS: 14x7x11 IN
BILL SENDER
TO J. BARKER
DHL ANALYTICAL
2300 DOUBLE CREEK DR
ROUND ROCK TX 78664
(512) 388-8222
REF:
INV:
DEPT:
FedEx
Express
THU - 29 JAN 8:00A
FIRST OVERNIGHT
TRK# 0215 8057 8763 3470
A1 BSMA
78664
TX-US AUS

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Larson & Associates** Date Received: **1/29/2015**

Work Order Number **1501283** Received by **JB**

Checklist completed by: _____ 1/29/2015 Reviewed by SS 1/29/2015
Signature Date Initials Date

Carrier name FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	0.6 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *05-Feb-15*

CLIENT: Larson & Associates
Project: Legacy Trash Pit
Lab Order: 1501283

CASE NARRATIVE

Sample was analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 1/29/15. A total of 2 samples were received. The Time of Collection was Mountain Standard Time. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 2/1/15 the matrix spike and matrix spike duplicate recoveries were below control limits for three analytes. These are flagged accordingly in the QC summary report. The reference sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 2/2/15 LCVL8-150202 was above control limits for Sodium. This is flagged accordingly. The associated CCV8-150202 was within control limits for this analyte. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 1/29/15 the matrix spike recovery was slightly below control limits for Nitrate-N. This is flagged accordingly in the QC summary report. The reference sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *05-Feb-15*

CLIENT: Larson & Associates
Project: Legacy Trash Pit
Lab Order: 1501283

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1501283-01	MW-2		01/28/15 02:00 PM	1/29/2015
1501283-02	MW-1		01/28/15 02:15 PM	1/29/2015

Lab Order: 1501283
Client: Larson & Associates
Project: Legacy Trash Pit

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1501283-01A	MW-2	01/28/15 02:00 PM	Aqueous	M2320 B	Alkalinity Preparation	02/02/15 09:34 AM	68041
	MW-2	01/28/15 02:00 PM	Aqueous	E300	Anion Preparation	01/29/15 12:45 PM	67992
	MW-2	01/28/15 02:00 PM	Aqueous	E300	Anion Preparation	01/29/15 12:45 PM	67992
	MW-2	01/28/15 02:00 PM	Aqueous	M2540C	TDS Preparation	01/29/15 09:44 AM	67984
1501283-01B	MW-2	01/28/15 02:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	01/30/15 08:42 AM	67999
	MW-2	01/28/15 02:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	01/30/15 08:42 AM	67999
1501283-02A	MW-1	01/28/15 02:15 PM	Aqueous	M2320 B	Alkalinity Preparation	02/02/15 09:34 AM	68041
	MW-1	01/28/15 02:15 PM	Aqueous	E300	Anion Preparation	01/29/15 12:45 PM	67992
	MW-1	01/28/15 02:15 PM	Aqueous	E300	Anion Preparation	01/29/15 12:45 PM	67992
	MW-1	01/28/15 02:15 PM	Aqueous	M2540C	TDS Preparation	01/29/15 09:44 AM	67984
1501283-02B	MW-1	01/28/15 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	01/30/15 08:42 AM	67999
	MW-1	01/28/15 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	01/30/15 08:42 AM	67999

Lab Order: 1501283
Client: Larson & Associates
Project: Legacy Trash Pit

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1501283-01A	MW-2	Aqueous	M2320 B	Alkalinity	68041	1	02/02/15 10:46 AM	TITRATOR_150202B
	MW-2	Aqueous	E300	Anions by IC method - Water	67992	10	01/29/15 04:48 PM	IC_150129A
	MW-2	Aqueous	E300	Anions by IC method - Water	67992	1	01/29/15 02:55 PM	IC_150129A
	MW-2	Aqueous	M2540C	Total Dissolved Solids	67984	1	01/30/15 08:30 AM	WC_150129A
1501283-01B	MW-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	67999	1	02/02/15 05:07 PM	ICP-MS4_150202E
	MW-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	67999	100	02/01/15 05:52 PM	ICP-MS4_150201C
1501283-02A	MW-1	Aqueous	M2320 B	Alkalinity	68041	1	02/02/15 11:03 AM	TITRATOR_150202B
	MW-1	Aqueous	E300	Anions by IC method - Water	67992	100	01/29/15 05:02 PM	IC_150129A
	MW-1	Aqueous	E300	Anions by IC method - Water	67992	1	01/29/15 03:09 PM	IC_150129A
	MW-1	Aqueous	M2540C	Total Dissolved Solids	67984	1	01/30/15 08:30 AM	WC_150129A
1501283-02B	MW-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	67999	100	02/02/15 05:09 PM	ICP-MS4_150202E
	MW-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	67999	10	02/01/15 05:54 PM	ICP-MS4_150201C

DHL Analytical, Inc.

Date: *05-Feb-15*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-2
Project:	Legacy Trash Pit	**Lab ID:**	1501283-01
Project No:	14-0107-01	**Collection Date:**	01/28/15 02:00 PM
Lab Order:	1501283	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Calcium	91.1	10.0	30.0		mg/L	100	02/01/15 05:52 PM
Magnesium	36.6	10.0	30.0		mg/L	100	02/01/15 05:52 PM
Potassium	7.30	0.100	0.300		mg/L	1	02/02/15 05:07 PM
Sodium	126	10.0	30.0		mg/L	100	02/01/15 05:52 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	71.3	3.00	10.0		mg/L	10	01/29/15 04:48 PM
Nitrate-N	1.36	0.100	0.500		mg/L	1	01/29/15 02:55 PM
Sulfate	112	1.00	3.00		mg/L	1	01/29/15 02:55 PM
ALKALINITY		**M2320 B**					Analyst: **LM**
Alkalinity, Bicarbonate (As CaCO3)	288	10.0	20.0		mg/L @ pH 4.52	1	02/02/15 10:46 AM
Alkalinity, Carbonate (As CaCO3)	ND	10.0	20.0		mg/L @ pH 4.52	1	02/02/15 10:46 AM
Alkalinity, Hydroxide (As CaCO3)	ND	10.0	20.0		mg/L @ pH 4.52	1	02/02/15 10:46 AM
Alkalinity, Total (As CaCO3)	288	20.0	20.0		mg/L @ pH 4.52	1	02/02/15 10:46 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **PT**
Total Dissolved Solids (Residue, Filterable)	573	10.0	10.0		mg/L	1	01/30/15 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *05-Feb-15*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-1
Project:	Legacy Trash Pit	**Lab ID:**	1501283-02
Project No:	14-0107-01	**Collection Date:**	01/28/15 02:15 PM
Lab Order:	1501283	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Calcium	610	10.0	30.0		mg/L	100	02/02/15 05:09 PM
Magnesium	437	10.0	30.0		mg/L	100	02/02/15 05:09 PM
Potassium	32.5	1.00	3.00		mg/L	10	02/01/15 05:54 PM
Sodium	1430	10.0	30.0		mg/L	100	02/02/15 05:09 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	3230	30.0	100		mg/L	100	01/29/15 05:02 PM
Nitrate-N	ND	0.100	0.500		mg/L	1	01/29/15 03:09 PM
Sulfate	947	100	300		mg/L	100	01/29/15 05:02 PM
ALKALINITY		**M2320 B**					Analyst: **LM**
Alkalinity, Bicarbonate (As CaCO3)	417	10.0	20.0		mg/L @ pH 4.54	1	02/02/15 11:03 AM
Alkalinity, Carbonate (As CaCO3)	ND	10.0	20.0		mg/L @ pH 4.54	1	02/02/15 11:03 AM
Alkalinity, Hydroxide (As CaCO3)	ND	10.0	20.0		mg/L @ pH 4.54	1	02/02/15 11:03 AM
Alkalinity, Total (As CaCO3)	417	20.0	20.0		mg/L @ pH 4.54	1	02/02/15 11:03 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **PT**
Total Dissolved Solids (Residue, Filterable)	6260	50.0	50.0		mg/L	1	01/30/15 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150201C

The QC data in batch 67999 applies to the following samples: 1501283-01B, 1501283-02B

Sample ID **MB-67999** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 5:20:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	0.300								
Magnesium	ND	0.300								
Potassium	ND	0.300								
Sodium	ND	0.300								

Sample ID **LCS-67999** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 5:31:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.09	0.300	5.00	0	102	80	120			
Magnesium	5.04	0.300	5.00	0	101	80	120			
Potassium	4.97	0.300	5.00	0	99.5	80	120			
Sodium	5.08	0.300	5.00	0	102	80	120			

Sample ID **LCSD-67999** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 5:38:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.14	0.300	5.00	0	103	80	120	0.978	15	
Magnesium	5.09	0.300	5.00	0	102	80	120	0.996	15	
Potassium	4.98	0.300	5.00	0	99.5	80	120	0.059	15	
Sodium	5.14	0.300	5.00	0	103	80	120	1.15	15	

Sample ID **1501203-02C SD** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 5:44:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	2.19	1.50	0	2.23				1.53	10	

Sample ID **1501203-02C PDS** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 6:04:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	7.66	0.300	5.00	2.23	109	80	120			

Sample ID **1501203-02C MS** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 6:06:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150201C

Sample ID **1501203-02C MS**	Batch ID: **67999**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_150201C**	Analysis Date: **2/1/2015 6:06:00 PM**	Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	175	0.300	5.00	173	54.0	80	120			S
Magnesium	43.1	0.300	5.00	39.4	74.1	80	120			S
Potassium	7.11	0.300	5.00	2.23	97.6	80	120			
Sodium	61.7	0.300	5.00	57.9	76.1	80	120			S

Sample ID **1501203-02C MSD**	Batch ID: **67999**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_150201C**	Analysis Date: **2/1/2015 6:08:00 PM**	Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	175	0.300	5.00	173	56.4	80	120	0.069	15	S
Magnesium	42.9	0.300	5.00	39.4	70.0	80	120	0.475	15	S
Potassium	7.13	0.300	5.00	2.23	98.1	80	120	0.309	15	
Sodium	61.2	0.300	5.00	57.9	65.9	80	120	0.828	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150201C

Sample ID	**ICV-150201**	Batch ID:	**R77824**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_150201C**	Analysis Date:	**2/1/2015 3:32:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.49	0.300	2.50	0	99.6	90	110			
Magnesium	2.64	0.300	2.50	0	106	90	110			
Potassium	2.62	0.300	2.50	0	105	90	110			
Sodium	2.64	0.300	2.50	0	106	90	110			

Sample ID	**LCVL-150201**	Batch ID:	**R77824**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_150201C**	Analysis Date:	**2/1/2015 3:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0974	0.300	0.100	0	97.4	70	130			
Magnesium	0.102	0.300	0.100	0	102	70	130			
Potassium	0.111	0.300	0.100	0	111	70	130			
Sodium	0.107	0.300	0.100	0	107	70	130			

Sample ID	**CCV2-150201**	Batch ID:	**R77824**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_150201C**	Analysis Date:	**2/1/2015 5:09:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.12	0.300	5.00	0	102	90	110			
Magnesium	5.19	0.300	5.00	0	104	90	110			
Potassium	5.16	0.300	5.00	0	103	90	110			
Sodium	5.26	0.300	5.00	0	105	90	110			

Sample ID	**LCVL2-150201**	Batch ID:	**R77824**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_150201C**	Analysis Date:	**2/1/2015 5:15:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.113	0.300	0.100	0	113	70	130			
Magnesium	0.101	0.300	0.100	0	101	70	130			
Potassium	0.104	0.300	0.100	0	104	70	130			
Sodium	0.114	0.300	0.100	0	114	70	130			

Sample ID	**CCV3-150201**	Batch ID:	**R77824**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_150201C**	Analysis Date:	**2/1/2015 6:10:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.10	0.300	5.00	0	102	90	110			
Magnesium	5.19	0.300	5.00	0	104	90	110			
Potassium	5.15	0.300	5.00	0	103	90	110			
Sodium	5.24	0.300	5.00	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150201C

Sample ID **LCVL3-150201** Batch ID: **R77824** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_150201C** Analysis Date: **2/1/2015 6:14:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.100	0.300	0.100	0	100	70	130			
Magnesium	0.102	0.300	0.100	0	102	70	130			
Potassium	0.0946	0.300	0.100	0	94.6	70	130			
Sodium	0.122	0.300	0.100	0	122	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_150202E**

The QC data in batch 67999 applies to the following samples: 1501283-01B, 1501283-02B

Sample ID **1501203-02C SD** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_150202E** Analysis Date: **2/2/2015 4:57:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	168	15.0	0	168				0.453	10	
Magnesium	40.0	15.0	0	39.8				0.432	10	
Sodium	58.0	15.0	0	57.6				0.686	10	

Sample ID **1501203-02C PDS** Batch ID: **67999** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_150202E** Analysis Date: **2/2/2015 4:59:00 PM** Prep Date: **1/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	219	3.00	50.0	168	102	80	120			
Magnesium	95.3	3.00	50.0	39.8	111	80	120			
Sodium	114	3.00	50.0	57.6	112	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150202E

Sample ID **ICV-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 10:45:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.48	0.300	2.50	0	99.1	90	110			
Magnesium	2.64	0.300	2.50	0	106	90	110			
Sodium	2.62	0.300	2.50	0	105	90	110			

Sample ID **LCVL-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 10:49:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0923	0.300	0.100	0	92.3	70	130			
Magnesium	0.101	0.300	0.100	0	101	70	130			
Sodium	0.100	0.300	0.100	0	100	70	130			

Sample ID **CCV7-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 4:34:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.81	0.300	5.00	0	96.2	90	110			
Magnesium	5.00	0.300	5.00	0	99.9	90	110			
Sodium	4.96	0.300	5.00	0	99.3	90	110			

Sample ID **LCVL7-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 4:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0991	0.300	0.100	0	99.1	70	130			
Magnesium	0.0997	0.300	0.100	0	99.7	70	130			
Sodium	0.101	0.300	0.100	0	101	70	130			

Sample ID **CCV8-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 5:20:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.78	0.300	5.00	0	95.5	90	110			
Magnesium	4.93	0.300	5.00	0	98.6	90	110			
Sodium	4.97	0.300	5.00	0	99.3	90	110			

Sample ID **LCVL8-150202**	Batch ID: **R77850**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_150202E**	Analysis Date: **2/2/2015 5:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.103	0.300	0.100	0	103	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_150202E

Sample ID **LCVL8-150202** Batch ID: **R77850** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_150202E** Analysis Date: **2/2/2015 5:31:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.148	0.300	0.100	0	148	70	130			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: IC_150129A

The QC data in batch 67992 applies to the following samples: 1501283-01A, 1501283-02A

Sample ID	**MB-67992**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 1:55:22 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.00								
Nitrate-N	ND	0.500								
Sulfate	ND	3.00								

Sample ID	**LCS-67992**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 2:09:58 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.78	1.00	10.00	0	97.8	90	110			
Nitrate-N	4.90	0.500	5.000	0	97.9	90	110			
Sulfate	29.4	3.00	30.00	0	98.0	90	110			

Sample ID	**LCSD-67992**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 2:24:35 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110	5.72	20	
Nitrate-N	4.87	0.500	5.000	0	97.4	90	110	0.549	20	
Sulfate	29.1	3.00	30.00	0	97.1	90	110	0.922	20	

Sample ID	**1501283-01AMS**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 3:35:19 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	5.30	0.500	4.516	1.357	87.3	90	110			S
Sulfate	134	3.00	20.00	111.8	109	90	110			

Sample ID	**1501283-01AMSD**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 3:49:55 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	5.57	0.500	4.516	1.357	93.2	90	110	4.91	20	
Sulfate	133	3.00	20.00	111.8	109	90	110	0.122	20	

Sample ID	**1501283-01AMS**	Batch ID:	**67992**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC_150129A**	Analysis Date:	**1/29/2015 4:04:31 PM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	272	10.0	200.0	71.32	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: IC_150129A

Sample ID **1501283-01AMSD**	Batch ID: **67992**	TestNo: **E300**	Units: **mg/L**		
SampType: **MSD**	Run ID: **IC_150129A**	Analysis Date: **1/29/2015 4:19:08 PM**	Prep Date: **1/29/2015**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	271	10.0	200.0	71.32	99.9	90	110	0.462	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: IC_150129A

Sample ID **ICV-150129**	Batch ID: **R77813**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC_150129A**	Analysis Date: **1/29/2015 12:55:17 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.8	1.00	25.00	0	99.3	90	110			
Nitrate-N	12.5	0.500	12.50	0	99.8	90	110			
Sulfate	74.0	3.00	75.00	0	98.7	90	110			

Sample ID **CCV1-150129**	Batch ID: **R77813**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC_150129A**	Analysis Date: **1/29/2015 5:19:15 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.86	1.00	10.00	0	98.6	90	110			
Nitrate-N	4.91	0.500	5.000	0	98.2	90	110			
Sulfate	29.4	3.00	30.00	0	98.1	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_150202B

The QC data in batch 68041 applies to the following samples: 1501283-01A, 1501283-02A

Sample ID **MB-68041** Batch ID: **68041** TestNo: **M2320 B** Units: **mg/L @ pH 4.49**
SampType: **MBLK** Run ID: **TITRATOR_150202B** Analysis Date: **2/2/2015 10:19:00 AM** Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	20.0								
Alkalinity, Carbonate (As CaCO3)	ND	20.0								
Alkalinity, Hydroxide (As CaCO3)	ND	20.0								
Alkalinity, Total (As CaCO3)	ND	20.0								

Sample ID **LCS-68041** Batch ID: **68041** TestNo: **M2320 B** Units: **mg/L @ pH 4.52**
SampType: **LCS** Run ID: **TITRATOR_150202B** Analysis Date: **2/2/2015 10:24:00 AM** Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	53.0	20.0	50.00	0	106	74	129			

Sample ID **1501296-06E DUP** Batch ID: **68041** TestNo: **M2320 B** Units: **mg/L @ pH 4.54**
SampType: **DUP** Run ID: **TITRATOR_150202B** Analysis Date: **2/2/2015 11:54:00 AM** Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	41.5	20.0	0	42.40				2.15	20	
Alkalinity, Carbonate (As CaCO3)	0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	41.5	20.0	0	42.40				2.15	20	

Sample ID **1502001-05E DUP** Batch ID: **68041** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_150202B** Analysis Date: **2/2/2015 3:16:00 PM** Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	241	20.0	0	241.1				0.221	20	
Alkalinity, Carbonate (As CaCO3)	0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	241	20.0	0	241.1				0.221	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_150202B

Sample ID **ICV-150202**	Batch ID: **R77870**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.51**
SampType: **ICV**	Run ID: **TITRATOR_150202B**	Analysis Date: **2/2/2015 10:17:00 AM**	Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	6.96	20.0	0							
Alkalinity, Carbonate (As CaCO3)	93.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	98	102			

Sample ID **CCV1-150202**	Batch ID: **R77870**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.52**
SampType: **CCV**	Run ID: **TITRATOR_150202B**	Analysis Date: **2/2/2015 12:01:00 PM**	Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	19.0	20.0	0							
Alkalinity, Carbonate (As CaCO3)	81.6	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0							
Alkalinity, Total (As CaCO3)	101	20.0	100.0	0	101	90	110			

Sample ID **CCV2-150202**	Batch ID: **R77870**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.51**
SampType: **CCV**	Run ID: **TITRATOR_150202B**	Analysis Date: **2/2/2015 3:07:00 PM**	Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.64	20.0	0							
Alkalinity, Carbonate (As CaCO3)	91.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	90	110			

Sample ID **CCV3-150202**	Batch ID: **R77870**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.51**
SampType: **CCV**	Run ID: **TITRATOR_150202B**	Analysis Date: **2/2/2015 3:33:00 PM**	Prep Date: **2/2/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	13.3	20.0	0							
Alkalinity, Carbonate (As CaCO3)	86.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	0	20.0	0							
Alkalinity, Total (As CaCO3)	99.4	20.0	100.0	0	99.4	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1501283
Project: Legacy Trash Pit

ANALYTICAL QC SUMMARY REPORT

RunID: WC_150129A

The QC data in batch 67984 applies to the following samples: 1501283-01A, 1501283-02A

Sample ID	**MB-67984**	Batch ID:	**67984**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_150129A**	Analysis Date:	**1/30/2015 8:30:00 AM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10.0								

Sample ID	**LCS-67984**	Batch ID:	**67984**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_150129A**	Analysis Date:	**1/30/2015 8:30:00 AM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	783	10.0	745.6	0	105	90	113			

Sample ID	**1501246-01D-DUP**	Batch ID:	**67984**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_150129A**	Analysis Date:	**1/30/2015 8:30:00 AM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	263	10.0	0	268.0				1.88	5	

Sample ID	**1501246-02D-DUP**	Batch ID:	**67984**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_150129A**	Analysis Date:	**1/30/2015 8:30:00 AM**	Prep Date:	**1/29/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	206	10.0	0	207.0				0.484	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

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Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

(Corrected Report)

Sarah Shissler
Larson and Associates, Inc.

P. O. Box 50685
Midland, TX, 79710

Report Date: June 17, 2015

Work Order: 15060221

Project Name: Legacy LMPSU Trash Pit
Project Number: 14-0107-01

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
394442	MW-4	water	2015-06-01	13:30	2015-06-02
394443	MW-3	water	2015-06-01	14:00	2015-06-02
394444	MW-1	water	2015-06-01	14:30	2015-06-02
394445	MW-2	water	2015-06-01	15:00	2015-06-02

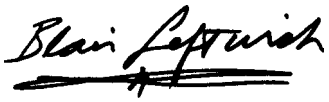
Report Corrections (Work Order 15060221)

- 6-17-15:Corrected Field Codes for Samples 394442 & 394443

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

TraceAnalysis, Inc. uses the attached chain of custody (COC) as the laboratory check-in documentation which includes sample receipt, temperature, sample preservation method and condition, collection date and time, testing requested, company, sampler, contacts and any special remarks.

This report consists of a total of 34 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director
James Taylor, Assistant Director
Brian Pellam, Operations Manager

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Case Narrative

Samples for project Legacy LMPSU Trash Pit were received by TraceAnalysis, Inc. on 2015-06-02 and assigned to work order 15060221. Samples for work order 15060221 were received intact at a temperature of 2.6 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
Alkalinity	SM 2320B	103334	2015-06-09 at 18:29	122142	2015-06-09 at 18:33
BTEX	S 8021B	103216	2015-06-03 at 14:19	121995	2015-06-03 at 14:19
Ca, Dissolved	S 6010C	103232	2015-06-04 at 14:09	122047	2015-06-05 at 13:17
Chloride (IC)	E 300.0	103219	2015-06-03 at 12:00	121999	2015-06-03 at 15:08
Chloride (IC)	E 300.0	103221	2015-06-03 at 13:00	122002	2015-06-03 at 15:08
Conductivity	SM 2510B	103313	2015-06-08 at 17:30	122119	2015-06-09 at 09:05
Fluoride (IC)	E 300.0	103219	2015-06-03 at 12:00	121999	2015-06-03 at 15:08
Fluoride (IC)	E 300.0	103221	2015-06-03 at 13:00	122002	2015-06-03 at 15:08
K, Dissolved	S 6010C	103232	2015-06-04 at 14:09	122047	2015-06-05 at 13:17
Mg, Dissolved	S 6010C	103232	2015-06-04 at 14:09	122047	2015-06-05 at 13:17
Na, Dissolved	S 6010C	103232	2015-06-04 at 14:09	122047	2015-06-05 at 13:17
NO3 (IC)	E 300.0	103219	2015-06-03 at 12:00	121999	2015-06-03 at 15:08
NO3 (IC)	E 300.0	103221	2015-06-03 at 13:00	122002	2015-06-03 at 15:08
pH	SM 4500-H+	103185	2015-06-02 at 17:24	121953	2015-06-02 at 17:25
SO4 (IC)	E 300.0	103219	2015-06-03 at 12:00	121999	2015-06-03 at 15:08
SO4 (IC)	E 300.0	103221	2015-06-03 at 13:00	122002	2015-06-03 at 15:08
TDS	SM 2540C	103212	2015-06-03 at 19:28	121991	2015-06-03 at 19:29

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 15060221 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	122142	Date Analyzed:	2015-06-09	Analyzed By:	HJ
Prep Batch:	103334	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Hydroxide Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Carbonate Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Bicarbonate Alkalinity		2,3,5,7,8	**236**	mg/L as CaCo3	1	20.0
Total Alkalinity		2,3,5,7,8	**236**	mg/L as CaCo3	1	20.0

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	121995	Date Analyzed:	2015-06-03	Analyzed By:	MT
Prep Batch:	103216	Sample Preparation:	2015-06-03	Prepared By:	MT

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Benzene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100
Toluene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100
Ethylbenzene		2,3,5,7,8	<0.00100	mg/L	1	0.00100
Xylene		2,3,5,7,8	**0.00150**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		8	0.0887	mg/L	1	0.100	89	74.6 - 120
4-Bromofluorobenzene (4-BFB)		8	0.0854	mg/L	1	0.100	85	72.9 - 120

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	Cations	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	122047	Date Analyzed:	2015-06-05	Analyzed By:	RR
Prep Batch:	103232	Sample Preparation:	2015-06-04	Prepared By:	RR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Dissolved Calcium		3,5,7,8	**83.0**	mg/L	10	1.00
Dissolved Potassium		3,5,7,8	**10.1**	mg/L	10	1.00
Dissolved Magnesium		3,5,7,8	**58.6**	mg/L	10	1.00
Dissolved Sodium		3,5,7,8	**186**	mg/L	10	1.00

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	122119	Date Analyzed:	2015-06-09	Analyzed By:	RL
Prep Batch:	103313	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Specific Conductance		2,3,5,7,8	**1450**	uMHOS/cm	1	0.00

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Fluoride		2,3,5,7,8	**3.74**	mg/L	2	0.500
Chloride		2,3,5,7,8	**190**	mg/L	10	2.50
Sulfate		2,3,5,7,8	**251**	mg/L	10	2.50

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Nitrate-N		2,3,5,7,8	**2.34**	mg/L	2	0.0400

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	121953	Date Analyzed:	2015-06-02	Analyzed By:	HJ
Prep Batch:	103185	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
pH		2,3,7,8	**7.69**		s.u.	1	2.00

Sample: 394442 - MW-4

Laboratory:	Lubbock				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	121991	Date Analyzed:	2015-06-03	Analyzed By:	HJ
Prep Batch:	103212	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Total Dissolved Solids		2,3,5,7,8	**918**		mg/L	20	2.50

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	122142	Date Analyzed:	2015-06-09	Analyzed By:	HJ
Prep Batch:	103334	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Hydroxide Alkalinity	U	2,3,5,7,8	<20.0		mg/L as CaCo3	1	20.0
Carbonate Alkalinity	U	2,3,5,7,8	<20.0		mg/L as CaCo3	1	20.0
Bicarbonate Alkalinity		2,3,5,7,8	**290**		mg/L as CaCo3	1	20.0
Total Alkalinity		2,3,5,7,8	**290**		mg/L as CaCo3	1	20.0

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	121995	Date Analyzed:	2015-06-03	Analyzed By:	MT
Prep Batch:	103216	Sample Preparation:	2015-06-03	Prepared By:	MT

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Benzene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Toluene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Ethylbenzene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Xylene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		8	0.0895	mg/L	1	0.100	90	74.6 - 120
4-Bromofluorobenzene (4-BFB)		8	0.0840	mg/L	1	0.100	84	72.9 - 120

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	Cations	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	122047	Date Analyzed:	2015-06-05	Analyzed By:	RR
Prep Batch:	103232	Sample Preparation:	2015-06-04	Prepared By:	RR

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Dissolved Calcium		3,5,7,8	**57.6**		mg/L	10	1.00
Dissolved Potassium		3,5,7,8	**10.7**		mg/L	10	1.00
Dissolved Magnesium		3,5,7,8	**60.5**		mg/L	10	1.00
Dissolved Sodium		3,5,7,8	**324**		mg/L	10	1.00

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	122119	Date Analyzed:	2015-06-09	Analyzed By:	RL
Prep Batch:	103313	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Specific Conductance		2,3,5,7,8	**1900**		uMHOS/cm	1	0.00

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Fluoride		2,3,5,7,8	**3.88**		mg/L	2	0.500
Chloride		2,3,5,7,8	**399**		mg/L	50	2.50
Sulfate		2,3,5,7,8	**234**		mg/L	50	2.50

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Nitrate-N		2,3,5,7,8	**2.19**		mg/L	2	0.0400

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	121953	Date Analyzed:	2015-06-02	Analyzed By:	HJ
Prep Batch:	103185	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
pH		2,3,7,8	**7.77**		s.u.	1	2.00

Sample: 394443 - MW-3

Laboratory:	Lubbock				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	121991	Date Analyzed:	2015-06-03	Analyzed By:	HJ
Prep Batch:	103212	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Total Dissolved Solids		2,3,5,7,8	**1180**		mg/L	20	2.50

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	122142	Date Analyzed:	2015-06-09	Analyzed By:	HJ
Prep Batch:	103334	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Hydroxide Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Carbonate Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Bicarbonate Alkalinity		2,3,5,7,8	**653**	mg/L as CaCo3	1	20.0
Total Alkalinity		2,3,5,7,8	**653**	mg/L as CaCo3	1	20.0

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	121995	Date Analyzed:	2015-06-03	Analyzed By:	MT
Prep Batch:	103216	Sample Preparation:	2015-06-03	Prepared By:	MT

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100
Toluene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100
Xylene	U	2,3,5,7,8	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		8	0.0887	mg/L	1	0.100	89	74.6 - 120
4-Bromofluorobenzene (4-BFB)		8	0.0843	mg/L	1	0.100	84	72.9 - 120

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	Cations	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	122047	Date Analyzed:	2015-06-05	Analyzed By:	RR
Prep Batch:	103232	Sample Preparation:	2015-06-04	Prepared By:	RR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Dissolved Calcium		3,5,7,8	**201**	mg/L	10	1.00
Dissolved Potassium		3,5,7,8	**27.6**	mg/L	10	1.00
Dissolved Magnesium		3,5,7,8	**270**	mg/L	10	1.00

continued ...

sample 394444 continued ...

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Dissolved Sodium		3,5,7,8	**950**	mg/L	10	1.00

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	122119	Date Analyzed:	2015-06-09	Analyzed By:	RL
Prep Batch:	103313	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Specific Conductance		2,3,5,7,8	**6250**	uMHOS/cm	1	0.00

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Fluoride		2,3,5,7,8	**4.25**	mg/L	5	0.500
Chloride		2,3,5,7,8	**1560**	mg/L	100	2.50
Sulfate		2,3,5,7,8	**446**	mg/L	100	2.50

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Nitrate-N	U	2,3,5,7,8	<0.200	mg/L	5	0.0400

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	121953	Date Analyzed:	2015-06-02	Analyzed By:	HJ
Prep Batch:	103185	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
pH		2,3,7,8	**7.09**	s.u.	1	2.00

Sample: 394444 - MW-1

Laboratory:	Lubbock				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	121991	Date Analyzed:	2015-06-03	Analyzed By:	HJ
Prep Batch:	103212	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Total Dissolved Solids		2,3,5,7,8	**3920**	mg/L	50	2.50

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	122142	Date Analyzed:	2015-06-09	Analyzed By:	HJ
Prep Batch:	103334	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Hydroxide Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Carbonate Alkalinity	U	2,3,5,7,8	<20.0	mg/L as CaCo3	1	20.0
Bicarbonate Alkalinity		2,3,5,7,8	**281**	mg/L as CaCo3	1	20.0
Total Alkalinity		2,3,5,7,8	**281**	mg/L as CaCo3	1	20.0

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	121995	Date Analyzed:	2015-06-03	Analyzed By:	MT
Prep Batch:	103216	Sample Preparation:	2015-06-03	Prepared By:	MT

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Benzene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Toluene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Ethylbenzene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100
Xylene	U	2,3,5,7,8	<0.00100		mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		8	0.0897	mg/L	1	0.100	90	74.6 - 120
4-Bromofluorobenzene (4-BFB)		8	0.0841	mg/L	1	0.100	84	72.9 - 120

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	Cations	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	122047	Date Analyzed:	2015-06-05	Analyzed By:	RR
Prep Batch:	103232	Sample Preparation:	2015-06-04	Prepared By:	RR

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Dissolved Calcium		3,5,7,8	**54.9**		mg/L	10	1.00
Dissolved Potassium		3,5,7,8	<10.0		mg/L	10	1.00
Dissolved Magnesium		3,5,7,8	**34.6**		mg/L	10	1.00
Dissolved Sodium		3,5,7,8	**117**		mg/L	10	1.00

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	122119	Date Analyzed:	2015-06-09	Analyzed By:	RL
Prep Batch:	103313	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Specific Conductance		2,3,5,7,8	**865**		uMHOS/cm	1	0.00

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Fluoride		2,3,5,7,8	**3.37**		mg/L	1	0.500
Chloride		2,3,5,7,8	**57.8**		mg/L	5	2.50
Sulfate		2,3,5,7,8	**112**		mg/L	5	2.50

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	Sample Preparation:		Prepared By:	RL

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Nitrate-N		2,3,5,7,8	**1.63**		mg/L	1	0.0400

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	121953	Date Analyzed:	2015-06-02	Analyzed By:	HJ
Prep Batch:	103185	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
pH		2,3,7,8	**7.67**		s.u.	1	2.00

Sample: 394445 - MW-2

Laboratory:	Lubbock				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	121991	Date Analyzed:	2015-06-03	Analyzed By:	HJ
Prep Batch:	103212	Sample Preparation:		Prepared By:	HJ

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Total Dissolved Solids		2,3,5,7,8	**578**		mg/L	10	2.50

Method Blanks

Method Blank (1) QC Batch: 121991

QC Batch:	121991	Date Analyzed:	2015-06-03	Analyzed By:	HJ
Prep Batch:	103212	QC Preparation:	2015-06-03	Prepared By:	HJ

Parameter	Flag	Cert	MDL Result	Units	RL
Total Dissolved Solids		2,3,5,7,8	<25.0	mg/L	2.5

Method Blank (1) QC Batch: 121995

QC Batch:	121995	Date Analyzed:	2015-06-03	Analyzed By:	MT
Prep Batch:	103216	QC Preparation:	2015-06-03	Prepared By:	MT

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		2,3,5,7,8	<0.000352	mg/L	0.001
Toluene		2,3,5,7,8	<0.000371	mg/L	0.001
Ethylbenzene		2,3,5,7,8	<0.000352	mg/L	0.001
Xylene		2,3,5,7,8	<0.000379	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		8	0.0877	mg/L	1	0.100	88	74.6 - 120
4-Bromofluorobenzene (4-BFB)		8	0.0829	mg/L	1	0.100	83	72.9 - 120

Method Blank (1) QC Batch: 121999

QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	QC Preparation:	2015-06-03	Prepared By:	RL

Parameter	Flag	Cert	MDL Result	Units	RL
Nitrate-N		2,3,5,7,8	<0.0136	mg/L	0.04

Method Blank (1) QC Batch: 121999

QC Batch:	121999	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103219	QC Preparation:	2015-06-03	Prepared By:	RL

Parameter	Flag	Cert	MDL Result	Units	RL
Fluoride		2,3,5,7,8	<0.134	mg/L	0.5
Chloride		2,3,5,7,8	0.626	mg/L	2.5
Sulfate		2,3,5,7,8	<0.363	mg/L	2.5

Method Blank (1) QC Batch: 122002

QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	QC Preparation:	2015-06-03	Prepared By:	RL

Parameter	Flag	Cert	MDL Result	Units	RL
Nitrate-N		2,3,5,7,8	<0.0136	mg/L	0.04

Method Blank (1) QC Batch: 122002

QC Batch:	122002	Date Analyzed:	2015-06-03	Analyzed By:	RL
Prep Batch:	103221	QC Preparation:	2015-06-03	Prepared By:	RL

Parameter	Flag	Cert	MDL Result	Units	RL
Fluoride		2,3,5,7,8	<0.134	mg/L	0.5
Chloride		2,3,5,7,8	0.550	mg/L	2.5
Sulfate		2,3,5,7,8	<0.363	mg/L	2.5

Method Blank (1) QC Batch: 122047

QC Batch:	122047	Date Analyzed:	2015-06-05	Analyzed By:	RR
Prep Batch:	103232	QC Preparation:	2015-06-04	Prepared By:	PM

Parameter	Flag	Cert	MDL Result	Units	RL
Dissolved Calcium		3,5,7,8	<0.0106	mg/L	1
Dissolved Potassium		3,5,7,8	<0.0464	mg/L	1
Dissolved Magnesium		3,5,7,8	<0.0224	mg/L	1
Dissolved Sodium		3,5,7,8	<0.0197	mg/L	1

Method Blank (1) QC Batch: 122119

QC Batch: 122119 Date Analyzed: 2015-06-09 Analyzed By: RL
Prep Batch: 103313 QC Preparation: 2015-06-08 Prepared By: RL

Parameter	Flag	Cert	MDL Result	Units	RL
Specific Conductance		2,3,5,7,8	1.93	uMHOS/cm	

Method Blank (1) QC Batch: 122142

QC Batch: 122142 Date Analyzed: 2015-06-09 Analyzed By: HJ
Prep Batch: 103334 QC Preparation: 2015-06-09 Prepared By: HJ

Parameter	Flag	Cert	MDL Result	Units	RL
Hydroxide Alkalinity		2,3,5,7,8	<20.0	mg/L as CaCo3	20
Carbonate Alkalinity		2,3,5,7,8	<20.0	mg/L as CaCo3	20
Bicarbonate Alkalinity		2,3,5,7,8	<20.0	mg/L as CaCo3	20
Total Alkalinity		2,3,5,7,8	<20.0	mg/L as CaCo3	20

Duplicates

Duplicates (1) Duplicated Sample: 394459

QC Batch: 121953 | Date Analyzed: 2015-06-02 | Analyzed By: HJ
Prep Batch: 103185 | QC Preparation: 2015-06-02 | Prepared By: HJ

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH	2,3,7,8	8.76	8.78	s.u.	1	0	20

Duplicates (1) Duplicated Sample: 394553

QC Batch: 121991 | Date Analyzed: 2015-06-03 | Analyzed By: HJ
Prep Batch: 103212 | QC Preparation: 2015-06-03 | Prepared By: HJ

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	2,3,5,7,8	13300	13300	mg/L	200	0	10

Duplicates (1) Duplicated Sample: 394601

QC Batch: 122119 | Date Analyzed: 2015-06-09 | Analyzed By: RL
Prep Batch: 103313 | QC Preparation: 2015-06-08 | Prepared By: RL

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance	2,3,5,7,8	775	772	uMHOS/cm	1	0	20

Duplicates (1) Duplicated Sample: 394724

QC Batch: 122142 | Date Analyzed: 2015-06-09 | Analyzed By: HJ
Prep Batch: 103334 | QC Preparation: 2015-06-09 | Prepared By: HJ

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity	2,3,5,7,8	<20.0	<20.0	mg/L as CaCo3	1	0	20
Carbonate Alkalinity	2,3,5,7,8	<20.0	<20.0	mg/L as CaCo3	1	0	20
Bicarbonate Alkalinity	2,3,5,7,8	295	290	mg/L as CaCo3	1	2	20
Total Alkalinity	2,3,5,7,8	295	290	mg/L as CaCo3	1	2	20

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 121991 | Date Analyzed: 2015-06-03 | Analyzed By: HJ
Prep Batch: 103212 | QC Preparation: 2015-06-03 | Prepared By: HJ

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Total Dissolved Solids		2,3,5,7,8	968	mg/L	10	1000	<25.0	97	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Total Dissolved Solids		2,3,5,7,8	958	mg/L	10	1000	<25.0	96	90 - 110	1	10

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 121995 | Date Analyzed: 2015-06-03 | Analyzed By: MT
Prep Batch: 103216 | QC Preparation: 2015-06-03 | Prepared By: MT

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		2,3,5,7,8	0.0891	mg/L	1	0.100	<0.000352	89	76 - 120
Toluene		2,3,5,7,8	0.0920	mg/L	1	0.100	<0.000371	92	77.4 - 120
Ethylbenzene		2,3,5,7,8	0.0917	mg/L	1	0.100	<0.000352	92	76.6 - 120
Xylene		2,3,5,7,8	0.278	mg/L	1	0.300	<0.000379	93	77.2 - 121

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		2,3,5,7,8	0.0896	mg/L	1	0.100	<0.000352	90	76 - 120	1	20
Toluene		2,3,5,7,8	0.0912	mg/L	1	0.100	<0.000371	91	77.4 - 120	1	20
Ethylbenzene		2,3,5,7,8	0.0910	mg/L	1	0.100	<0.000352	91	76.6 - 120	1	20
Xylene		2,3,5,7,8	0.276	mg/L	1	0.300	<0.000379	92	77.2 - 121	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

continued ...

control spikes continued ...

Surrogate		LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Surrogate		LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	8	0.0869	0.0895	mg/L	1	0.100	87	90	74.6 - 120
4-Bromofluorobenzene (4-BFB)	8	0.0943	0.0917	mg/L	1	0.100	94	92	75 - 120

Laboratory Control Spike (LCS-1)

QC Batch: 121999 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103219 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Nitrate-N		2,3,5,7,8	5.08	mg/L	1	5.00	<0.0136	102	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Nitrate-N		2,3,5,7,8	5.06	mg/L	1	5.00	<0.0136	101	90 - 110	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 121999 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103219 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Fluoride		2,3,5,7,8	5.12	mg/L	1	5.00	<0.134	102	90 - 110
Chloride		2,3,5,7,8	24.4	mg/L	1	25.0	0.626	95	90 - 110
Sulfate		2,3,5,7,8	25.6	mg/L	1	25.0	<0.363	102	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Fluoride		2,3,5,7,8	5.18	mg/L	1	5.00	<0.134	104	90 - 110	1	20
Chloride		2,3,5,7,8	24.4	mg/L	1	25.0	0.626	95	90 - 110	0	20
Sulfate		2,3,5,7,8	25.3	mg/L	1	25.0	<0.363	101	90 - 110	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 122002 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103221 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Nitrate-N		2,3,5,7,8	5.15	mg/L	1	5.00	<0.0136	103	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Nitrate-N		2,3,5,7,8	5.07	mg/L	1	5.00	<0.0136	101	90 - 110	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 122002 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103221 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Fluoride		2,3,5,7,8	5.25	mg/L	1	5.00	<0.134	105	90 - 110
Chloride		2,3,5,7,8	24.8	mg/L	1	25.0	0.55	97	90 - 110
Sulfate		2,3,5,7,8	25.4	mg/L	1	25.0	<0.363	102	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Fluoride		2,3,5,7,8	5.25	mg/L	1	5.00	<0.134	105	90 - 110	0	20
Chloride		2,3,5,7,8	25.5	mg/L	1	25.0	0.55	100	90 - 110	3	20
Sulfate		2,3,5,7,8	25.1	mg/L	1	25.0	<0.363	100	90 - 110	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 122047 | Date Analyzed: 2015-06-05 | Analyzed By: RR
Prep Batch: 103232 | QC Preparation: 2015-06-04 | Prepared By: PM

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Calcium		3,5,7,8	55.2	mg/L	1	52.5	<0.0106	105	85 - 115
Dissolved Potassium		3,5,7,8	54.0	mg/L	1	52.5	<0.0464	103	85 - 115
Dissolved Magnesium		3,5,7,8	56.1	mg/L	1	52.5	<0.0224	107	85 - 115
Dissolved Sodium		3,5,7,8	56.8	mg/L	1	52.5	<0.0197	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Calcium		3,5,7,8	55.4	mg/L	1	52.5	<0.0106	106	85 - 115	0	20
Dissolved Potassium		3,5,7,8	54.4	mg/L	1	52.5	<0.0464	104	85 - 115	1	20
Dissolved Magnesium		3,5,7,8	56.5	mg/L	1	52.5	<0.0224	108	85 - 115	1	20
Dissolved Sodium		3,5,7,8	54.4	mg/L	1	52.5	<0.0197	104	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

Matrix Spike (MS-1) Spiked Sample: 394423

QC Batch: 121995 | Date Analyzed: 2015-06-03 | Analyzed By: MT
Prep Batch: 103216 | QC Preparation: 2015-06-03 | Prepared By: MT

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		2,3,5,7,8	0.0885	mg/L	1	0.100	<0.000352	88	12.8 - 158
Toluene		2,3,5,7,8	0.0894	mg/L	1	0.100	0.002	87	16.9 - 157
Ethylbenzene		2,3,5,7,8	0.0915	mg/L	1	0.100	0.0007	91	10 - 158
Xylene		2,3,5,7,8	0.274	mg/L	1	0.300	0.0043	90	10 - 159

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		2,3,5,7,8	0.0876	mg/L	1	0.100	<0.000352	88	12.8 - 158	1	20
Toluene		2,3,5,7,8	0.0912	mg/L	1	0.100	0.002	89	16.9 - 157	2	20
Ethylbenzene		2,3,5,7,8	0.0933	mg/L	1	0.100	0.0007	93	10 - 158	2	20
Xylene		2,3,5,7,8	0.278	mg/L	1	0.300	0.0043	91	10 - 159	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate		MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	8	0.102	0.101	mg/L	1	0.1	102	101	74.6 - 120
4-Bromofluorobenzene (4-BFB)	8	0.0921	0.0919	mg/L	1	0.1	92	92	75 - 120

Matrix Spike (MS-1) Spiked Sample: 394430

QC Batch: 121999 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103219 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Nitrate-N		2,3,5,7,8	28.8	mg/L	5	25.0	2.01	107	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

continued ...

matrix spikes continued ...

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Nitrate-N		2,3,5,7,8	28.5	mg/L	5	25.0	2.01	106	80 - 120	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 394430

QC Batch: 121999 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103219 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Fluoride		2,3,5,7,8	35.1	mg/L	5	25.0	6.97	112	80 - 120
Chloride		2,3,5,7,8	184	mg/L	5	125	47.6	109	80 - 120
Sulfate		2,3,5,7,8	213	mg/L	5	125	74.2	111	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Fluoride		2,3,5,7,8	34.6	mg/L	5	25.0	6.97	110	80 - 120	1	20
Chloride		2,3,5,7,8	184	mg/L	5	125	47.6	109	80 - 120	0	20
Sulfate		2,3,5,7,8	211	mg/L	5	125	74.2	109	80 - 120	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 394445

QC Batch: 122002 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103221 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Nitrate-N		2,3,5,7,8	28.1	mg/L	5	25.0	1.84	105	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Nitrate-N		2,3,5,7,8	28.1	mg/L	5	25.0	1.84	105	80 - 120	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 394445

QC Batch: 122002 | Date Analyzed: 2015-06-03 | Analyzed By: RL
Prep Batch: 103221 | QC Preparation: 2015-06-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Fluoride		2,3,5,7,8	32.2	mg/L	5	25.0	4.97	109	80 - 120
Chloride		2,3,5,7,8	195	mg/L	5	125	57.8	110	80 - 120
Sulfate		2,3,5,7,8	255	mg/L	5	125	112	114	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Fluoride		2,3,5,7,8	31.6	mg/L	5	25.0	4.97	106	80 - 120	2	20
Chloride		2,3,5,7,8	195	mg/L	5	125	57.8	110	80 - 120	0	20
Sulfate		2,3,5,7,8	255	mg/L	5	125	112	114	80 - 120	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 394405

QC Batch: 122047 | Date Analyzed: 2015-06-05 | Analyzed By: RR
Prep Batch: 103232 | QC Preparation: 2015-06-04 | Prepared By: PM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Calcium		3,5,7,8	608	mg/L	1	525	67	103	75 - 125
Dissolved Potassium		3,5,7,8	553	mg/L	1	525	19.1	102	75 - 125
Dissolved Magnesium		3,5,7,8	652	mg/L	1	525	102	105	75 - 125
Dissolved Sodium		3,5,7,8	703	mg/L	1	525	143	107	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Calcium		3,5,7,8	596	mg/L	1	525	67	101	75 - 125	2	20
Dissolved Potassium		3,5,7,8	545	mg/L	1	525	19.1	100	75 - 125	1	20
Dissolved Magnesium		3,5,7,8	641	mg/L	1	525	102	103	75 - 125	2	20
Dissolved Sodium		3,5,7,8	688	mg/L	1	525	143	104	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Calibration Standards

Standard (CCV-1)

QC Batch: 121953 | Date Analyzed: 2015-06-02 | Analyzed By: HJ

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		2,3,7,8	s.u.	7.00	7.06	101	98.6 - 101.4	2015-06-02

Standard (CCV-1)

QC Batch: 121995 | Date Analyzed: 2015-06-03 | Analyzed By: MT

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2,3,5,7,8	mg/L	0.100	0.0914	91	80 - 120	2015-06-03
Toluene		2,3,5,7,8	mg/L	0.100	0.0919	92	80 - 120	2015-06-03
Ethylbenzene		2,3,5,7,8	mg/L	0.100	0.0917	92	80 - 120	2015-06-03
Xylene		2,3,5,7,8	mg/L	0.300	0.278	93	80 - 120	2015-06-03

Standard (CCV-2)

QC Batch: 121995 | Date Analyzed: 2015-06-03 | Analyzed By: MT

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2,3,5,7,8	mg/L	0.100	0.0901	90	80 - 120	2015-06-03
Toluene		2,3,5,7,8	mg/L	0.100	0.0912	91	80 - 120	2015-06-03
Ethylbenzene		2,3,5,7,8	mg/L	0.100	0.0906	91	80 - 120	2015-06-03
Xylene		2,3,5,7,8	mg/L	0.300	0.274	92	80 - 120	2015-06-03

Standard (CCV-1)

QC Batch: 121999 | Date Analyzed: 2015-06-03 | Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		2,3,5,7,8	mg/L	5.00	5.08	102	90 - 110	2015-06-03

Standard (CCV-1)

QC Batch: 121999 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		2,3,5,7,8	mg/L	5.00	5.31	106	90 - 110	2015-06-03
Chloride		2,3,5,7,8	mg/L	25.0	25.0	100	90 - 110	2015-06-03
Sulfate		2,3,5,7,8	mg/L	25.0	25.5	102	90 - 110	2015-06-03

Standard (CCV-2)

QC Batch: 121999 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		2,3,5,7,8	mg/L	5.00	5.14	103	90 - 110	2015-06-03

Standard (CCV-2)

QC Batch: 121999 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		2,3,5,7,8	mg/L	5.00	5.26	105	90 - 110	2015-06-03
Chloride		2,3,5,7,8	mg/L	25.0	24.9	100	90 - 110	2015-06-03
Sulfate		2,3,5,7,8	mg/L	25.0	25.8	103	90 - 110	2015-06-03

Standard (CCV-1)

QC Batch: 122002 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		2,3,5,7,8	mg/L	5.00	5.14	103	90 - 110	2015-06-03

Standard (CCV-1)

QC Batch: 122002 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		2,3,5,7,8	mg/L	5.00	5.26	105	90 - 110	2015-06-03
Chloride		2,3,5,7,8	mg/L	25.0	24.9	100	90 - 110	2015-06-03
Sulfate		2,3,5,7,8	mg/L	25.0	25.8	103	90 - 110	2015-06-03

Standard (CCV-2)

QC Batch: 122002 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		2,3,5,7,8	mg/L	5.00	5.33	107	90 - 110	2015-06-03

Standard (CCV-2)

QC Batch: 122002 Date Analyzed: 2015-06-03 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		2,3,5,7,8	mg/L	5.00	5.38	108	90 - 110	2015-06-03
Chloride		2,3,5,7,8	mg/L	25.0	26.4	106	90 - 110	2015-06-03
Sulfate		2,3,5,7,8	mg/L	25.0	26.8	107	90 - 110	2015-06-03

Standard (ICV-1)

QC Batch: 122047 Date Analyzed: 2015-06-05 Analyzed By: RR

Param	Flag	Cert	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		3,5,7,8	mg/L	51.0	51.1	100	90 - 110	2015-06-05
Dissolved Potassium		3,5,7,8	mg/L	55.0	54.8	100	90 - 110	2015-06-05
Dissolved Magnesium		3,5,7,8	mg/L	51.0	51.8	102	90 - 110	2015-06-05
Dissolved Sodium		3,5,7,8	mg/L	51.0	52.5	103	90 - 110	2015-06-05

Standard (CCV-1)

QC Batch: 122047 Date Analyzed: 2015-06-05 Analyzed By: RR

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		3,5,7,8	mg/L	51.0	50.7	99	90 - 110	2015-06-05
Dissolved Potassium		3,5,7,8	mg/L	55.0	54.3	99	90 - 110	2015-06-05
Dissolved Magnesium		3,5,7,8	mg/L	51.0	51.7	101	90 - 110	2015-06-05
Dissolved Sodium		3,5,7,8	mg/L	51.0	50.5	99	90 - 110	2015-06-05

Standard (ICV-1)

QC Batch: 122119 Date Analyzed: 2015-06-09 Analyzed By: RL

Param	Flag	Cert	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		2,3,5,7,8	uMHOS/cm	1410	1400	99	90 - 110	2015-06-09

Standard (CCV-1)

QC Batch: 122119 Date Analyzed: 2015-06-09 Analyzed By: RL

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		2,3,5,7,8	uMHOS/cm	1410	1390	98	90 - 110	2015-06-09

Standard (ICV-1)

QC Batch: 122142 | Date Analyzed: 2015-06-09 | Analyzed By: HJ

Param	Flag	Cert	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	<20.0		-	2015-06-09
Carbonate Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	228		-	2015-06-09
Bicarbonate Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	<20.0		-	2015-06-09
Total Alkalinity		2,3,5,7,8	mg/L as CaCo3	250	240	96	90 - 110	2015-06-09

Standard (CCV-1)

QC Batch: 122142 | Date Analyzed: 2015-06-09 | Analyzed By: HJ

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	<20.0		-	2015-06-09
Carbonate Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	226		-	2015-06-09
Bicarbonate Alkalinity		2,3,5,7,8	mg/L as CaCo3	0.00	<20.0		-	2015-06-09
Total Alkalinity		2,3,5,7,8	mg/L as CaCo3	250	243	97	90 - 110	2015-06-09

Appendix

Report Definitions

Name	Definition
MDL	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	L-A-B	L2418.01	El Paso
2	L-A-B	L2418	Lubbock
3	Kansas	Kansas E-10317	Lubbock
4	LELAP	LELAP-02002	El Paso
5	LELAP	LELAP-02003	Lubbock
6	NELAP	T104704221-15-6	El Paso
7	NELAP	T104704219-15-11	Lubbock
8		2014-018	Lubbock

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
MI1	Split peak or shoulder peak
MI2	Instrument software did not integrate
MI3	Instrument software misidentified the peak
MI4	Instrument software integrated improperly
MI5	Baseline correction
Qc	Calibration check outside of laboratory limits.

F	Description
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits.
U	The analyte is not detected above the SDL

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

15060221

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

Data Reported to:

DATE: 6/11/2015 PAGE 1 OF 1

PO #: _____ LAB WORK ORDER #: _____

PROJECT LOCATION OR NAME: Legacy LMPSU Trash Pit

LAI PROJECT #: 14-0107-09 COLLECTOR: Sarah Swisher

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: TX

S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☒ MTBE ☐ | TRPH 418.1 ☐ | TPH 1005 ☐ TPH 1006 ☐ | GASOLINE MOD 8015 ☐ | DIESEL - MOD 8015 ☐ | VOC 8260 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ | 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ | 8082 PCBS ☐ | TCLP - METALS (RCRA) ☐ TCLP VOC ☐ | TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ | TOTAL METALS (RCRA) ☐ OTHER LIST ☐ | LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ | RCI ☐ TOX ☐ FLASHPOINT ☐ | TDS ☒ TSS ☐ % MOISTURE ☐ | pH ☐ HEXAVALENT CHROMIUM ☐ CYANIDE ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDE ☒ ANIONS ☒ ALKALINITY ☒ | Sulfate NITRATE Na^+, Mg^+, K^+, Ca^+

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	TDS	Sulfate	NITRATE	Na^+, Mg^+, K^+, Ca^+	FIELD NOTES
MW-3	01	6/11/15	1:30	W	5	X			X		X	X	X	X	394442
MW-4	02	↓	2:00	↓	↓	↓			↓		↓	↓	↓	↓	443
MW-1	03		2:30												444
MW-2	04	↓	3:00	↓	↓	↓			↓		↓	↓	↓	↓	445

TOTAL

RELINQUISHED BY:(Signature) Sarah Swisher 6/11/15 DATE/TIME 4:45 PM RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 6-2-15 10Am

TURN AROUND TIME
NORMAL ☒
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 2.4 / 2.6 THERM #: IR3
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # FX 805787634098
☐ HAND DELIVERED

Cation-Anion Balance Sheet

DATE: 6/10/2015

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate-N ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
394443	57.6	60.5	324	10.7	290.00	234	399	2.19	3.88		1180	1900
394442	83	58.6	186	10.1	236.00	251	190	2.34	3.74		918	1450
394444	201	270	950	27.6	653.00	446	1560	0	4.25		3920	6250
394445	54.9	34.6	117	6.57	281.00	112	57.8	1.63	3.37		578	865

*

Anion Sum meq/L	Acceptable Difference
0–3.0	+/- 0.2 meq/L
3.0–10.0	+/- 2%
10.0–800	5%

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate-N in meq/L	Fluoride in meq/L	Bromide in meq/L	**Total Cations in meq/L**	**Total Anions in meq/L**	**% Difference***
394443	2.87	4.98	14.09	0.27	5.80	4.87	11.26	0.16	0.20	0.00	22.22	22.29	0.15
394442	4.14	4.82	8.09	0.26	4.72	5.23	5.36	0.17	0.20	0.00	17.31	15.67	4.98
394444	10.03	22.22	41.33	0.71	13.06	9.29	44.01	0.00	0.22	0.00	74.28	66.58	5.47
394445	2.74	2.85	5.09	0.17	5.62	2.33	1.63	0.12	0.18	0.00	10.84	9.88	4.67

	EC/Cation	EC/Anion				
394443	2222.0491	2228.82573	range	1710	to	2090
394442	1731.3252	1566.96462	range	1305	to	1595
394444	7427.9208	6657.704	range	5625	to	6875
394445	1084.43046	987.61405	range	778.5	to	951.5

TDS/EC	TDS/Cat		TDS/Anion	
0.62	0.53		0.53	needs to be 0.55-0.77
0.63	0.53		0.59	needs to be 0.55-0.77
0.63	0.53		0.59	needs to be 0.55-0.77
0.67	0.53		0.59	needs to be 0.55-0.77

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
10014 SCR 1213
Midland, TX 79706

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: Legacy Trash Pit

Project Number: 14-0107-01

Location: None Given

Lab Order Number: 4F13007

NELAP/TCEQ # T104704156-13-3

Report Date: 06/26/14

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW2 5	4F13007-01	Soil	06/12/14 09:40	06-13-2014 10:00
MW2 10	4F13007-02	Soil	06/12/14 09:46	06-13-2014 10:00
MW2 15	4F13007-03	Soil	06/12/14 09:51	06-13-2014 10:00
MW2 20	4F13007-04	Soil	06/12/14 09:56	06-13-2014 10:00
MW2 25	4F13007-05	Soil	06/12/14 09:50	06-13-2014 10:00
MW2 30	4F13007-06	Soil	06/12/14 10:00	06-13-2014 10:00
SB-9 5	4F13007-11	Soil	06/12/14 13:22	06-13-2014 10:00
SB-9 10	4F13007-12	Soil	06/12/14 13:24	06-13-2014 10:00
SB-9 15	4F13007-13	Soil	06/12/14 13:25	06-13-2014 10:00
SB-9 20	4F13007-14	Soil	06/12/14 13:29	06-13-2014 10:00
SB-9 25	4F13007-15	Soil	06/12/14 13:32	06-13-2014 10:00
SB-9 30	4F13007-16	Soil	06/12/14 13:35	06-13-2014 10:00
SB-9 35	4F13007-17	Soil	06/12/14 13:42	06-13-2014 10:00
SB-10 5	4F13007-19	Soil	06/12/14 12:47	06-13-2014 10:00
SB-10 10	4F13007-20	Soil	06/12/14 12:52	06-13-2014 10:00
SB-10 15	4F13007-21	Soil	06/12/14 12:56	06-13-2014 10:00
SB-10 20	4F13007-22	Soil	06/12/14 13:00	06-13-2014 10:00
SB-10 25	4F13007-23	Soil	06/12/14 13:02	06-13-2014 10:00
SB-10 30	4F13007-24	Soil	06/12/14 13:06	06-13-2014 10:00
SB-11 5	4F13007-27	Soil	06/12/14 10:56	06-13-2014 10:00
SB-11 10	4F13007-28	Soil	06/12/14 11:00	06-13-2014 10:00
SB-11 15	4F13007-29	Soil	06/12/14 11:04	06-13-2014 10:00
SB-12 5	4F13007-35	Soil	06/12/14 14:03	06-13-2014 10:00
SB-12 10	4F13007-36	Soil	06/12/14 14:05	06-13-2014 10:00
SB-12 15	4F13007-37	Soil	06/12/14 14:10	06-13-2014 10:00
SB-12 20	4F13007-38	Soil	06/12/14 14:15	06-13-2014 10:00
SB-12 25	4F13007-39	Soil	06/12/14 14:20	06-13-2014 10:00
SB-12 30	4F13007-40	Soil	06/12/14 14:23	06-13-2014 10:00
SB-12 35	4F13007-41	Soil	06/12/14 14:25	06-13-2014 10:00
SB-14 5	4F13007-43	Soil	06/12/14 14:45	06-13-2014 10:00
SB-14 10	4F13007-44	Soil	06/12/14 14:48	06-13-2014 10:00
SB-14 15	4F13007-45	Soil	06/12/14 14:53	06-13-2014 10:00

Chloride analysis was requested on addtional samples on 06/20/14. This report includes orginal data and added analyses.

MW2 5

4F13007-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**131**	5.32	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW2 10

4F13007-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**692**	5.32	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW2 15

4F13007-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**381**	10.6	mg/kg dry	10	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW2 20

4F13007-04 (Soil)

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloride	**315**	5.32	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW2 25

4F13007-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**562**	5.49	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW2 30

4F13007-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**81.2**	5.21	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

SB-9 5

4F13007-11 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**378**	5.43	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P4F1810	06/16/14	06/16/14	TPH 8015M	
>C12-C28	**490**	27.2	mg/kg dry	1	P4F1810	06/16/14	06/16/14	TPH 8015M	
>C28-C35	**267**	27.2	mg/kg dry	1	P4F1810	06/16/14	06/16/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*74.4 %*	*70-130*		*P4F1810*	*06/16/14*	*06/16/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*81.2 %*	*70-130*		*P4F1810*	*06/16/14*	*06/16/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**757**	81.5	mg/kg dry	1	[CALC]	06/16/14	06/16/14	calc	

SB-9 10

4F13007-12 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**316**	1.04	mg/kg dry	1	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*96.3 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*107 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	78.1	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-13 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1320**	5.68	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.4	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	28.4	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	28.4	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*92.6 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*95.8 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	85.2	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-14 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**344**	5.43	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-15 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**178**	5.43	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-16 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**297**	5.75	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-17 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**500**	5.62	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-19 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**227**	5.43	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*112 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*112 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	81.5	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-20 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1010**	5.75	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.7	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	28.7	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	28.7	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*98.7 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*104 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	86.2	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**328**	5.56	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.8	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.8	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.8	mg/kg dry	1	P4F1604	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*103 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*113 %*	*70-130*		*P4F1604*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	83.3	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-22 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**572**	5.49	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-23 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**621**	5.43	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-24 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**422**	5.38	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-27 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**79.2**	5.56	mg/kg dry	5	P4F2002	06/18/14	06/20/14	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.8	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.8	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.8	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*94.0 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*104 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	83.3	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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4F13007-28 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**428**	1.08	mg/kg dry	1	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*97.3 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*106 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	80.6	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-29 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**187**	5.43	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*91.2 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*96.8 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	81.5	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-35 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**286**	5.26	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*103 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	78.9	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-36 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**700**	5.49	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*92.7 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*99.9 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	82.4	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-37 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**581**	5.49	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*93.3 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*102 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	82.4	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

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4F13007-38 (Soil)

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloride	**136**	10.8	mg/kg dry	10	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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4F13007-39 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1220**	5.81	mg/kg dry	5	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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Project Manager: Mark Larson

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4F13007-40 (Soil)

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloride	**102**	1.10	mg/kg dry	1	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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4F13007-41 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**67.7**	1.16	mg/kg dry	1	P4F2308	06/23/14	06/23/14	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	P4F2402	06/24/14	06/24/14	% calculation	

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4F13007-43 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**10.9**	1.05	mg/kg dry	1	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*95.0 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*102 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	78.9	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

SB-14 10

4F13007-44 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**89.1**	5.43	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*93.7 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*103 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	81.5	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-14 15

4F13007-45 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**160**	5.38	mg/kg dry	5	P4F1803	06/13/14	06/18/14	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P4F1601	06/16/14	06/16/14	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C12-C28	**98.0**	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P4F1603	06/13/14	06/14/14	TPH 8015M	
Surrogate: 1-Chlorooctane		*81.6 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Surrogate: o-Terphenyl		*88.5 %*	*70-130*		*P4F1603*	*06/13/14*	*06/14/14*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**98.0**	80.6	mg/kg dry	1	[CALC]	06/13/14	06/14/14	calc	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F1601 - * DEFAULT PREP *** **										
Blank (P4F1601-BLK1)				Prepared & Analyzed: 06/16/14						
% Moisture	ND	0.1	%							
Duplicate (P4F1601-DUP1)		**Source: 4F13004-01**		Prepared & Analyzed: 06/16/14						
% Moisture	1.0	0.1	%		1.0			0.00	20	
Duplicate (P4F1601-DUP2)		**Source: 4F13009-01**		Prepared & Analyzed: 06/16/14						
% Moisture	28.0	0.1	%		28.0			0.00	20	
Duplicate (P4F1601-DUP3)		**Source: 4F13009-02**		Prepared & Analyzed: 06/16/14						
% Moisture	15.0	0.1	%		15.0			0.00	20	
Batch P4F1803 - * DEFAULT PREP *** **										
Blank (P4F1803-BLK1)				Prepared & Analyzed: 06/18/14						
Chloride	ND	1.00	mg/kg wet							
LCS (P4F1803-BS1)				Prepared & Analyzed: 06/18/14						
Chloride	113	1.00	mg/kg wet	100		113	80-120			
LCS Dup (P4F1803-BSD1)				Prepared & Analyzed: 06/18/14						
Chloride	116	1.00	mg/kg wet	100		116	80-120	2.38	20	
Duplicate (P4F1803-DUP1)		**Source: 4F13003-01**		Prepared & Analyzed: 06/18/14						
Chloride	2420	10.4	mg/kg dry		2440			0.728	20	
Matrix Spike (P4F1803-MS1)		**Source: 4F13003-01**		Prepared & Analyzed: 06/18/14						
Chloride	2710	10.4	mg/kg dry		2440		80-120			

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F2002 - * DEFAULT PREP *** **										
Blank (P4F2002-BLK1)				Prepared: 06/18/14 Analyzed: 06/20/14						
Chloride	ND	1.00	mg/kg wet							
LCS (P4F2002-BS1)				Prepared: 06/18/14 Analyzed: 06/20/14						
Chloride	123	1.00	mg/kg wet	110		112	80-120			
LCS Dup (P4F2002-BSD1)				Prepared: 06/18/14 Analyzed: 06/20/14						
Chloride	126	1.00	mg/kg wet	110		115	80-120	3.05	20	
Duplicate (P4F2002-DUP1)		**Source: 4F13013-39**		Prepared: 06/18/14 Analyzed: 06/20/14						
Chloride	591	5.75	mg/kg dry		588			0.410	20	
Batch P4F2308 - * DEFAULT PREP *** **										
Blank (P4F2308-BLK1)				Prepared & Analyzed: 06/23/14						
Chloride	ND	1.00	mg/kg wet							
LCS (P4F2308-BS1)				Prepared & Analyzed: 06/23/14						
Chloride	89.7	1.00	mg/kg wet	100		89.7	80-120			
LCS Dup (P4F2308-BSD1)				Prepared & Analyzed: 06/23/14						
Chloride	91.3	1.00	mg/kg wet	100		91.3	80-120	1.74	20	
Duplicate (P4F2308-DUP1)		**Source: 4F23002-01**		Prepared & Analyzed: 06/23/14						
Chloride	96.8	5.88	mg/kg dry		99.9			3.11	20	
Matrix Spike (P4F2308-MS1)		**Source: 4F13007-17**		Prepared & Analyzed: 06/23/14						
Chloride	1010	5.62	mg/kg dry	562	500	91.3	80-120			

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F2402 - * DEFAULT PREP *** **										
Blank (P4F2402-BLK1)				Prepared & Analyzed: 06/24/14						
% Moisture	ND	0.1	%							
Duplicate (P4F2402-DUP1)	**Source: 4F13013-46**			Prepared & Analyzed: 06/24/14						
% Moisture	8.0	0.1	%		7.0			13.3	20	
Duplicate (P4F2402-DUP2)	**Source: 4F24003-04**			Prepared & Analyzed: 06/24/14						
% Moisture	17.0	0.1	%		17.0			0.00	20	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F1603 - TX 1005										
Blank (P4F1603-BLK1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*154*		*"*	*150*		*103*	*70-130*			
Surrogate: o-Terphenyl	*85.4*		*"*	*75.0*		*114*	*70-130*			
LCS (P4F1603-BS1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	1020	25.0	mg/kg wet	1200		84.8	75-125			
>C12-C28	1270	25.0	"	1200		105	75-125			
Surrogate: 1-Chlorooctane	*151*		*"*	*150*		*101*	*70-130*			
Surrogate: o-Terphenyl	*70.6*		*"*	*75.0*		*94.2*	*70-130*			
LCS Dup (P4F1603-BSD1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	1020	25.0	mg/kg wet	1200		84.8	75-125	0.0246	20	
>C12-C28	1270	25.0	"	1200		106	75-125	0.327	20	
Surrogate: 1-Chlorooctane	*151*		*"*	*150*		*101*	*70-130*			
Surrogate: o-Terphenyl	*72.6*		*"*	*75.0*		*96.9*	*70-130*			
Duplicate (P4F1603-DUP1)	**Source: 4F13008-02**			Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	142	26.3	mg/kg dry		136			4.37	20	
>C12-C28	2220	26.3	"		2150			2.87	20	
Surrogate: 1-Chlorooctane	*151*		*"*	*158*		*95.8*	*70-130*			
Surrogate: o-Terphenyl	*79.5*		*"*	*78.9*		*101*	*70-130*			
Batch P4F1604 - TX 1005										
Blank (P4F1604-BLK1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*152*		*"*	*150*		*102*	*70-130*			
Surrogate: o-Terphenyl	*76.1*		*"*	*75.0*		*101*	*70-130*			

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F1604 - TX 1005										
LCS (P4F1604-BS1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	983	25.0	mg/kg wet	1000		98.3	75-125			
>C12-C28	1180	25.0	"	1000		118	75-125			
Surrogate: 1-Chlorooctane	*143*		*"*	*150*		*95.3*	*70-130*			
Surrogate: o-Terphenyl	*67.0*		*"*	*75.0*		*89.3*	*70-130*			
LCS Dup (P4F1604-BSD1)				Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	1010	25.0	mg/kg wet	1000		101	75-125	3.03	20	
>C12-C28	1180	25.0	"	1000		118	75-125	0.0510	20	
Surrogate: 1-Chlorooctane	*150*		*"*	*150*		*100*	*70-130*			
Surrogate: o-Terphenyl	*73.2*		*"*	*75.0*		*97.6*	*70-130*			
Duplicate (P4F1604-DUP1)	**Source: 4F13007-21**			Prepared: 06/13/14 Analyzed: 06/14/14						
C6-C12	ND	27.8	mg/kg dry		ND				20	
>C12-C28	ND	27.8	"		ND				20	
Surrogate: 1-Chlorooctane	*178*		*"*	*167*		*107*	*70-130*			
Surrogate: o-Terphenyl	*94.6*		*"*	*83.3*		*114*	*70-130*			
Batch P4F1810 - TX 1005										
Blank (P4F1810-BLK1)				Prepared & Analyzed: 06/16/14						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*169*		*"*	*200*		*84.6*	*70-130*			
Surrogate: o-Terphenyl	*91.0*		*"*	*100*		*91.0*	*70-130*			
LCS (P4F1810-BS1)				Prepared & Analyzed: 06/16/14						
C6-C12	1200	25.0	mg/kg wet	1200		100	75-125			
>C12-C28	1250	25.0	"	1200		104	75-125			
Surrogate: 1-Chlorooctane	*195*		*"*	*200*		*97.3*	*70-130*			
Surrogate: o-Terphenyl	*93.5*		*"*	*100*		*93.5*	*70-130*			

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P4F1810 - TX 1005										
LCS Dup (P4F1810-BSD1)				Prepared & Analyzed: 06/16/14						
C6-C12	1170	25.0	mg/kg wet	1200		97.6	75-125	2.82	20	
>C12-C28	1290	25.0	"	1200		107	75-125	3.14	20	
Surrogate: 1-Chlorooctane	*192*		*"*	*200*		*95.8*	*70-130*			
Surrogate: o-Terphenyl	*94.8*		*"*	*100*		*94.8*	*70-130*			
Duplicate (P4F1810-DUP1)		**Source: 4F13013-17**		Prepared: 06/16/14 Analyzed: 06/17/14						
C6-C12	ND	27.5	mg/kg dry		ND				20	
>C12-C28	ND	27.5	"		ND				20	
Surrogate: 1-Chlorooctane	*192*		*"*	*220*		*87.2*	*70-130*			
Surrogate: o-Terphenyl	*106*		*"*	*110*		*96.1*	*70-130*			

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Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 6/26/2014

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 6/12/14 PAGE 1 OF 4
PO #: LAB WORK ORDER #:
PROJECT LOCATION OR NAME: Legacy Trash Pit
LAI PROJECT #: 14-0107-01 COLLECTOR: Adrian

Data Reported to:

TRRP report? ☐ Yes ☑ No
TIME ZONE: Time zone/State: Mountain / NM

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

4F13007

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ | TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐ | GASOLINE MOD 8015 ☐ | DIESEL - MOD 8015 ☐ | VOC 8260 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ | 8081 FESTICIDES ☐ 8151 HERBICIDES ☐ | 8082 PCBS ☐ | TCLP - METALS (RCRA) ☐ TCLP VOC ☐ | TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ | TOTAL METALS (RCRA) ☐ D.W. 200.8 ☐ OTHER LIST ☐ | LEAD - TOTAL ☐ TOX ☐ FLASHPOINT ☐ TCLP ☐ | RCI ☐ TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | TDS ☐ pH ☐ HEXAVALENT CHROMIUM ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐ | Hold | FIELD NOTES

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
MW2 5	01	6/12	940	S	1				X			
10	02		946									
15	03		951									
20	04		956									
25	05		958									
30	06		1000									
35	07		1002									
40	08		1006									
50	09		1015									
60	10		1024									
SB-9 5	11		122								BTEX, MTBE	
10	12		125								BTEX, MTBE	
15	13		126								BTEX, MTBE	
20	14		129								Hold	
25	15		132								Hold	
TOTAL												

RELINQUISHED BY:(Signature) DATE/TIME 6/12/14 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME 6/13/14 10:20 RECEIVED BY: (Signature)

TURN AROUND TIME
NORMAL ☑
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY: HCl=
RECEIVING TEMP: 2.6 THERM #:
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

Please data before hold time expires for additional analyses!

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

Data Reported to:

DATE: 6/12/14 PAGE 2 OF 4
PO #: LAB WORK ORDER #:
PROJECT LOCATION OR NAME: Legacy Trash Pit
LAI PROJECT #: 14-0107-01 COLLECTOR: Adrian

TRRP report? ☐ Yes ☑ No
TIME ZONE: Time zone/State:
S=SOIL P=PAINT W=WATER SL=SLUDGE A=AIR OT=OTHER
4F13007

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
SB-9 30'	16	6/12	135	S	1				X			
35'	17		142									
40'	18		145									
SB-10 5	19		1247									
10	20		1252									
15	21		1256									
20	22		100									
25	23		102									
30	24		106									
35	25		108									
40	26		110									
SB-11 5	27		1056									
10	28		1100									
15	29		1104									
20	31		1112									

ANALYSES: BTEX ☐ MTBE ☐ TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐ GASOLINE MOD 8015 ☐ DIESEL - MOD 8015 ☐ VOC 8260 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ 8082 PCBS ☐ TCLP - METALS (RCRA) ☐ TCLP VOC ☐ TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ TOTAL METALS (RCRA) ☐ OTHER LIST ☐ LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ RCI ☐ TOX ☐ FLASHPOINT ☐ TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ pH ☐ HEXAVALENT CHROMIUM ☐ EXPLOSIVES ☐ PECHLORATE ☐ CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐ Hold

TOTAL

RELINQUISHED BY:(Signature) DATE/TIME 6/12/14 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 6/13/14 10:07

TURN AROUND TIME
NORMAL ☑
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 2.1° C THERM #: NCF
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

Report data before hold time expires for additional analysis!

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 6/12/14 PAGE 3 OF 4
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: Logan Trash Pit
LAI PROJECT #: 14-0107-01 COLLECTOR: Adam

Data Reported to:

TRRP report? ☐ Yes ☐ No
TIME ZONE: Time zone/State: Mountain / NM

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

4F13007

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ | TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐ | GASOLINE MOD 8015 ☐ | DIESEL - MOD 8015 ☐ | VOC 8260 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ | 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ | 8082 PCBS ☐ | TCLP - METALS (RCRA) ☐ TCLP VOC ☐ | TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ | TOTAL METALS (RCRA) ☐ OTHER LIST ☐ | LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ | RCI ☐ TOX ☐ FLASHPOINT ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | pH ☐ HEXAVALENT CHROMIUM ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐ | Hold

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	BTEX MTBE	TRPH 418.1 TPH 1005 TPH 1006	GASOLINE MOD 8015	DIESEL - MOD 8015	VOC 8260	SVOC 8270 PAH 8270 HOLDPAH	8081 PESTICIDES 8151 HERBICIDES	8082 PCBS	TCLP - METALS (RCRA) TCLP VOC	TCLP - PEST HERB Semi-VOC	TOTAL METALS (RCRA) OTHER LIST	LEAD - TOTAL D.W. 200.8 TCLP	RCI TOX FLASHPOINT	TDS TSS % MOISTURE CYANIDE	pH HEXAVALENT CHROMIUM	EXPLOSIVES PECHLORATE	CHLORIDE ANIONS ALKALINITY	Hold	FIELD NOTES
SB-11 25	31	6/12	1118	S	1				X																		✓		
30	32		1120																								✓		
35	33		1121																								✓		
40	34		1127																								✓		
SB-12 5	35		203								✓	✓													✓				
10	36		205								✓	✓													✓				
15	37		210								✓	✓													✓				
20	38		215																								✓		
25	39		220																								✓		
30	40		223																								✓		
35	41		225																								✓		
40	42		228																								✓		
SB-14 5	43		245								✓	✓													✓				
10	44		248								✓	✓													✓				
15	45		253								✓	✓													✓				
TOTAL																													

RELINQUISHED BY:(Signature) Adam DATE/TIME 6/12/14 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME 6/13/14 11:45 RECEIVED BY: (Signature)

TURN AROUND TIME
NORMAL ☑
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY: NCF
RECEIVING TEMP: 2.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☐ HAND DELIVERED

Report data before hold times expire for additional analysis

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 6/12/14 PAGE 4 OF 9
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: _____
LAI PROJECT #: 14-0107-01 COLLECTOR: AM
Data Reported to:

TRRP report? ☐ Yes ☐ No
TIME ZONE: Time zone/State: Montana

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

4F13007

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☐ MTBE ☐	TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☐	DIESEL - MOD 8015 ☐	VOC 8260 ☐	SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐	8081 PESTICIDES ☐ 8151 HERBICIDES ☐	8082 PCBS ☐	TCLP - METALS (RCRA) ☐ TCLP VOC ☐	TCLP - PEST ☐ HERB ☐ Semi-VOC ☐	TOTAL METALS (RCRA) ☐ OTHER LIST ☐	LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐	RCI ☐ TOX ☐ FLASHPOINT ☐	TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐	pH ☐ HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐	FIELD NOTES
SB-14 20	46	6/12	258	S	1				X			L	L	L													L	
25	47		301									L	L	L													L	
30	48		305																								L	
35	49		308																								L	
40	50		311																								L	

TOTAL

RELINQUISHED BY:(Signature) DATE/TIME 6/12/14 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 6/13/14 10:30

TURN AROUND TIME
NORMAL ☑
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 2.6 °C THERM #: NCF
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☐ HAND DELIVERED

Report data before hold time expires for additional analysis!

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
10014 SCR 1213
Midland, TX 79706

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: Legacy Trash Pit

Project Number: 14-0107-01

Location:

Lab Order Number: 5D16012

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704156-13-3

Report Date: 04/24/15

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-3 0FT	5D16012-01	Soil	04/15/15 09:19	04-15-2015 00:00
MW-3 10FT	5D16012-02	Soil	04/15/15 09:29	04-15-2015 00:00
MW-3 20FT	5D16012-03	Soil	04/15/15 09:32	04-15-2015 00:00
MW-3 30FT	5D16012-04	Soil	04/15/15 09:44	04-15-2015 00:00
MW-3 40FT	5D16012-05	Soil	04/15/15 09:46	04-15-2015 00:00
MW-3 50FT	5D16012-06	Soil	04/15/15 09:56	04-15-2015 00:00
MW-3 60FT	5D16012-07	Soil	04/15/15 09:59	04-15-2015 00:00
MW-4 0FT	5D16012-08	Soil	04/15/15 12:49	04-15-2015 00:00
MW-4 10FT	5D16012-09	Soil	04/15/15 12:54	04-15-2015 00:00
MW-4 20FT	5D16012-10	Soil	04/15/15 12:57	04-15-2015 00:00
MW-4 30FT	5D16012-11	Soil	04/15/15 13:07	04-15-2015 00:00
MW-4 40FT	5D16012-12	Soil	04/15/15 13:45	04-15-2015 00:00
MW-4 50FT	5D16012-13	Soil	04/15/15 14:06	04-15-2015 00:00
MW-4 60FT	5D16012-14	Soil	04/15/15 15:03	04-15-2015 00:00

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 0FT

5D16012-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.11	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 10FT

5D16012-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**550**	1.10	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 20FT

5D16012-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**166**	1.03	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 30FT

5D16012-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**195**	1.08	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 40FT

5D16012-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**66.5**	1.12	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 50FT

5D16012-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**11.6**	1.10	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-3 60FT

5D16012-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**46.6**	1.08	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 0FT

5D16012-08 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.09	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 10FT

5D16012-09 (Soil)

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloride	ND	1.19	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 20FT

5D16012-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**52.4**	1.08	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 30FT

5D16012-11 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**28.1**	1.06	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 40FT

5D16012-12 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**5.53**	1.04	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 50FT

5D16012-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**17.5**	1.14	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.	Project: Legacy Trash Pit	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 14-0107-01	
Midland TX, 79710	Project Manager: Mark Larson	

MW-4 60FT

5D16012-14 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**126**	1.37	mg/kg dry	1	P5D2203	04/22/15	04/22/15	EPA 300.0	
% Moisture	**27.0**	0.1	%	1	P5D2002	04/20/15	04/20/15	% calculation	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P5D2002 - * DEFAULT PREP *** **										
Blank (P5D2002-BLK1)				Prepared & Analyzed: 04/20/15						
% Moisture	ND	0.1	%							
Duplicate (P5D2002-DUP1)		**Source: 5D16011-01**		Prepared & Analyzed: 04/20/15						
% Moisture	12.0	0.1	%		11.0			8.70	20	
Duplicate (P5D2002-DUP2)		**Source: 5D16012-01**		Prepared & Analyzed: 04/20/15						
% Moisture	9.0	0.1	%		10.0			10.5	20	
Duplicate (P5D2002-DUP3)		**Source: 5D16013-01**		Prepared & Analyzed: 04/20/15						
% Moisture	6.0	0.1	%		6.0			0.00	20	
Duplicate (P5D2002-DUP4)		**Source: 5D17005-07**		Prepared & Analyzed: 04/20/15						
% Moisture	8.0	0.1	%		8.0			0.00	20	
Batch P5D2203 - * DEFAULT PREP *** **										
Blank (P5D2203-BLK1)				Prepared & Analyzed: 04/22/15						
Chloride	ND	1.00	mg/kg wet							
LCS (P5D2203-BS1)				Prepared & Analyzed: 04/22/15						
Chloride	116	1.00	mg/kg wet	100		116	80-120			
LCS Dup (P5D2203-BSD1)				Prepared & Analyzed: 04/22/15						
Chloride	111	1.00	mg/kg wet	100		111	80-120	4.73	20	
Duplicate (P5D2203-DUP1)		**Source: 5D16006-02**		Prepared & Analyzed: 04/22/15						
Chloride	1570	5.88	mg/kg dry		1580			0.513	20	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P5D2203 - * DEFAULT PREP *** **										
Duplicate (P5D2203-DUP2)		**Source: 5D16012-08**		Prepared & Analyzed: 04/22/15						
Chloride	ND	1.09	mg/kg dry		ND				20	
Matrix Spike (P5D2203-MS1)		**Source: 5D16006-02**		Prepared & Analyzed: 04/22/15						
Chloride	2090	5.88	mg/kg dry	588	1580	86.8	80-120			

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Legacy Trash Pit
Project Number: 14-0107-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 4/24/2015

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

Data Reported to:

DATE: 4-15-15 PAGE 1 OF 1
PO #: _____ LAB WORK ORDER #: SD16012
PROJECT LOCATION OR NAME: 14-0107-01
LAI PROJECT #: 14-0107-01 COLLECTOR: KH

TRRP report? ☐ Yes ☐ No
TIME ZONE: Time zone/State: NM

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

Field Sample I.D.	Lab # (SD16012)	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☐ MTBE ☐ / TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐ / GASOLINE MOD 8015 ☐ / DIESEL - MOD 8015 ☐ / VOC 8260 ☐ / SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ / 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ / 8082 PCBS ☐ / TCLP - METALS (RCRA) ☐ TCLP VOC ☐ / TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ / TOTAL METALS (RCRA) ☐ OTHER LIST ☐ / LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ / RCI ☐ TOX ☐ FLASHPOINT ☐ / TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ / pH ☐ HEXAVALENT CHROMIUM ☐ / EXPLOSIVES ☐ PECHLORATE ☐ / CHLORIDE X ANIONS ☐ ALKALINITY ☐	FIELD NOTES
MW-3 0FT	01	4-15-15	9:19	S	1				X		X	
MW-3 10FT	02		9:29									
MW-3 20FT	03		9:32									
MW-3 30FT	04		9:44									
MW-3 40FT	05		9:46									
MW-3 50FT	06		9:56									
MW-3 60FT	07		9:59									
MW-4 0FT	08		1249									
MW-4 10FT	09		1254									
MW-4 20FT	10		1257									
MW-4 30FT	11		1307									
MW-4 40FT	12		1345									
MW-4 50FT	13		1406									
MW-4 60FT	14		1503									
TOTAL												

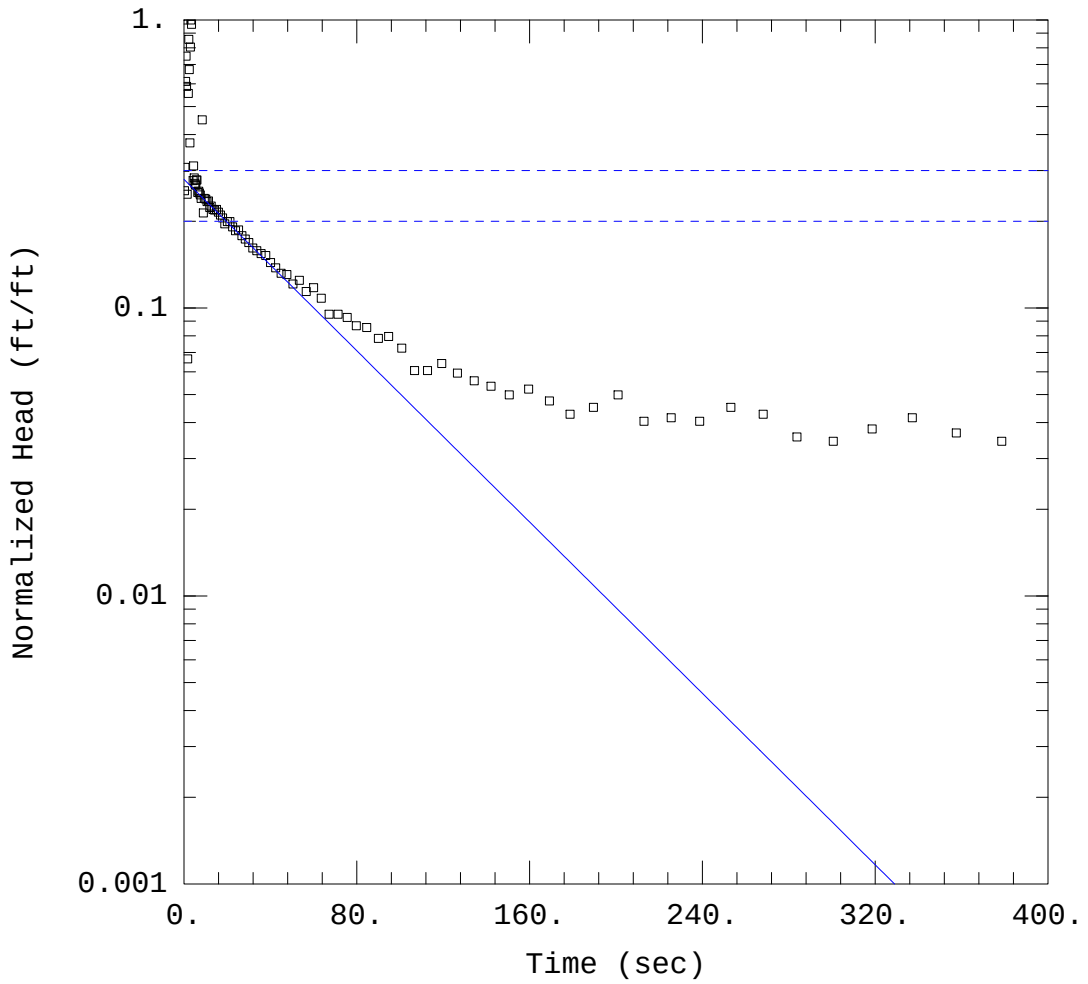
RELINQUISHED BY:(Signature) Kimberly McLean DATE/TIME 4-15-15 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) Sam Gomez 4-15-15

TURN AROUND TIME
NORMAL ☐
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 3.4 °C THERM #: NCF
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☐ HAND DELIVERED

APPENDIX G

Horizontal Hydraulic Conductivity (Slug Test) Data



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:21:15

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

Saturated Thickness: 15.5 ft Anisotropy Ratio (Kz/Kr): 1.

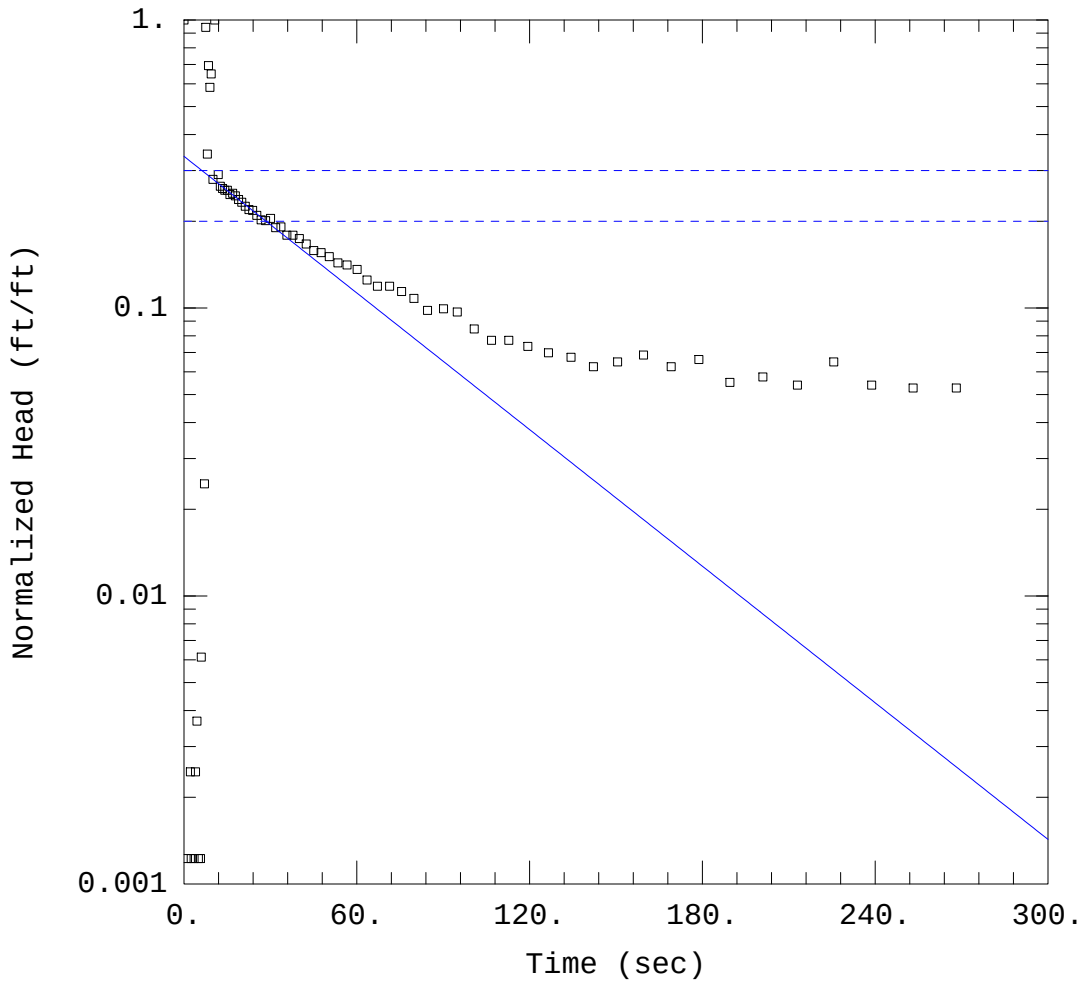
WELL DATA (MW-2 Falling Head)

Initial Displacement: 0.842 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 15.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.214 ft/day
y0 = 0.2353 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:15:34

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

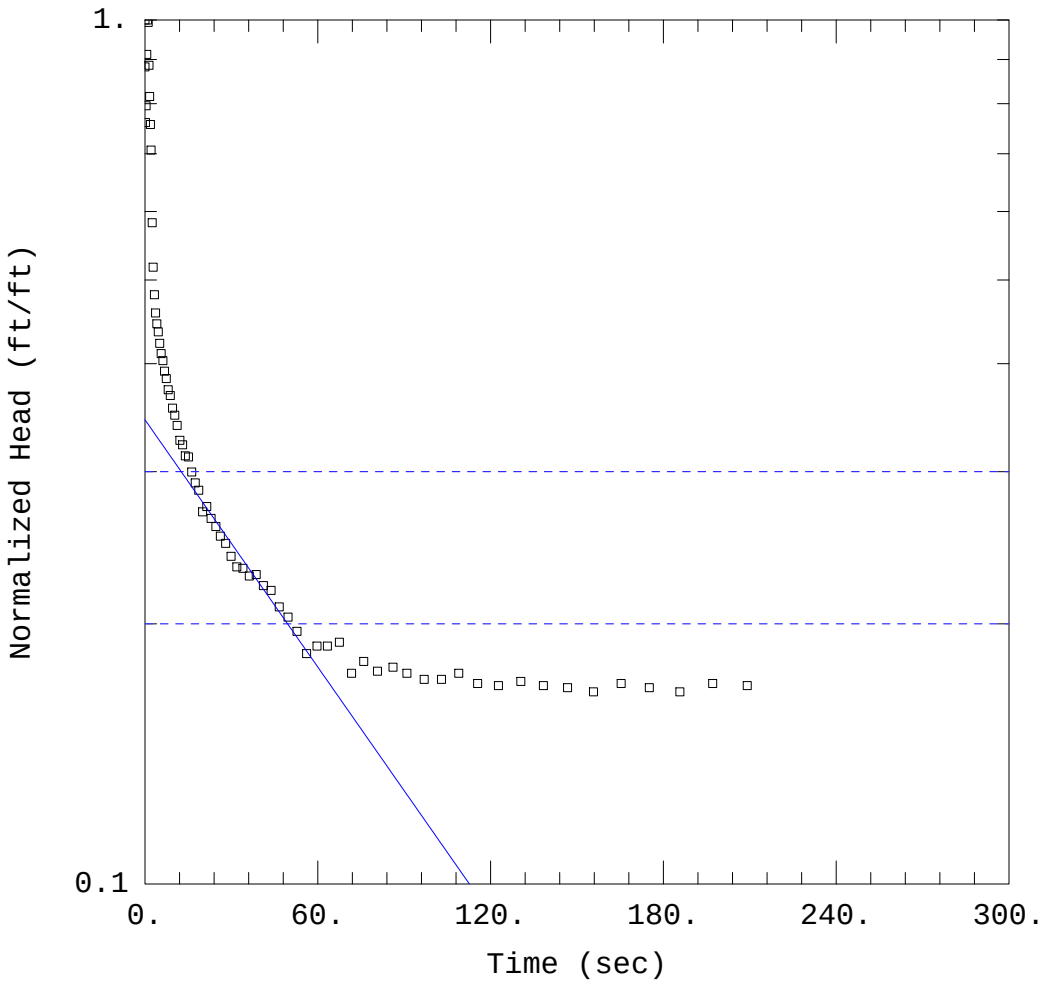
Saturated Thickness: 15.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2 Falling Head)

Initial Displacement: 0.816 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 15.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.354 ft/day
y0 = 0.2742 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/15/15 Time: 08:37:48

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

Saturated Thickness: 15.5 ft Anisotropy Ratio (Kz/Kr): 1.

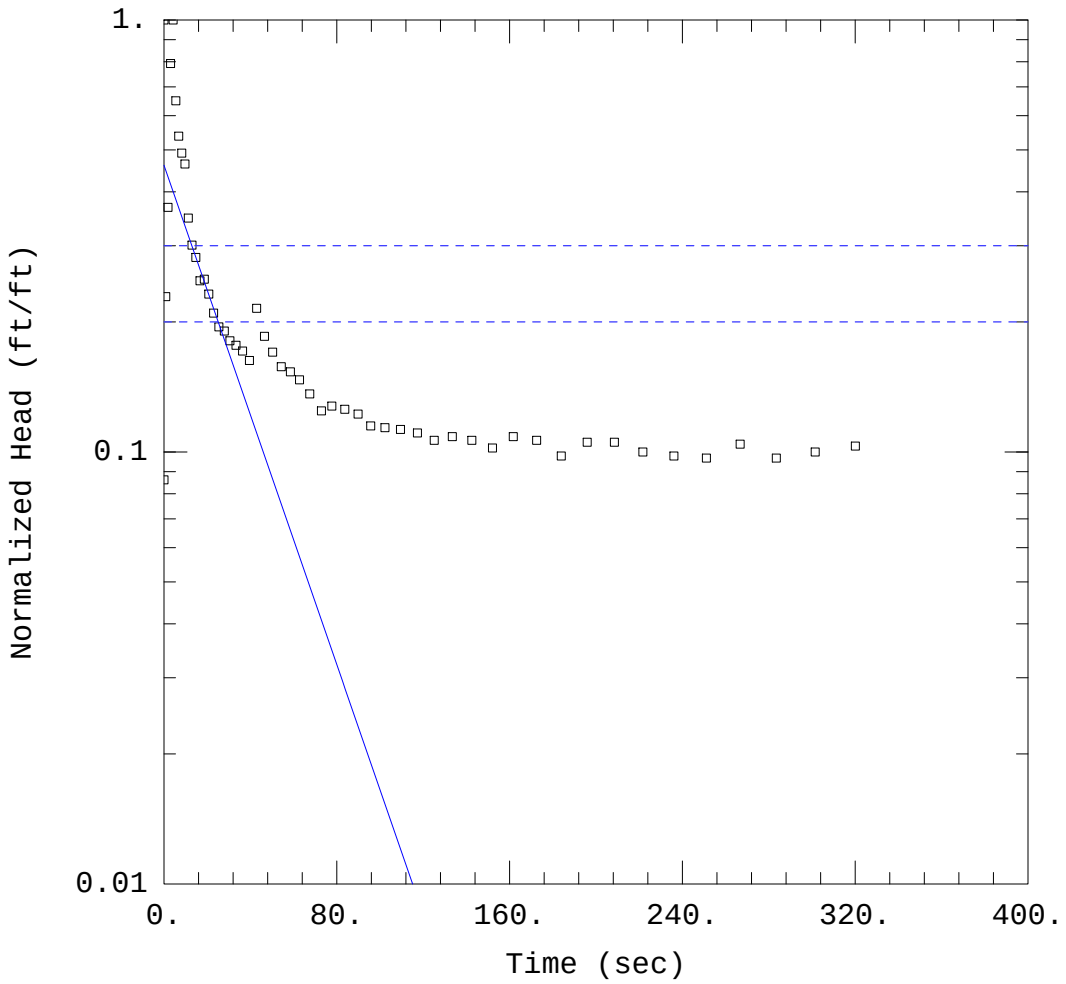
WELL DATA (MW-2 Rising Head)

Initial Displacement: 1.061 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 15.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.42 ft/day y0 = 0.3655 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/15/15 Time: 08:33:28

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

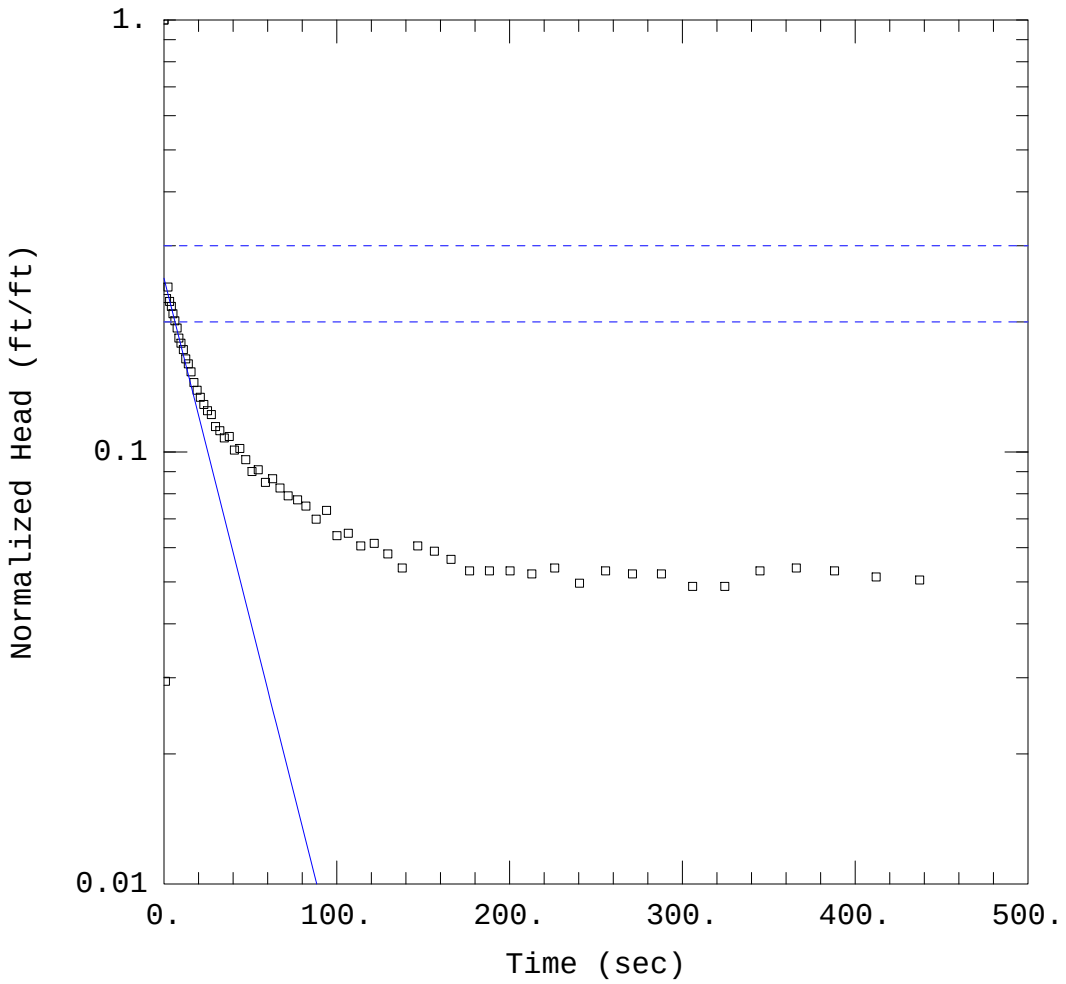
Saturated Thickness: 15.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2 Rising Head)

Initial Displacement: 0.94 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 15.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.3 ft/day
y0 = 0.4331 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/15/15 Time: 08:27:53

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

Saturated Thickness: 14.1 ft Anisotropy Ratio (Kz/Kr): 1.

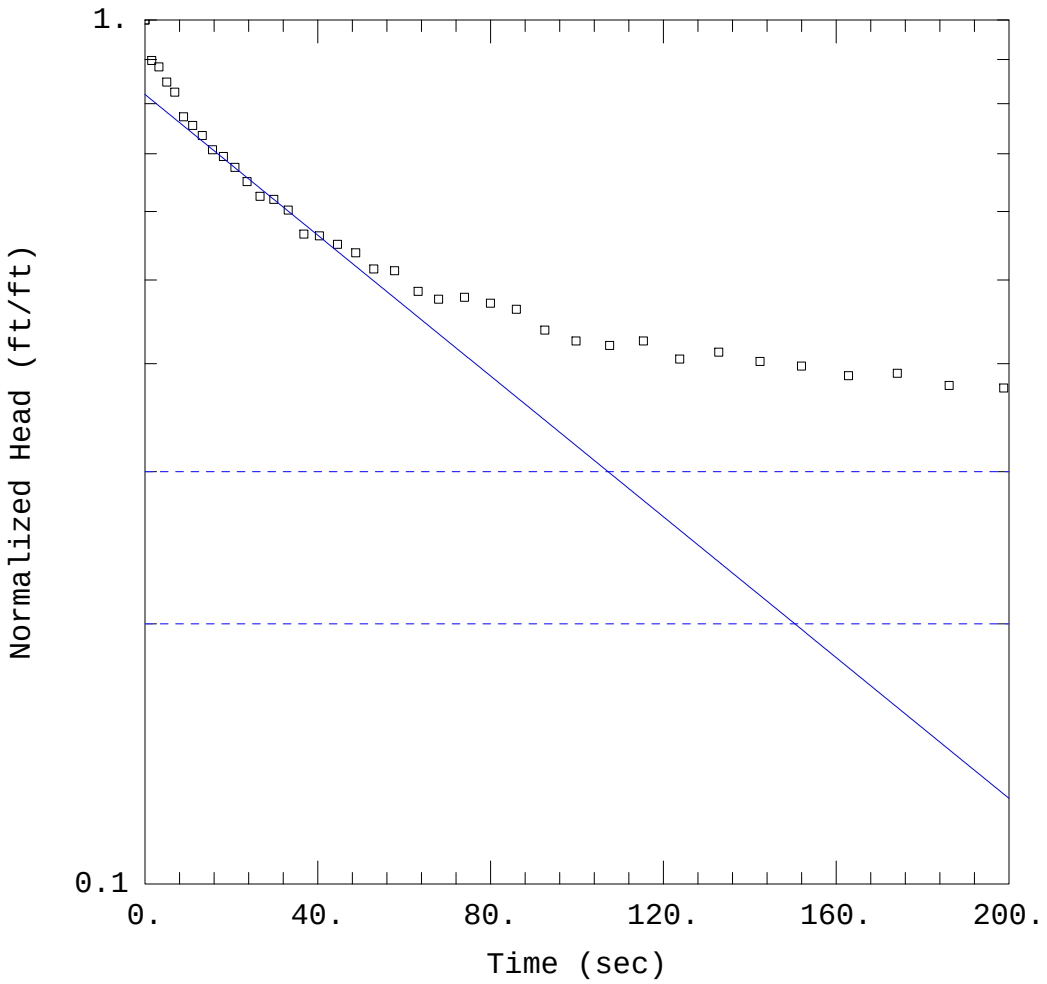
WELL DATA (MW-3 Falling Head)

Initial Displacement: 1.188 ft
Total Well Penetration Depth: 54.75 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 14.1 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 5.115 ft/day y0 = 0.2997 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:55:10

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

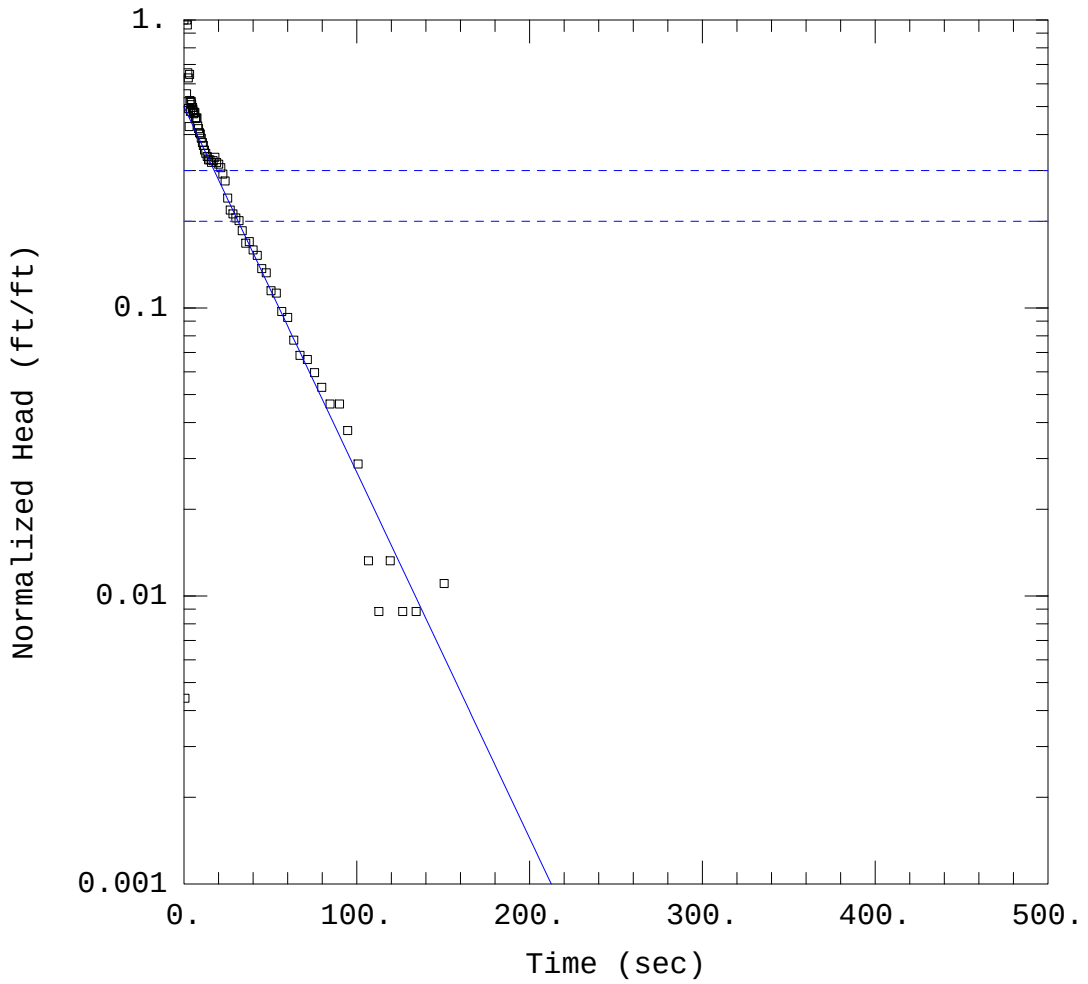
Saturated Thickness: 14.1 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3 Rising Head)

Initial Displacement: 0.4 ft
Total Well Penetration Depth: 54.75 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 14.1 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.314 ft/day
y0 = 0.3279 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:48:09

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

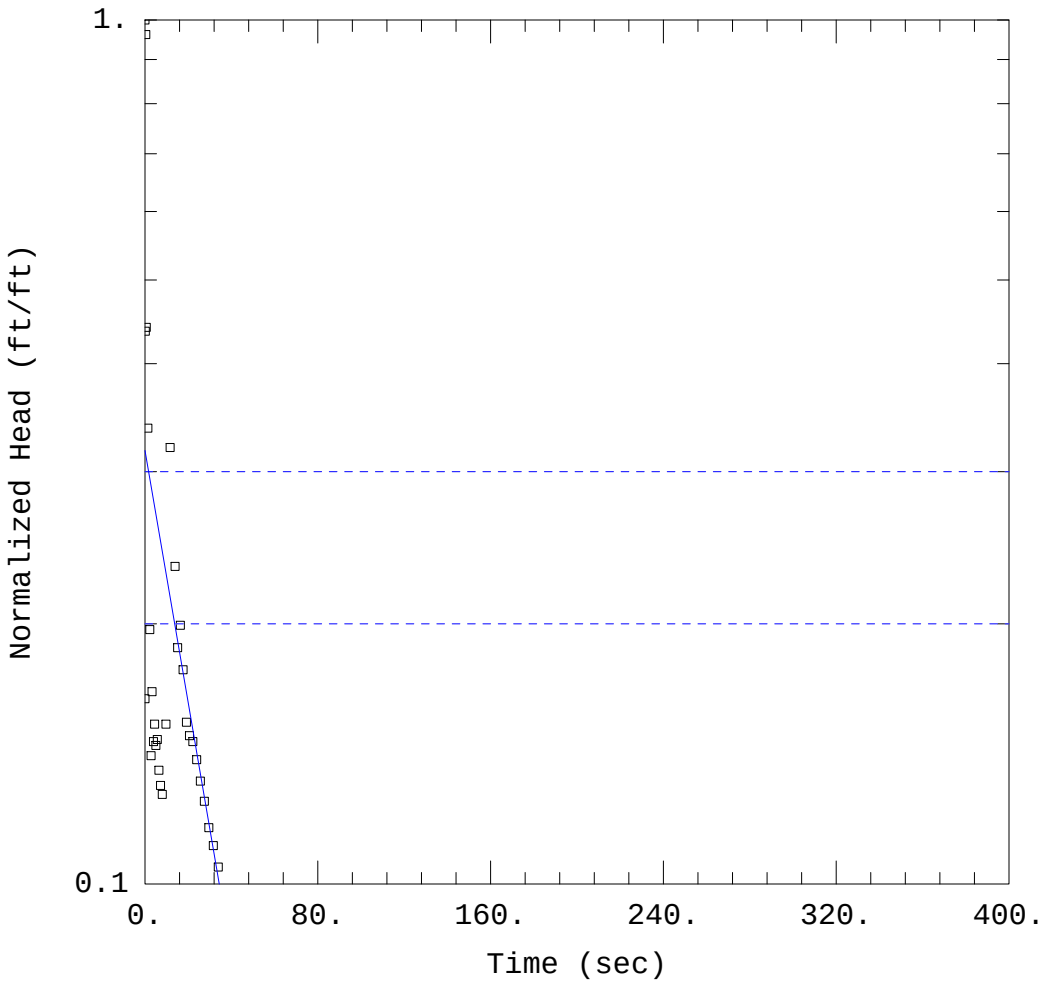
Saturated Thickness: 14.1 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3 Rising Head)

Initial Displacement: 0.453 ft
Total Well Penetration Depth: 54.75 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 14.1 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.093 ft/day
y0 = 0.2262 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/15/15 Time: 08:44:38

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

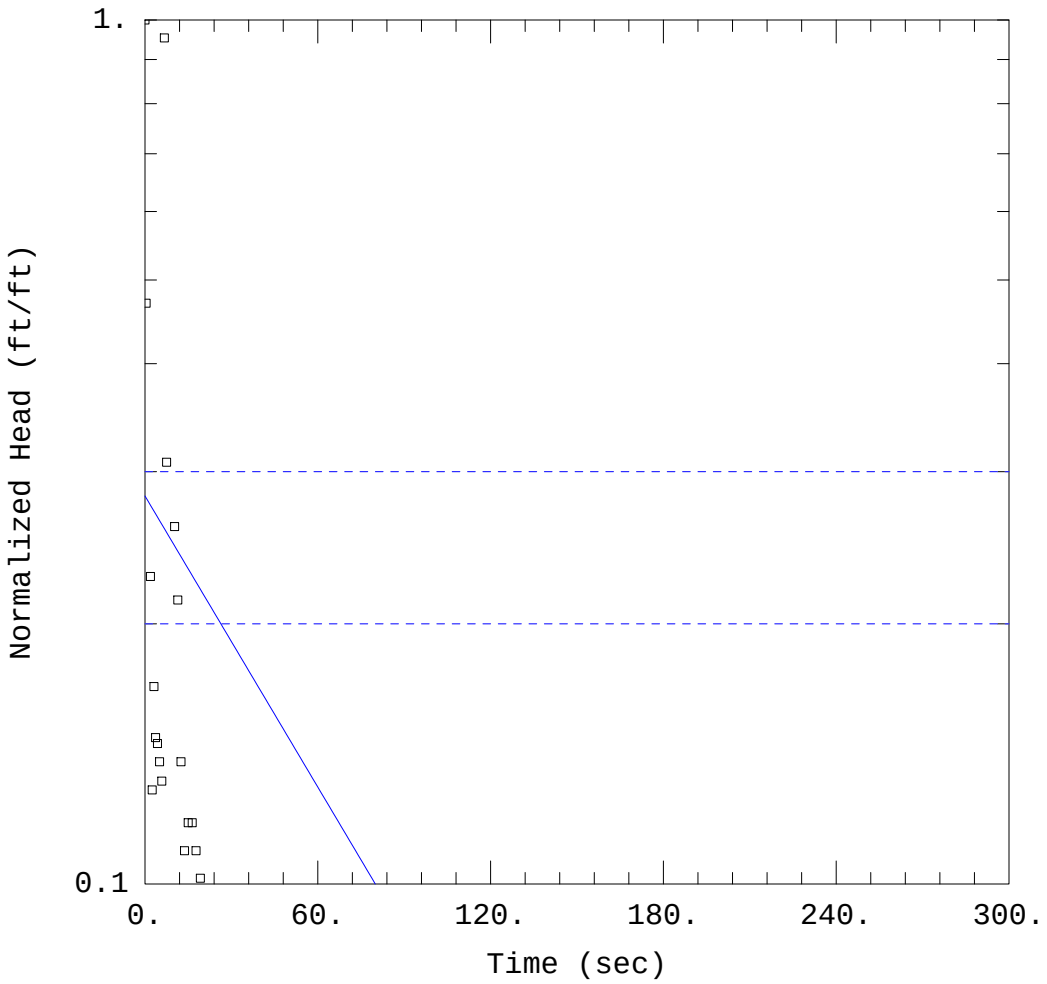
Saturated Thickness: 18.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4 Falling Head)

Initial Displacement: 1.3 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 18.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.689 ft/day
y0 = 0.4126 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/15/15 Time: 08:42:40

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

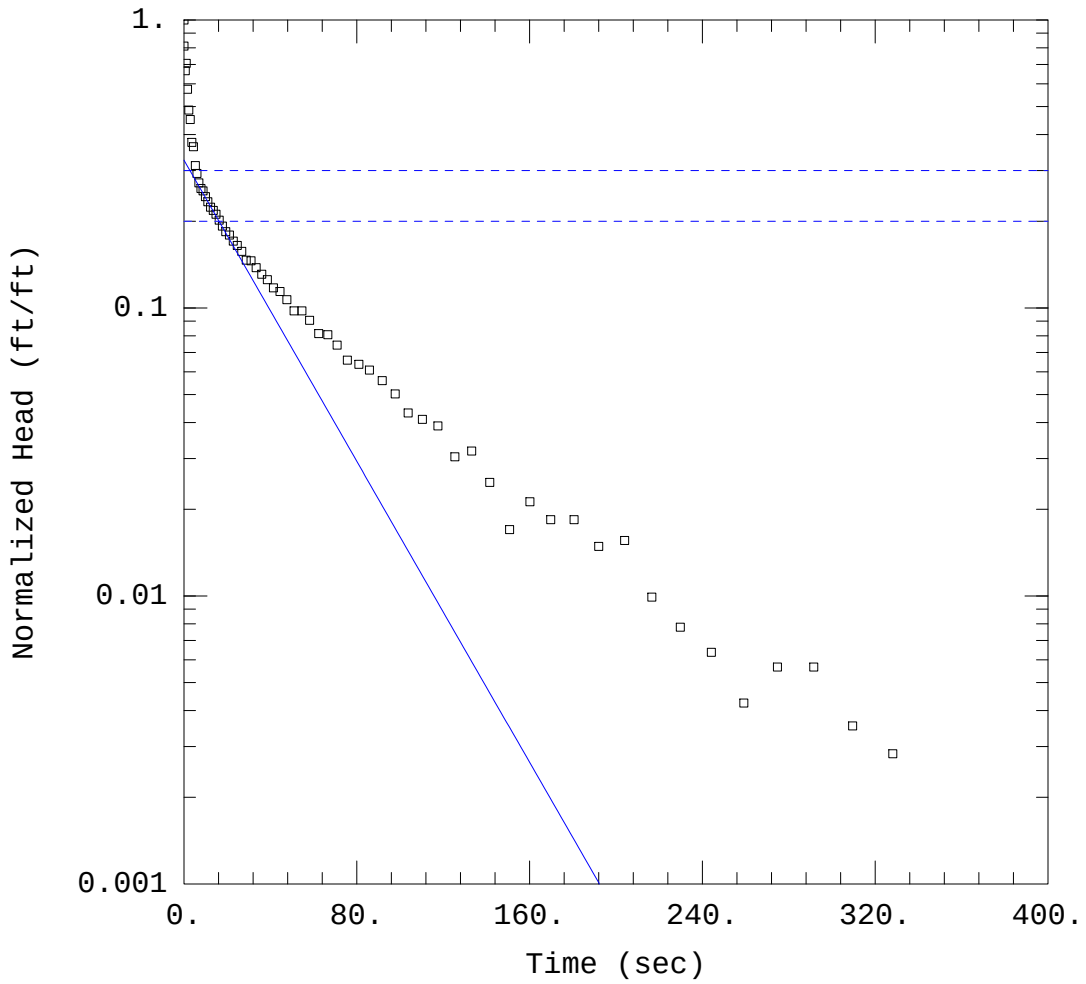
Saturated Thickness: 18.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4 Falling Head)

Initial Displacement: 1.3 ft
Total Well Penetration Depth: 58.17 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 18.5 ft
Screen Length: 20. ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.42 ft/day
y0 = 0.3655 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:42:04

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

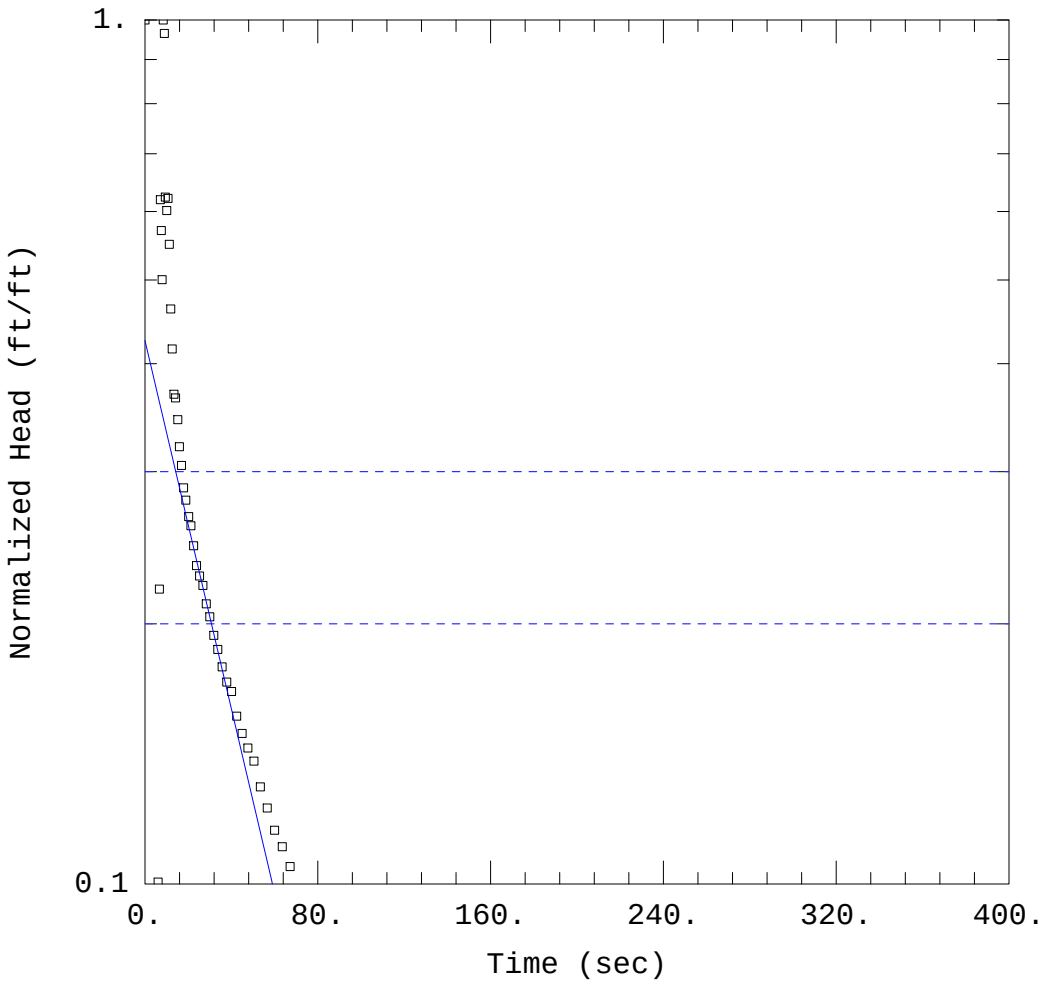
Saturated Thickness: 18.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4 Rising Head)

Initial Displacement: 1.413 ft
Total Well Penetration Depth: 60.42 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 18. ft
Screen Length: 22.65 ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.319 ft/day
y0 = 0.4603 ft



WELL TEST ANALYSIS

Data Set:
Date: 09/14/15 Time: 15:38:10

PROJECT INFORMATION

Company: Larson and Associates, Inc.
Client: Legacy Reserves
Project: 14-0107-01
Location: Lea, New Mexico
Test Well: MW-2
Test Date: 9/11/2015

AQUIFER DATA

Saturated Thickness: 18.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4 Rising Head)

Initial Displacement: 1.413 ft
Total Well Penetration Depth: 60.42 ft
Casing Radius: 0.08529 ft
Static Water Column Height: 18. ft
Screen Length: 22.65 ft
Well Radius: 0.02083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.706 ft/day
y0 = 0.6011 ft