

NM1 - _____54_____

**BORING
PLAN(S)**

2012

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John Bemis
Cabinet Secretary

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

Jami Bailey
Division Director
Oil Conservation Division



August 28, 2012

Mark J. Larson
Larson & Associates, Inc.
507 North Marienfeld, Suite 200
Midland, Texas 79701

**RE: Hydrogeologic Investigation Boring Plan
Commercial Surface Waste Management Facility
R360 Permian Basin, LLC – Avalon Surface Waste Management Facility
Facility Location: Section 36, Township 26 South, Range 31 East NMPM
Eddy County, New Mexico**

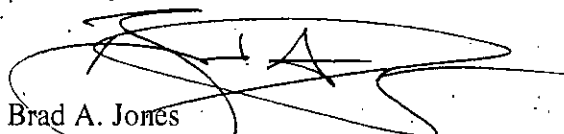
Dear Mr. Larson:

The Oil Conservation Division (OCD) has received WWC Engineering's boring plan proposal, dated August 24, 2012 and submitted on the behalf of R360 Permian Basin, LLC, to investigate and characterize the uppermost aquifer and subsurface geology for a proposed commercial surface waste management facility permit (Avalon Surface Waste Management Facility) located in Section 36, Township 26 South, Range 31 East, NMPM, Eddy County, New Mexico. OCD has completed the review and determined that the proposal is adequate to proceed with the site investigation.

OCD agrees that the proposed four (4) boring/monitoring well locations appear adequate. However, if the hydrogeologic conditions cannot be determined, additional borings or monitoring wells may be needed. It should be understood that if a monitoring well is constructed, it shall be bailed until fully developed.

The OCD appreciates your cooperation in providing a boring plan for review, in order to determine if the submitted application and the proposed site are suitable for consideration of approval. If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3487 or brad.a.jones@state.nm.us.

Sincerely,



Brad A. Jones
Environmental Engineer

BAJ/baj

Cc: OCD District II Office, Artesia
Wayne Crawley, R360 Environmental Solutions, Inc., Houston, TX



August 24, 2012

Mr. Brad Jones
Environmental Engineer
New Mexico Oil Conservation Division
1220 So. St. Francis Drive
Santa Fe, New Mexico 87505

**Re: Hydrogeologic Investigation Boring Plan, Avalon Surface Waste Management Facility
R360 Permian Basin, LLC, Section 36, Township 26 South, Range 31 East, Eddy County, New Mexico**

Dear Mr. Jones:

On behalf of R360 Permian Basin, LLC (R360) please accept the enclosed boring plan for the Avalon surface waste management facility located in Eddy County, New Mexico. Please contact Mr. Wayne Crawley with R360 at (281) 873-3205 or me at (432) 687-0901 should have any questions or require additional information.

Sincerely,

Larson & Associates, Inc.

A handwritten signature in black ink, appearing to read 'Mark J. Larson', is written over a circular stamp or seal.

Mark J. Larson, P.G.
Sr. Project Manager
Mark@laenvironmental.com

Enclosure

cc: Wayne Crawley – R360

**HYDROGEOLOGIC INVESTIGATION
BORING PLAN
AVALON SURFACE WASTE
MANAGEMENT FACILITY
Eddy County, New Mexico**

LAI Project No. 11-0132-02

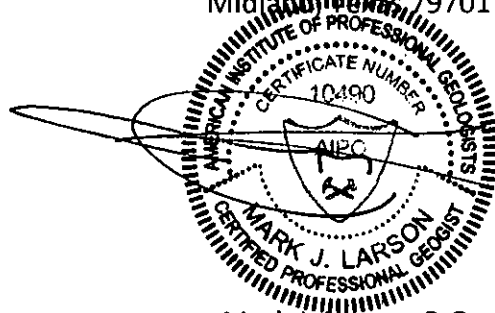
August 21, 2012

Prepared for:

R360 Environmental Solutions, Inc.
Greenspoint Plaza 4
16945 Northchase Drive, Suite 2200
Houston, TX 77060

Prepared by:

Larson & Associates, Inc.
507 North Marienfeld, Suite 200
Midland, TX 79701



Mark J. Larson, P.G.
Certified Professional Geologist No. 10490

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1.0 INTRODUCTION

This hydrogeologic investigation boring plan (Plan) is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of R360 Permian Basin, LLC (R360), a wholly owned subsidiary of R360 Environmental Solutions, Inc., for a proposed surface waste management facility (Facility). The Facility will include evaporation ponds for oil field liquids (i.e., drilling mud) and a landfill for oil field waste. The evaporation ponds AND LANDFILL will be designed, constructed and operated according to OCD rule 19.15.36 NMAC.

The Facility will be located on approximately 267 acres of private land (Property) owned by Mr. David Kirk. R360 has an agreement with the Property owner to construct and operate the Facility. The Property is located in the north half (N/2) Section 36, Township 26 South and Range 31 East, in Eddy County, New Mexico. The Property is located about 25 miles southeast of Malaga, New Mexico. The Property is bounded on the east by Lea County, New Mexico, on the north by State Line Road, on the west by federal (BLM) land and on the south by State of Texas (Loving County). The geodetic position near the center of the Property is latitude 32° 00' 14.13" north and longitude 103° 46' 06.44" west. Figures 1 through 3 present regional and detailed topographic maps. Figure 4 presents an aerial photograph.

Oil and gas production is present on the west side of the Property and includes a plugged well (Getty Oil "AG" #2), 2 producing wells (Texaco "AG" #2 and Texaco "AG" #3), production tank battery (Texaco Eddy State "AG"), flow lines and natural gas pipelines. The east side of the Property is undeveloped. The evaporation ponds will be located near the west side of the Property and the landfill will be located near the east side of the Property. A commercial salt water disposal (SWD-1346) has been approved by the OCD for installation near the north central area of the Property. The south central and southwest areas of the Property may be used for future expansion. Figure 5 presents a conceptual Site plan.

1.1 Objective

The objective of the hydrogeologic investigation is to characterize subsurface conditions and to confirm that groundwater is not present at depths required for permitting the evaporation ponds and landfill. It is important to realize that the west side of the Property will be used for evaporation ponds and the east side of the Property will be used for the landfill. However, the landfill may be expanded to the west and southwest area of the Property.

The evaporation ponds require a minimum separation of 50 feet between the lowest designed elevation for placement of oilfield waste and groundwater. Since the landfill could be expanded to the west and southwest R360 proposes to increase the separation to 100 feet. The maximum depth of the lowest point in the proposed evaporation ponds and expansion area occurs at an elevation of 3055 feet above mean sea level (MSL) assuming a landfill cell depth of 45 feet. Therefore, boreholes SB-1 and SB-2 will be drilled to a minimum elevation of 2945 feet above MSL to account for a depth of 100 feet below the lowest elevation in the area plus an additional 10 feet for conservative measures.

The maximum depth of the lowest point in the landfill occurs at an elevation of 3080 feet above MSL assuming a cell depth of 45 feet. Therefore, boreholes SB-3 and SB-4 will be drilled to a minimum elevation of 2970 feet above MSL to account for a depth of 100 feet below the lowest elevation in the landfill system plus an additional 10 feet for conservative measures. Figure 3 presents the boring locations and 1-foot

topographic contours. The following is a summary of ground elevations, TD elevations and boring depths.

Boring	Ground Elev. (Feet AMSL)	TD Elevation (Feet AMSL)	Boring Depth (Feet)
SB-1	3128	2945	183
SB-2	3110	2945	165
SB-3	3148	2970	178
SB-4	3144	2970	174

1.2 Background

In October and November 2011, Larson & Associates, Inc. (LAI), at the request of R360, conducted an exploratory investigation for feasibility of permitting the evaporation ponds and landfill. The exploratory investigation consisted of drilling 8 borings (BH-1 through BH-8) between approximately 40 and 140 feet bgs. The borings were drilled using air rotary methods to depths of 40 (BH-1, BH-3, BH-4, BH-5), 44 (BH-7), 100 (BH-8), 101 (BH-2) and 140 (BH-6) feet bgs. Water was used to remove drill cuttings from the borings. Figure 3 presents the boring locations. The following is a summary of ground elevations, TD elevations and boring depths.

Boring	Ground Elev. (Feet AMSL)	TD Elevation (Feet AMSL)	Boring Depth (Feet)
BH-1	3097.8	3057.8	40
BH-2	3136.0	3135	101
BH-3	3115.5	3174.5	41
BH-4	3132.5	3092.5	40
BH-5	3107.5	3067.5	40
BH-6	3146.00	3006.0	140
BH-7	3151.0	3107.0	44
BH-8	3142.0	3042.0	100

Drill cuttings were described according to the unified soil classification system (USCS).

Caliche was observed in 6 borings (BH-1, BH-3, BH-5, BH-6, BH-7 and BH-8) between approximately 1 to 5 feet

bgs. The caliche ranged in thickness between approximately 4 (BH-1) and 21 (BH-7) feet. Gravel, sandy gravel, clayey gravel and gravelly sand were observed in the borings between approximately 2 and 33 feet thick. The gravel is underlain by sand and silty sand to TD. Appendix A presents the borehole logs.

Four (4) water wells are located within 1 mile of the Property. A stock well (Hackberry Windmill) is located about 0.6 miles east of the Property in Unit D (NW/4, NW/4), Section 31, Township 26 South, Range 32 East, in Lea County, New Mexico. On November 2, 2011, LAI personnel measure the groundwater at 177 feet bgs. The groundwater elevation was 2973 feet AMSL. Three wells are located south and southeast of the Property in Loving County, Texas. According to the Texas Department of Licensing and Regulation (TDLR) the wells are used for stock (#12286) and rig supply (#270635 and 276294). The nearest water well (#270635) is located about 150 feet south of the Property, in Loving County, Texas. The following is a summary of well details. Figure 2 presents the well locations. Appendix B presents the water well records.

Well	Ground Elev. (AMSL)	Groundwater Elev. (AMSL)	TD Elevation (AMSL)	Well Depth (Feet)
Windmill	3150	2973	2910	240
#270635	3100	--	2860	240
#122867	3125	2935	2726	399
#276294	3130	--	2790	340

2.0 SCOPE OF WORK

2.1 Soil Borings

National Exploration Wells & Pumps (NEWPP) will utilize air rotary with casing advance drilling methods to drill the borings. Continuous coring will be performed on all borings from ground surface to TD utilizing 94mm core and BLN sample hammer systems depending on the formation encountered. The following equipment will be used:

- Speedstar 30 or 50K drill rig for air rotary and air rotary casing advance drilling;
- Sullair two-stage twin screw air compressor required to efficiently clean cuttings from the boreholes at the proposed depths is a 1,050 cfm x 350 psi located on the rig;
- Flat-water Fleet support truck with integral water tank;
- Welder/Generator;
- High-pressure hot-water cleaner (steam cleaner);
- Ford F-350 support truck;
- Four wheel drive forklift;
- 3 cubic yard self-dumping hoppers;
- 20' dovetail trailer;
- Air rotary casing advance, with 8" nominal, steel flush threaded drive casing and bits;
- Hydraulic casing jacks for 8" nominal steel drive casing removal. – pulling capacity from 300,000 lbs to 700,000 lbs;

- Auxiliary air compressor (if required) either 900/350 or 1170/350.

The New Mexico One Call Notification center will be contacted to possible underground utilities at the proposed drilling locations. A hand augured may be used to auger to a depth of 5 feet bgs, if necessary, to confirm the presence of subsurface utilities. An 8" diameter nominal drive casing, steel/flush threaded, is of sufficient diameter to allow for sampling of the boring. Appendix C presents descriptions for the casing advance and coring procedures.

Drill cuttings will be discharged through the cyclone and into 3 cubic yard self-dumping hoppers for transport to roll off containers or deposited on the ground surface at each boring location. It is important to note that no water will be introduced into the borings during the drilling process. Drill cuttings will be flushed from the borings using compressed air.

The drill rig will be cleaned and decontaminated prior to entering the site.

The following generalized steps will be used for drilling and well completion

- Mobilize to the location.
- Mobilize to the well location, conduct daily safety meeting, rig up drilling equipment on plastic sheeting.
- Hand auger to 5' to locate utilities.
- Drill and continuously sample from ground surface to TD using casing advance drilling methods. Casing diameters will be of sufficient diameter to allow sampling by both 94mm and BLN sample hammer methods.
- Upon completion and sampling National EWP will emplace (tremmie) a high solids bentonite grout to the ground surface.
- Mobilize to additional sites or complete demobilization.

Note: Drilling will be suspended whenever dampness or groundwater is observed in the core samples for a period of up to 12 hours to see if free water accumulates in the borehole sufficient to verify that the water table has been identified.

The following additional activities will be performed during core sampling:

- Photograph cores and monitor to determine depths at which changes in texture, color and moisture content occur to allow accurate logging of the subsurface soil stratigraphy;
- Collect cores in boxes for future reference.

2.2 Soil Samples and Analysis

No geotechnical samples are planned since samples from the previous investigation were analyzed for geotechnical analysis unless it is determined necessary based on inspection of core samples. The cores will be described according to the Unified Soil Classification System (USCS). The core samples will be examined for texture, color, and moisture content to allow accurate logging of the lithology and hydrogeologic

characteristics within each borehole. The soil cores will be wrapped with aluminum foil and plastic in wax covered boxes for future reference.

2.3 Monitoring Wells

A monitoring well will be installed when groundwater is encountered. The drilling contractor will follow ASTM D5092 Standard Practice for Design and Installation of Groundwater Monitoring Wells when installing unconfined and confined monitoring wells.

The following procedures will be used for installing monitoring wells in an unconfined aquifer:

- Should unconfined groundwater be encountered the borehole will be advanced approximately 5 to 7 feet beyond the measured static water level in the borehole;
- The well will be constructed with 2-inch diameter schedule 40 PVC casing and screen with flush thread connections;
- A 10-foot section of 0.010 inch factory slotted screen will be installed in the borehole with the top of the screen approximately 3 feet above the measured static water level;
- Graded silica sand will be placed around the screen to approximately 2 feet above the screen;
- A layer of bentonite chips approximately 3 feet thick will be placed above the sand and hydrated with potable water;
- The annulus above the bentonite chips will be filled with a slurry of cement and bentonite grout to about 1 foot below ground surface;
- The annulus above the cement and bentonite grout will be filled with cement to ground surface;
- A pad measuring approximately 3 x 3 feet will be constructed above ground around the 2 inch PVC casing stickup;
- The pad will be filled with cement and sloped for drainage;
- A locking steel sleeve will be placed over the 2 inch PVC casing stickup and will extend into cement approximately 1 foot below ground surface;
- The well will be secured with a lock.

Appendix D presents a typical unconfined monitoring well construction diagram.

The following procedures will be used for installing monitoring wells in a confined aquifer:

- Should confined groundwater be encountered the borehole will be advanced approximately 12 feet below the base of the upper confining layer;

- The well will be constructed with 2-inch diameter schedule 40 PVC casing and screen with flush thread connections;
- A 10-foot section of 0.010 inch factory slotted screen will be installed in the borehole with the top of the screen approximately 2 feet below the base of the upper confining layer;
- Graded silica sand will be placed around the screen through a tremmie pipe to approximately 1 foot above the screen;
- A layer of time-release bentonite chips will be placed above the sand and across the confining layer;
- The annulus above the bentonite chips will be filled with a slurry of cement and bentonite grout to about 1 foot below ground surface;
- The annulus above the cement and bentonite grout will be filled with cement to ground surface;
- A pad measuring approximately 3 x 3 feet will be constructed above ground around the 2 inch PVC casing stickup;
- The pad will be filled with cement and sloped for drainage;
- A locking steel sleeve will be placed over the 2 inch PVC casing stickup and will extend into cement approximately 1 foot below ground surface;
- The well will be secured with a lock.

Appendix D presents a typical confined monitoring well construction diagram.

The following procedures will occur after installing the monitoring wells:

- The monitoring wells will be surveyed by a New Mexico licensed surveyor for top of casing and ground elevation;
- The wells will be gauged for depth to static groundwater and total well depth prior to developing with an electric submersible or mechanical pump or hand bailed to remove fine grained material disturbed during the drilling process.

2.4 Groundwater Samples

Groundwater samples will be collected from the monitoring wells after the wells are developed to remove sediment disturbed during drilling and well installation. The wells will be developed by pumping with electric or mechanical pumps until groundwater is visibly free of suspended solids. Groundwater samples will be collected approximately 24 hours following development using low flow sampling methods. The samples will be collected in laboratory containers, preserved and shipped under chain of custody to DHL Analytical, Inc. (DHL), a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory, located in Round Rock, Texas. DHL will analyze the samples for benzene, toluene, ethyl benzene and xylenes (BTEX), dissolved (filtered) RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver),

cations (sodium, calcium, magnesium, potassium), anions (nitrate-N, chloride, sulfate, alkalinity) and total dissolved solids (TDS).

2.5 Schedule

Drilling activities for four (4) boreholes will occur over approximately 7 to 10 days depending on weather and subsurface conditions. The duration of the laboratory sampling analysis and report preparation will be approximately 4 to 6 weeks depending on the laboratory schedule. The total project duration is expected to be up to 2 months after the initiation of drilling activities.

3.0 RESPONSIBILITIES

3.1 Drilling Contractor

National Exploration, Wells and Pumps will be responsible for drilling the borings, collecting core samples and installing monitoring wells according to procedures identified above. The drilling contractor will be responsible for equipment decontamination.

3.2 Laboratory

ETTL will perform geotechnical analysis of soil samples, if necessary. DHL Analytical, Inc. will analyze the groundwater samples for major cations and anions, benzene, toluene, ethyl benzene and xylenes (BTEX), RCRA metals, and total dissolved solids (TDS). LAI personnel will be responsible for project management including supervising drilling operations, describing and preserving core samples, gauging and sampling monitoring wells, data interpretation and report preparation.

3.3 LAI

LAI personnel will be responsible of project management including staking boring locations, New Mexico One Call Notification, supervising drilling, core and soil sampling, core descriptions and preservation, supervising well installation, well development and groundwater sampling, data evaluation and report preparation.

4.0 NOTIFICATION

The following individuals will be notified at least 10 days prior to commencing drilling activities:

Mr. Wayne Crawley – R360 Permian Basin LLC

Mr. Brad Jones – NMOCD

Mr. Randy Dade – NMOCD District 2

5.0 SAFETY CONSIDERATIONS

Possible safety hazards that may be associated with the subsurface investigation involve heavy lifting, inclement and hazardous weather and terrain. Caution will be exercised to mitigate the risks posed by

each of these hazards should they arise. Required personal protective equipment (PPE), at a minimum, will include work gloves, latex sampling gloves, hardhats, long-sleeved shirts, safety glasses, hearing protection, and steel-toed boots. The work will be conducted in accordance with R360 safety practices. All contractors will be responsible for adhering to these practices.

FIGURES

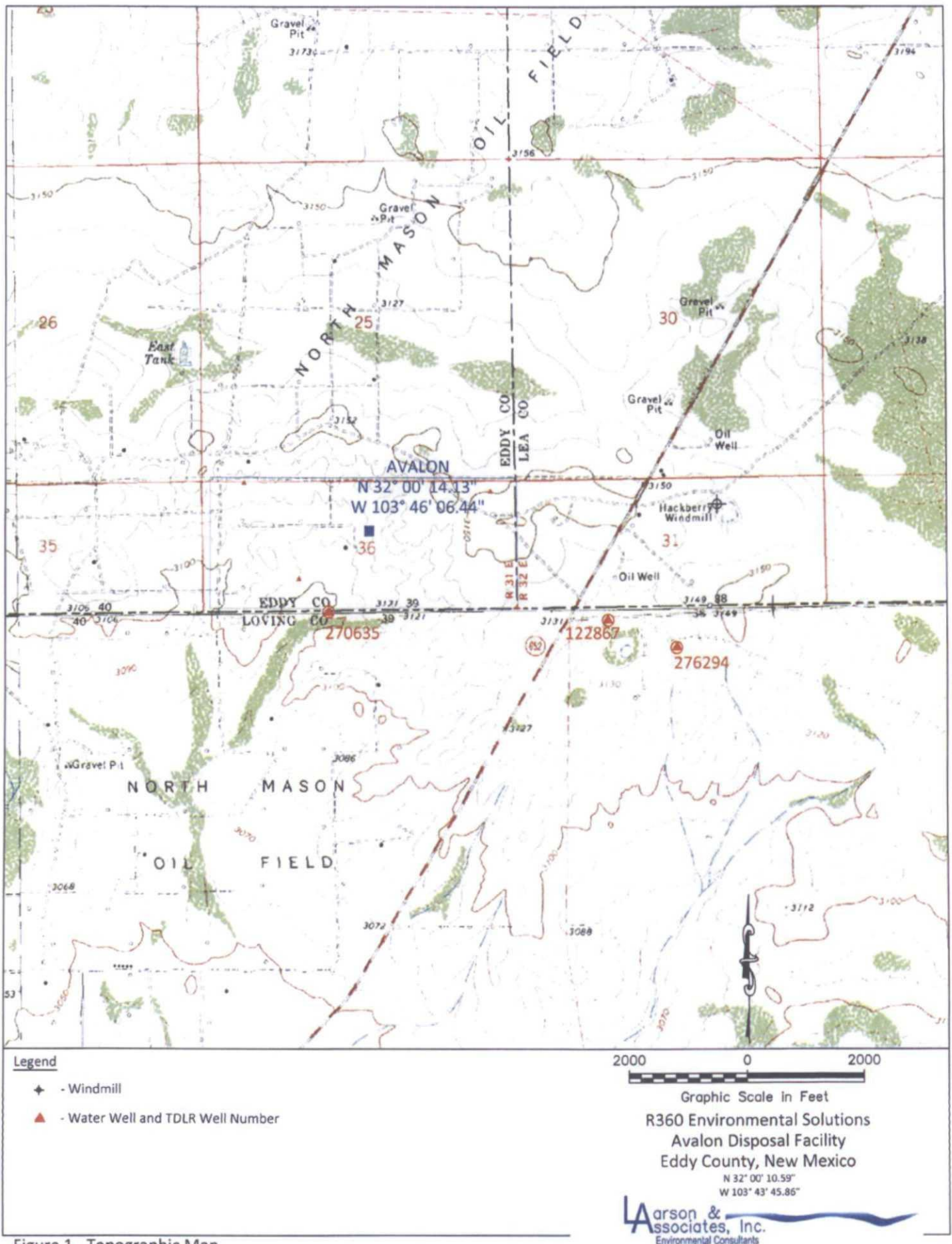


Figure 1 - Topographic Map

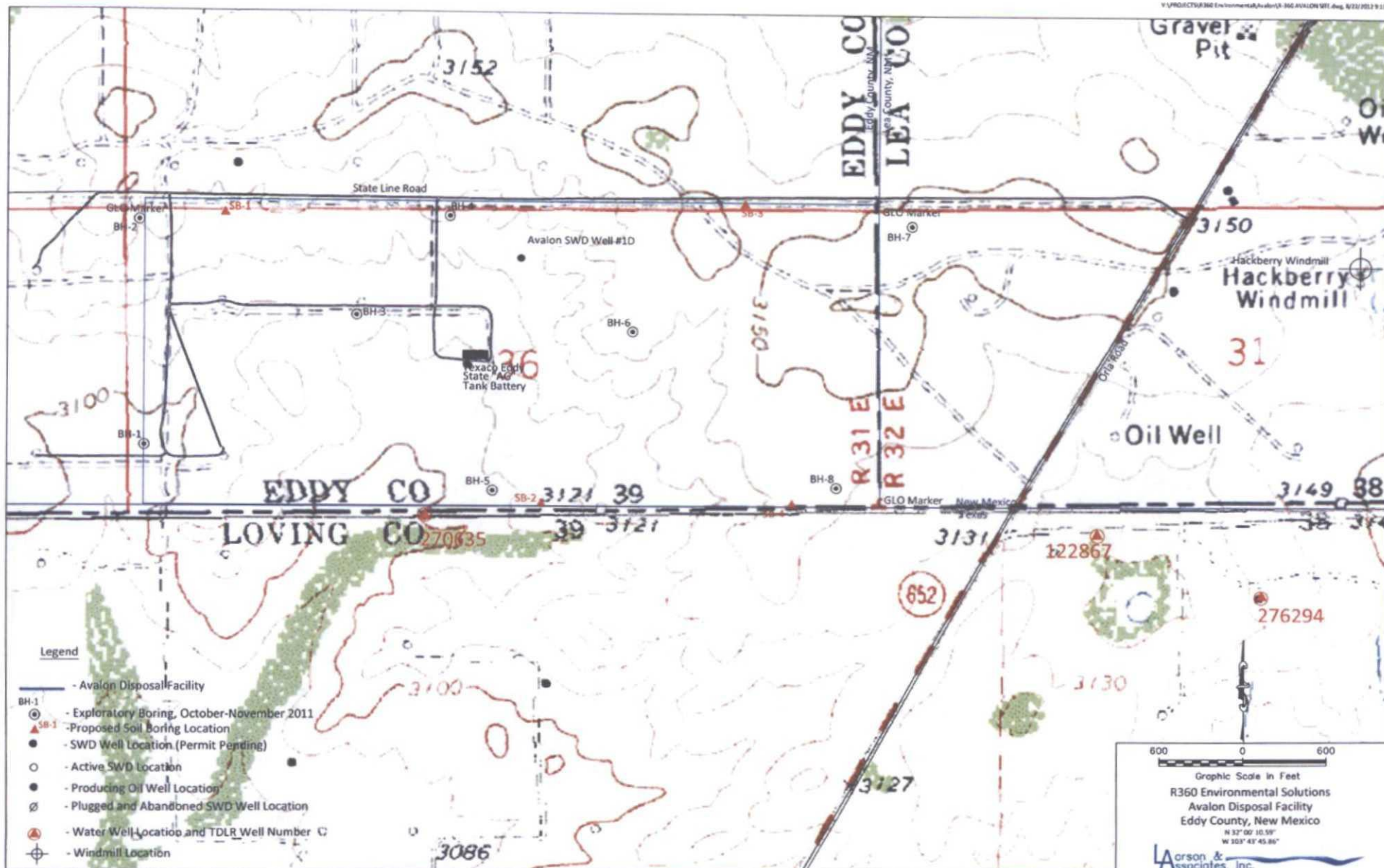
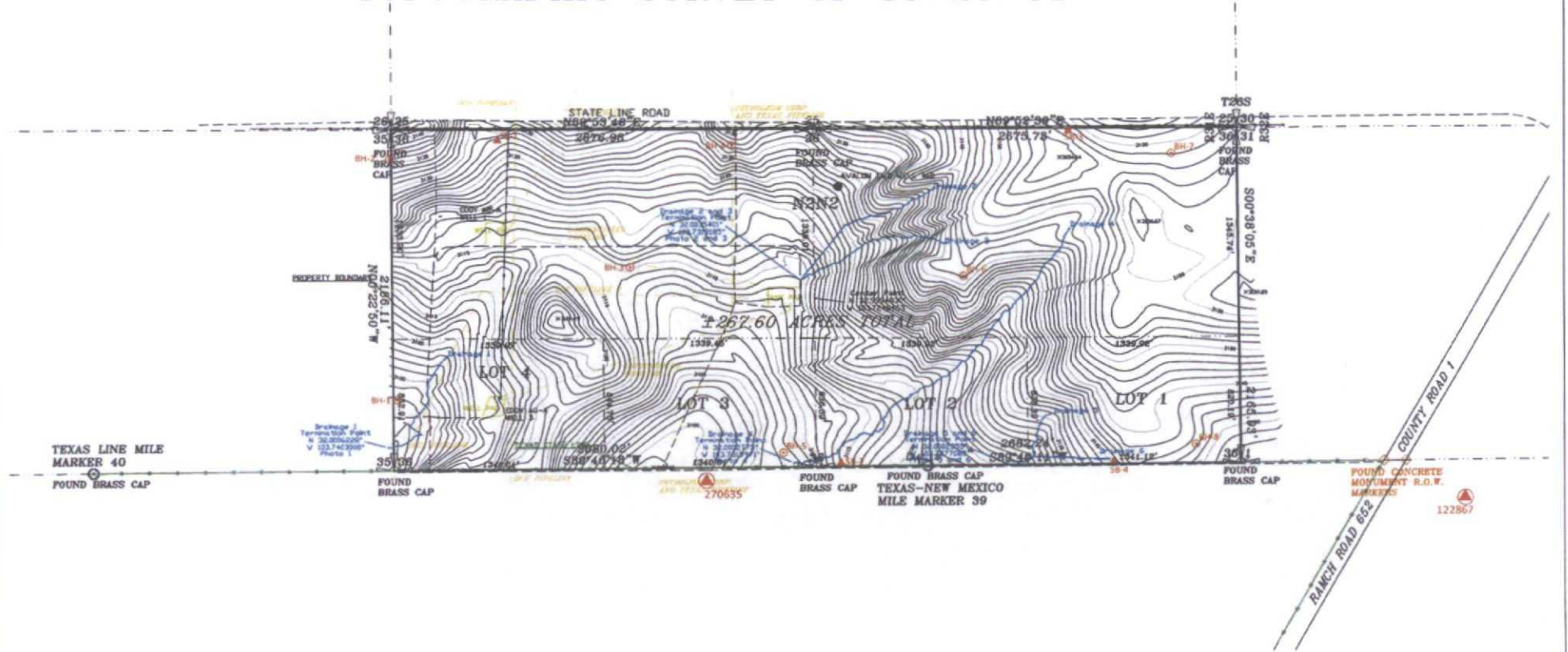


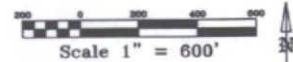
Figure 2 - Site Topographic Map

TOPOGRAPHIC SURVEY OF 36-26-31



LEGEND

- ▲ SB-1 - Proposed Soil Boring Location
- - SWD Well Location (Permit Pending)
- - Active SWD Location
- - Producing Oil Well Location
- ∅ - Plugged and Abandoned SWD Well Location
- ▲ - Water Well Location and TDLR Well Number
- ⊕ - Windmill Location



(Adapted by Larson and Associates)
 (Adapted by Larson and Associates)
 (Adapted by Larson and Associates)

FIGURE 2 - Detailed Topographic Map

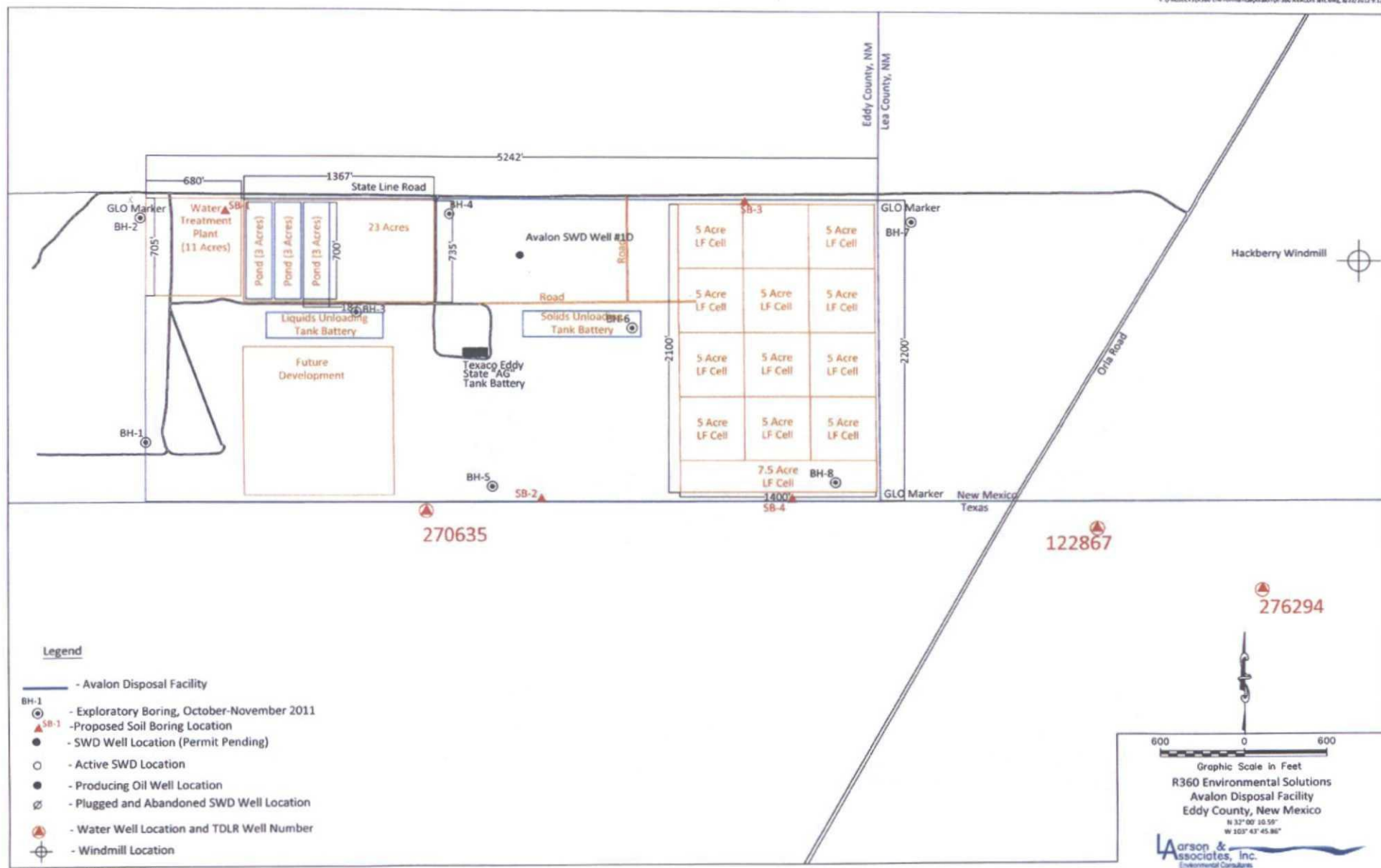
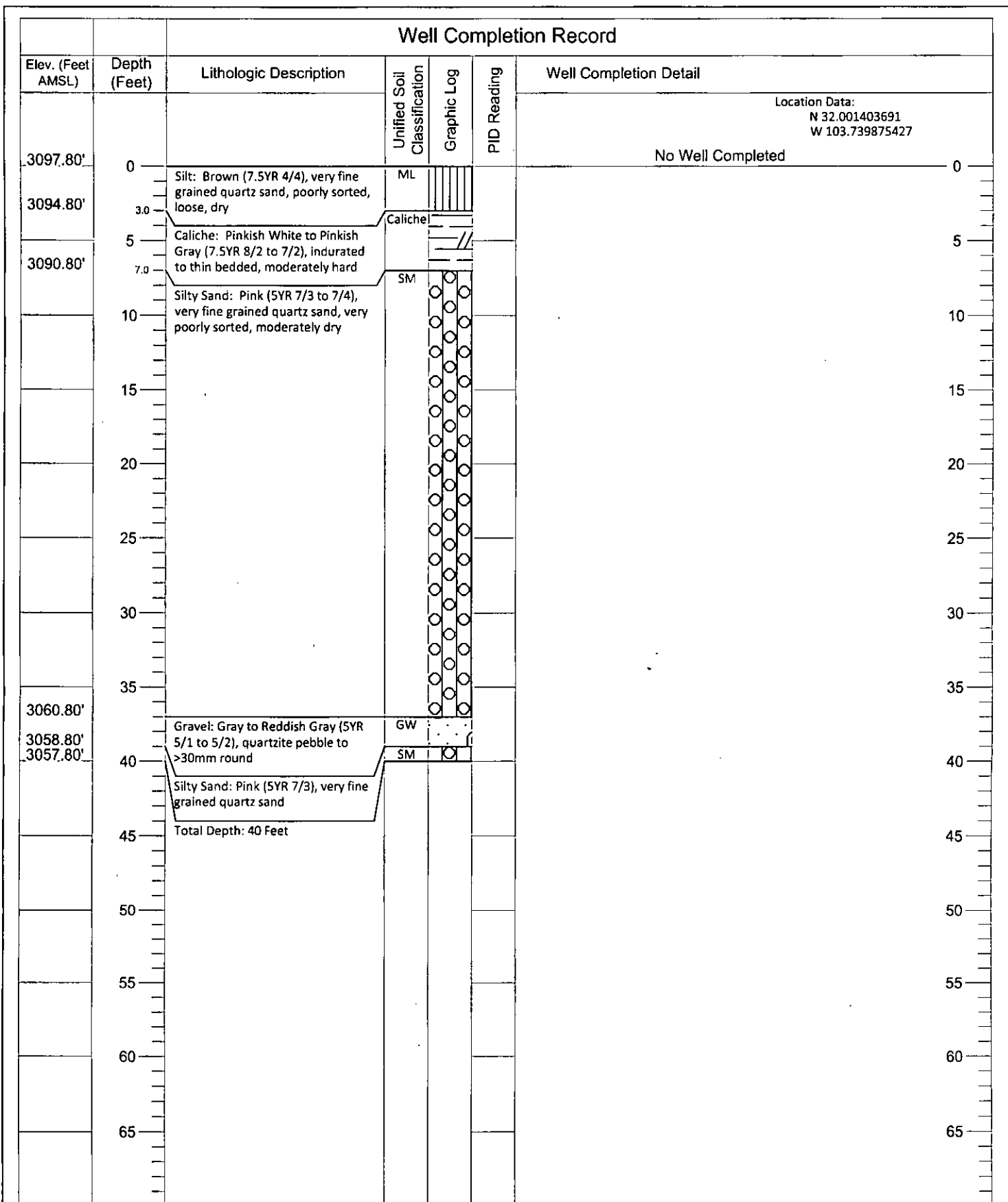


Figure 5 - Facility Drawing

APPENDIX A

Borehole Logs



Legend

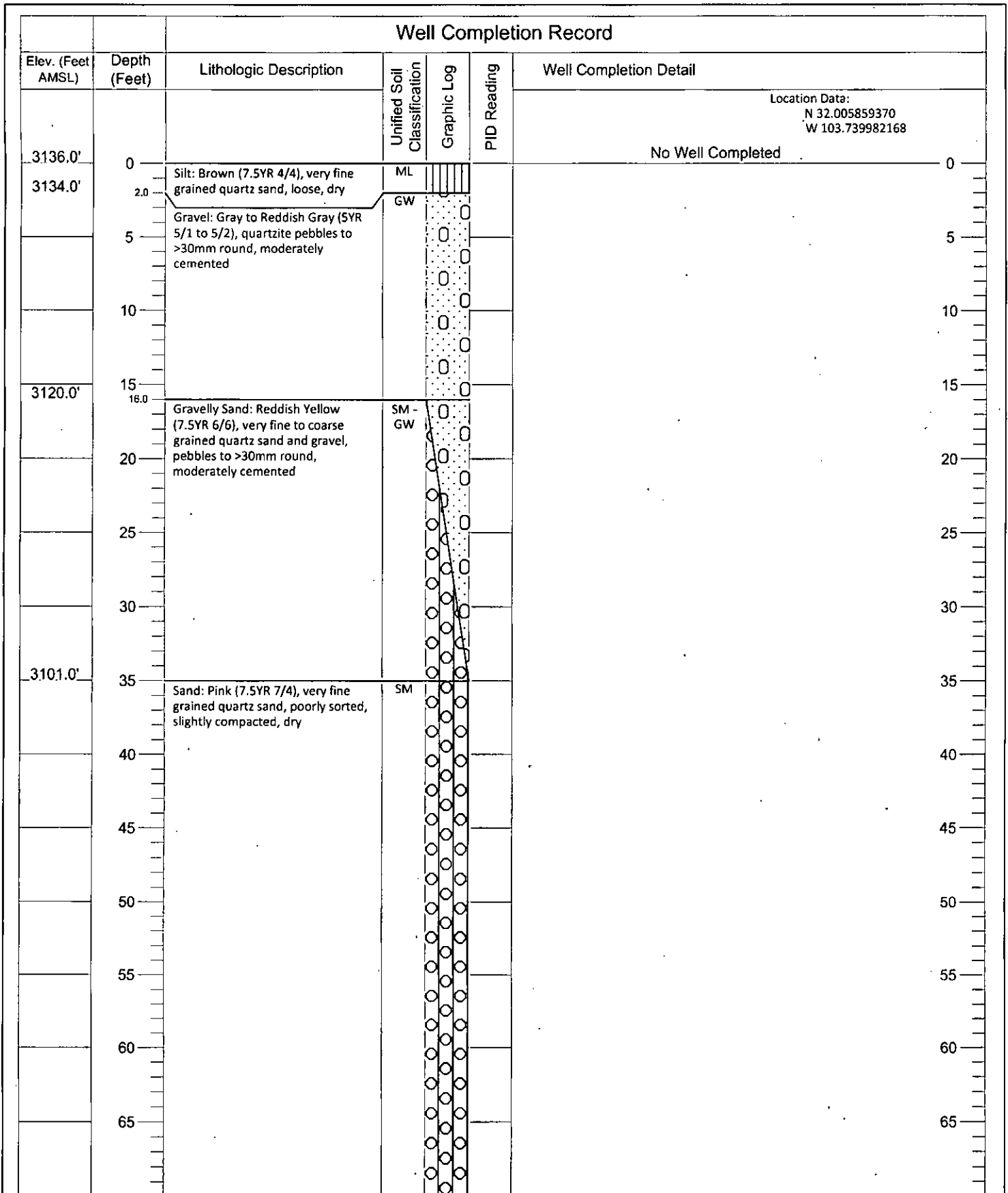
 - Water Table (Time of Boring)

Date Drilled - 10/27/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico

N 32° 00' 10.59"
 W 103° 43' 45.86"

Larson & Associates, Inc.
 Environmental Consultants






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 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico
 N 32° 00' 10.59"
 W 103° 43' 45.86"

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 Environmental Consultants

Well Completion Record					
Geolog. Unit	Depth (Feet)	Lithologic Description	Unified Soil Classification	Graphic Log	PID Reading
3066.0'	70	Sand: Pink (7.5YR 7/4), very fine grained quartz sand, poorly sorted, slightly compacted, dry	SM		
	75				
3056.0'	80	Sand: Light Yellow Orange (10YR 8/3), very fine grained quartz sand, unconsolidated, dry	SM		
	85				
	90				
	95				
3035.0'	100	Total Depth: 101 Feet			
	101.0				
	105				
	110				
	115				
	120				
	125				
	130				
	135				

Legend

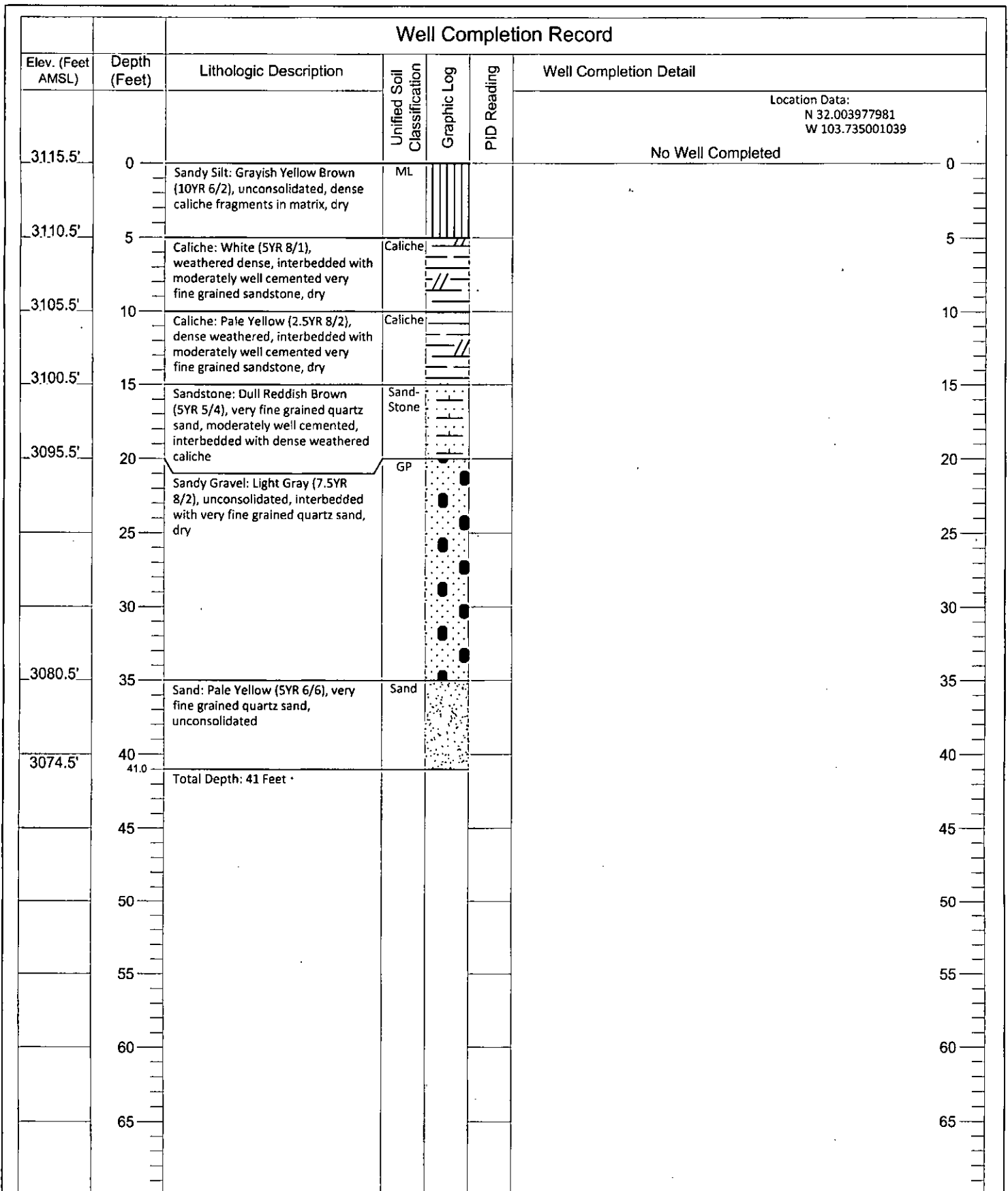
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 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
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Legend

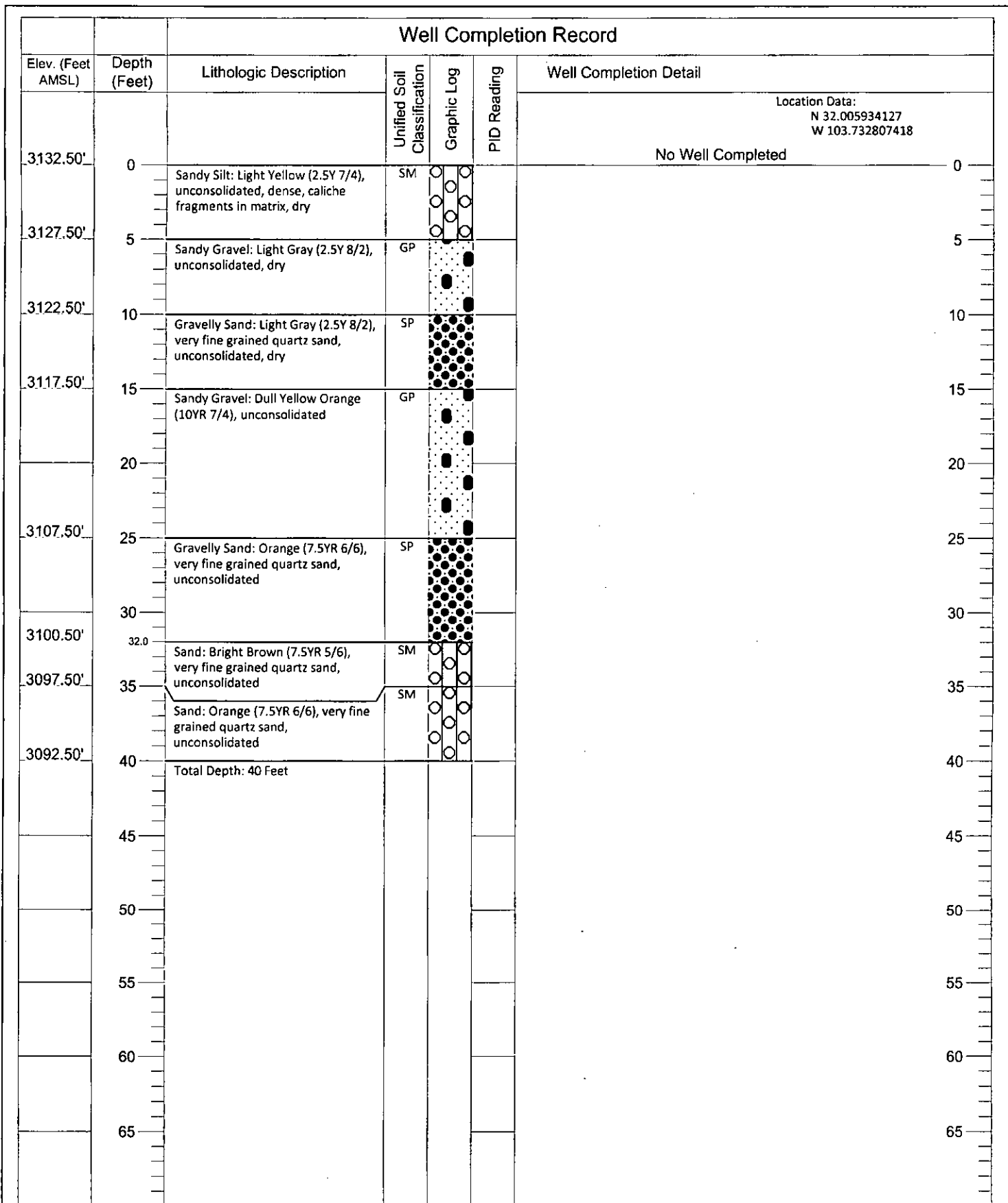
- Water Table (Time of Boring)

Date Drilled - 10/28/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - J. Ferguson
 Checked By - J. Ferguson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico

N 32° 00' 10.59"
 W 103° 43' 45.86"

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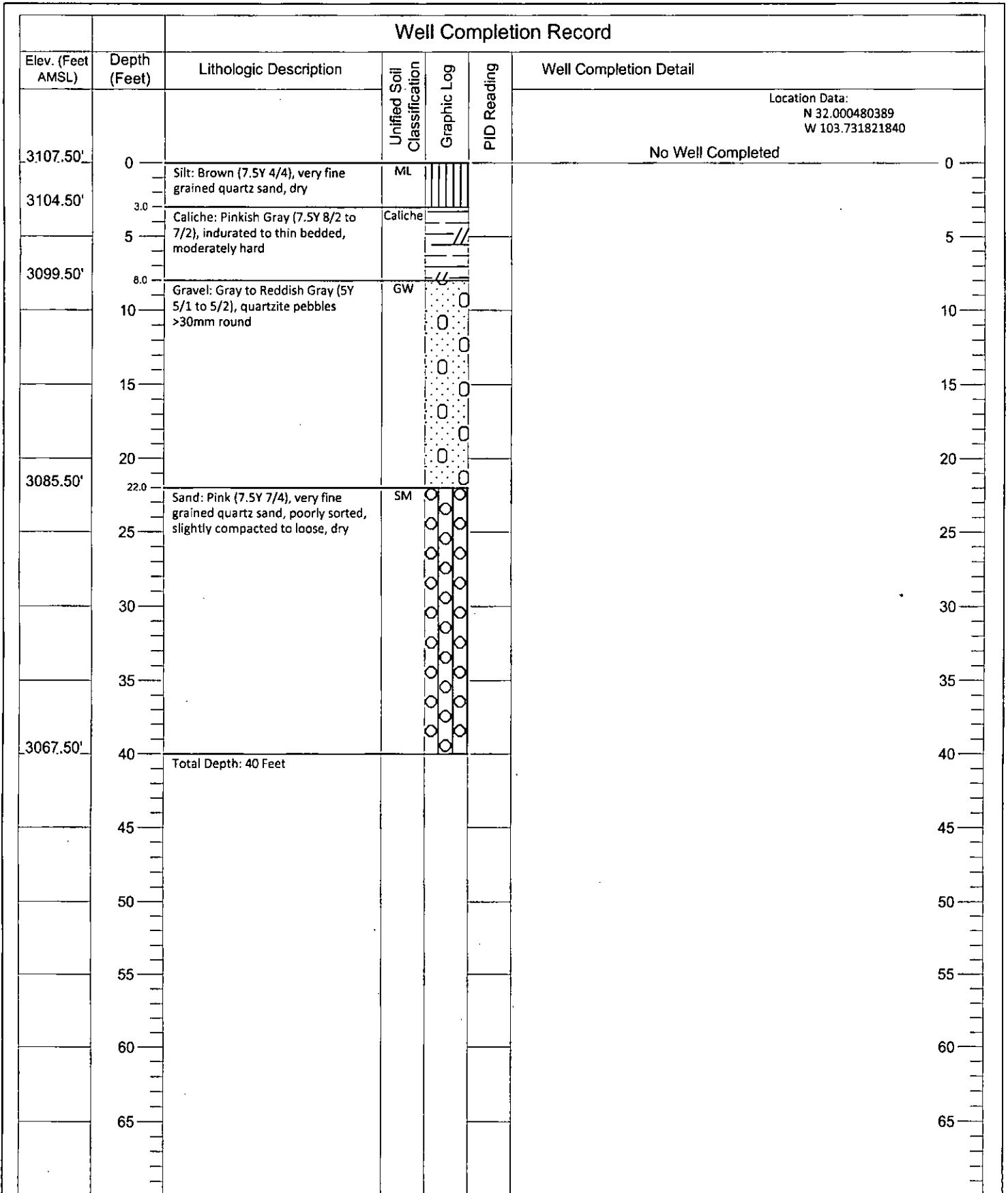
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--- - Water Table (Time of Boring)

Date Drilled - 10/28/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - J. Fergerson
 Checked By - J. Fergerson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico
 N 32° 00' 10.59"
 W 103° 43' 45.86"

Larson & Associates, Inc.
 Environmental Consultants



Legend

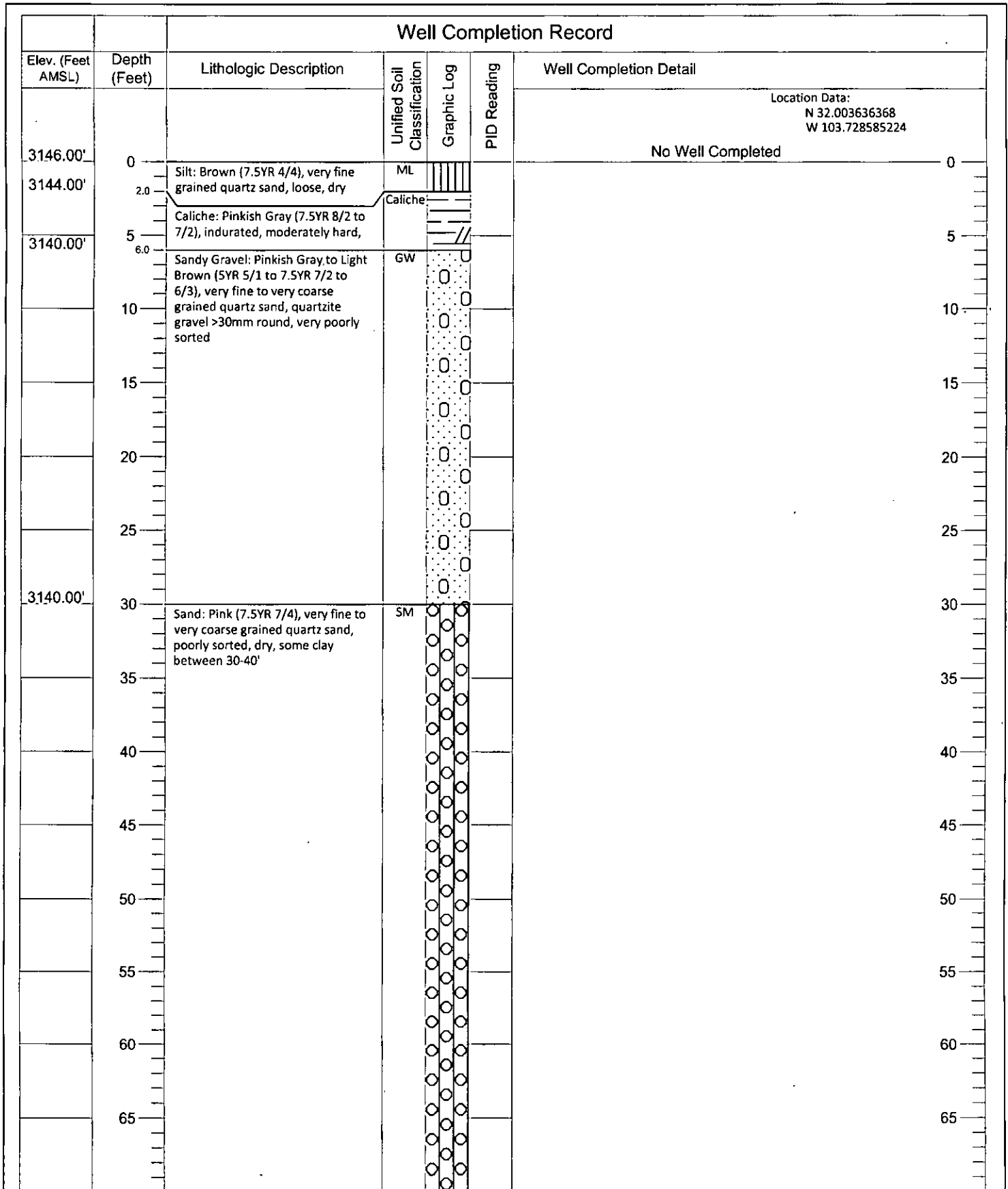
- Water Table (Time of Boring)

Date Drilled - 10/31/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico

N 32° 00' 10.59"
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Legend

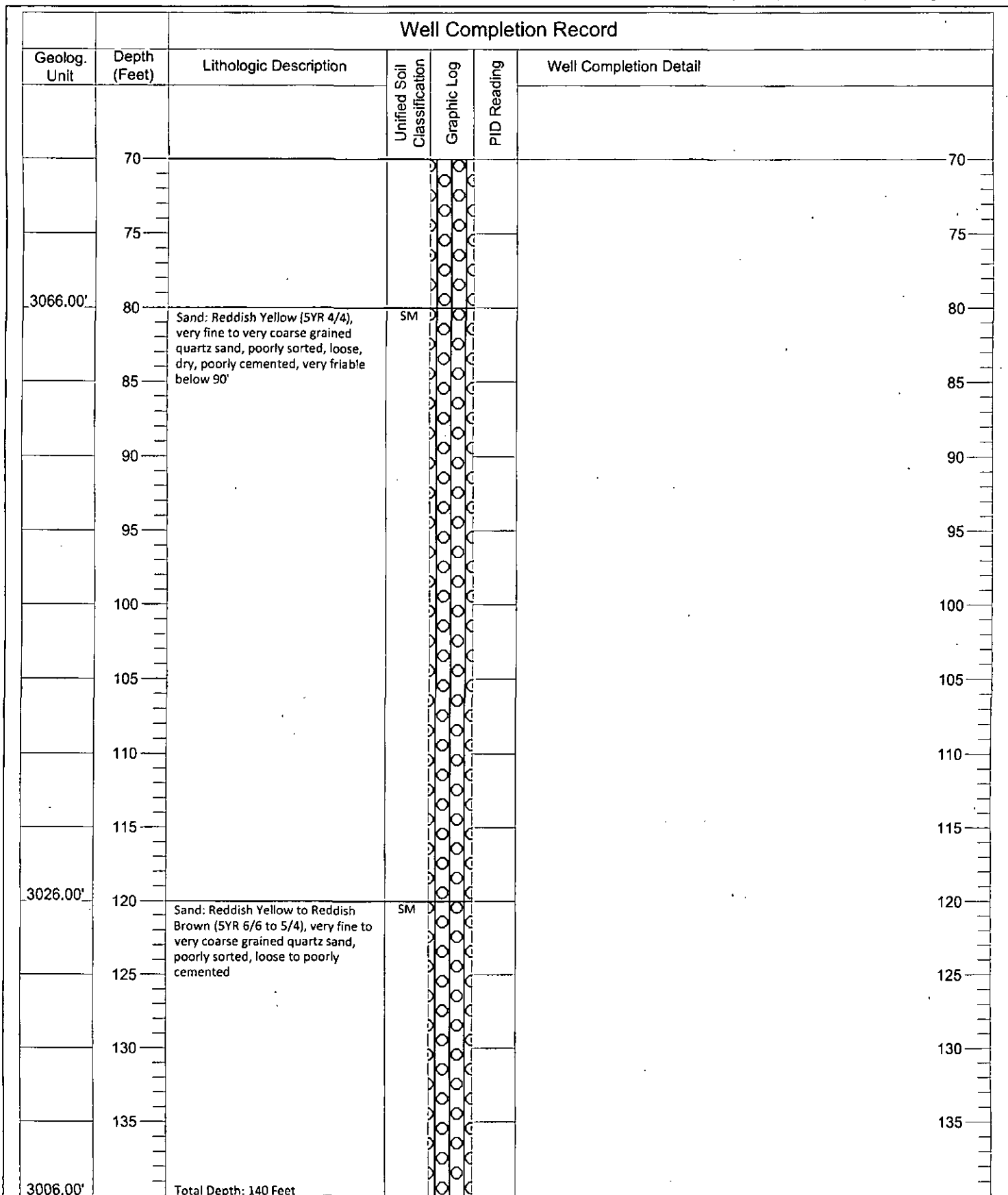
--- - Water Table (Time of Boring)

Date Drilled - 10/31/2011
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 Logged By - M. Larson
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 Eddy County, New Mexico

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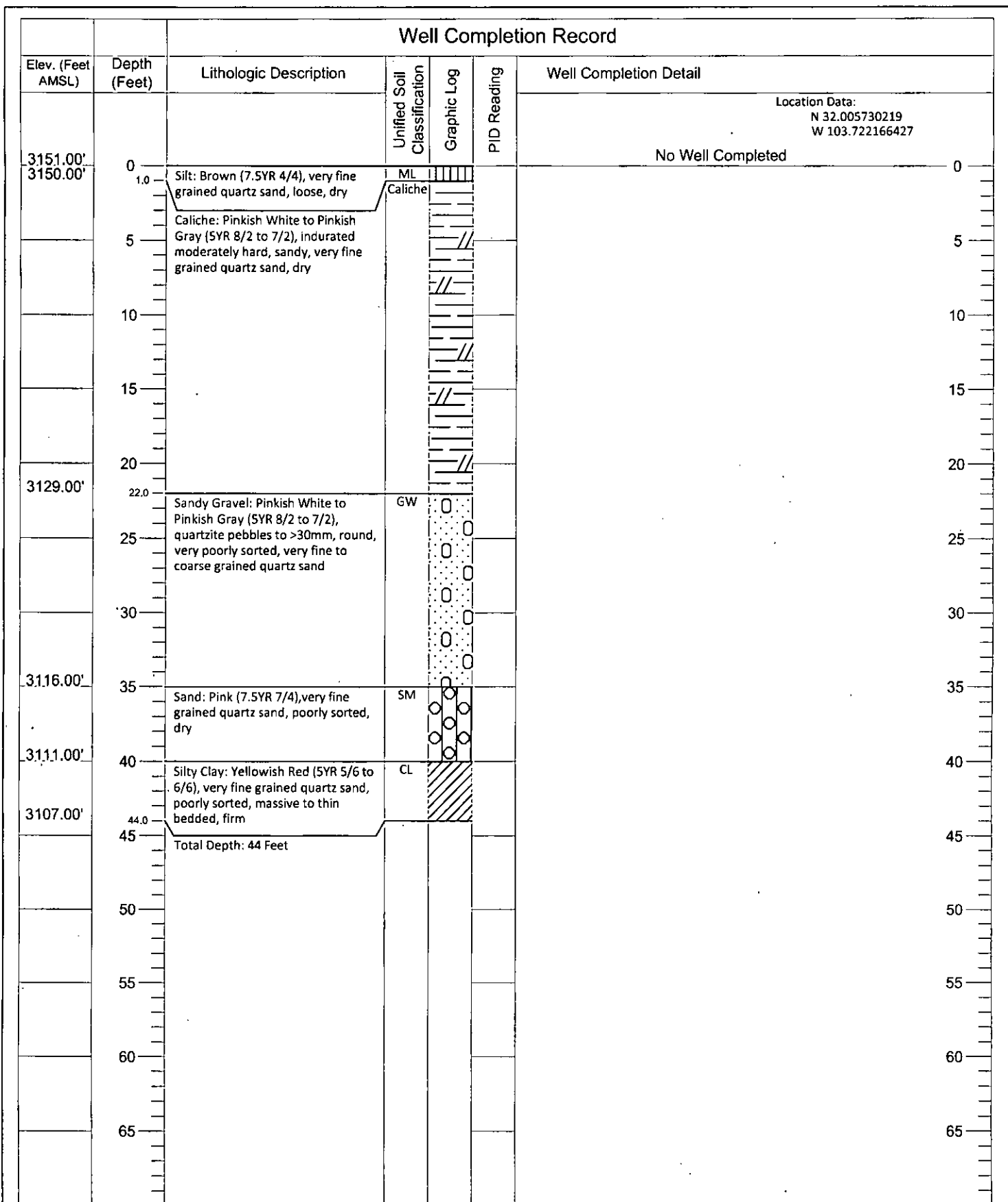
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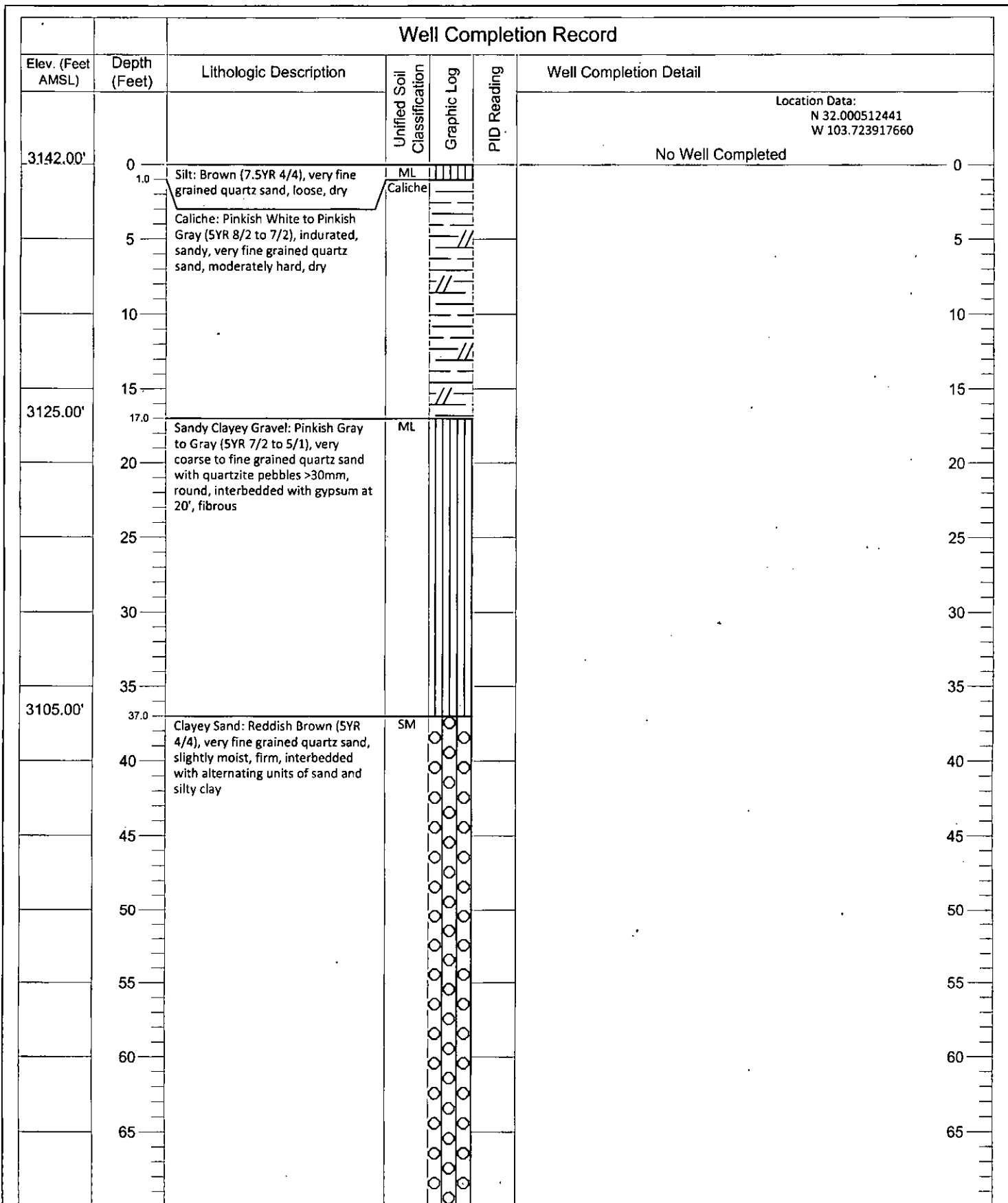
Legend

--- - Water Table (Time of Boring)

Date Drilled - 11/01/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico
 N 32° 00' 10.59"
 W 103° 43' 45.86"

Larson & Associates, Inc.
 Environmental Consultants




Legend

--- - Water Table (Time of Boring)

Date Drilled - 11/01/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico
 N 32° 00' 10.59"
 W 103° 43' 45.86"

Larson &
 Associates, Inc.
 Environmental Consultants

Well Completion Record						
Elev. (Feet AMSL)	Depth (Feet)	Lithologic Description	Unified Soil Classification	Graphic Log	PID Reading	Well Completion Detail
3072.00'	70	Clayey Sand: Reddish Brown (5YR 4/4), very fine grained quartz sand, slightly moist, firm, interbedded with alternating units of sand and silty clay	SM			70
	75					75
	80					80
	85					85
	90					90
	95					95
3042.00'	100	Total Depth: 100 Feet				100
	105					105
	110					110
	115					115
	120					120
	125					125
	130					130
	135					135

Legend
 - Water Table (Time of Boring)

Date Drilled - 11/01/2011
 Drilling Method - Air Rotary
 Drilled By - Scarborough Drilling
 Logged By - M. Larson
 Checked By - M. Larson

R360 Environmental Solutions
 Avalon Disposal Facility
 Eddy County, New Mexico

N 32° 00' 10.59"
 W 103° 43' 45.86"

Larson &
 Associates, Inc.
 Environmental Consultants

APPENDIX B

Water Well Records

STATE OF TEXAS WELL REPORT for Tracking #270635

Owner:	CONOCO PHILLIPS	Owner Well #:	JN 2771
Address:	4001 PENBROOK ODESSA , TX 79761	Grid #:	26-59-7
Well Location:	MENTONE , TX 79754	Latitude:	32° 00' 00" N
Well County:	Loving	Longitude:	103° 43' 59" W
Elevation:	No Data	GPS Brand Used:	GARMIN GPS III PLUS
Type of Work:	New Well	Proposed Use:	Rig Supply

Drilling Date: Started: 11/2/2011
Completed: 11/2/2011

Diameter of Hole: Diameter: 8.75 in From Surface To 240 ft

Drilling Method: Air Rotary

Borehole Completion: Gravel Packed From: 0 ft to 15 ft
Gravel Pack Size: 0.02

Annular Seal Data: 1st Interval: From 0 ft to 15 ft with 6 BAG CEMENT (#sacks and material)
2nd Interval: No Data
3rd Interval: No Data
Method Used: No Data
Cemented By: No Data
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Alternative Procedure Used

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No Data

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: DARRELL CRASS DRILLING
PO BOX 60031
MIDLAND , TX 79711

Driller License Number: **2752**

Licensed Well Driller Signature: **R DARRELL CRASS**

Registered Driller Apprentice Signature: **RELLES ALVARADO**

Apprentice Registration Number: **57809**

Comments: **13 - 18 NOT APPLICABLE**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #270635) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	3	TOP SOIL
3	15	CALICHE
15	33	SAND
33	38	GRAVEL
38	50	SANDY CLAY
50	60	GRAVEL
60	70	SANDY CLAY
70	100	SAND
100	180	SANDY CLAY
180	210	SAND
210	230	SANDY CLAY
230	240	RED BED

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
6"	NEW	PVC PIPE BLANK	0 - 140
6"	NEW	PVC PIPE SCREEN	140 - 240

STATE OF TEXAS WELL REPORT for Tracking #122867

Owner:	Zane Kiehne	Owner Well #:	No Data
Address:	P.O. Box 7 Orla, TX 79770	Grid #:	46-03-1
Well Location:	17 miles E. of 285 on Hwy 652 TX	Latitude:	31° 59' 59" N
Well County:	Loving	Longitude:	103° 43' 04" W
Elevation:	3154 ft.	GPS Brand Used:	Garmin
Type of Work: New Well		Proposed Use: Stock	

Drilling Date: **Started: 9/14/2007
Completed: 9/19/2007**

Diameter of Hole: **Diameter: 8-3/4 in From Surface To 399 ft**

Drilling Method: **Mud Rotary**

Borehole Completion: **Gravel Packed From: 393 ft to 190 ft
Gravel Pack Size: 3/8 vealmo**

Annular Seal Data: **1st Interval: From 0 ft to 10 ft with 6 Cement (#sacks and material)
2nd Interval: From 170 ft to 190 ft with 8 Hole Plug (#sacks and material)
3rd Interval: No Data
Method Used: Poured Slurry
Cemented By: WTWWS
Distance to Septic Field or other Concentrated Contamination: N/A ft
Distance to Property Line: N/A ft
Method of Verification: N/A
Approved by Variance: No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **Static level: 190 ft. below land surface on 9/20/2007
Artesian flow: No Data**

Packers: **No Data**

Plugging Info: **Casing or Cement/Bentonite left in well: No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: **Type of Water: Fresh
Depth of Strata: 240-300 / 385-395 ft.
Chemical Analysis Made: No
Did the driller knowingly penetrate any strata which contained undesirable constituents: No**

Certification Data: **The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.**

Company Information: **West Texas Water Well Service
3410 Mankins**

Odessa, TX 79764

Driller License Number: **4854**

Licensed Well Driller Signature: **Ronny Keith**

Registered Driller Apprentice Signature: **Luis Armendariz**

Apprentice Registration Number: **3030**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #122867) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	5	Top Soil
5	18	White Sandy Caliche
18	20	Hard White Limestone
20	35	Brown Sandstone & Sand
35	65	Loose Brown Sand
65	240	Red Sand & Shale
240	300	Loose Red Sand & Water
300	385	Red Clay
385	395	Red Sand
395	399	Red Clay

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
5	New	PVC Screen	393 - 373 .035
5	New	PVC Blank	373 - 293
5	New	PVC Screen	293 - 233 .035
5	New	PVC Blank	2' AGL - 233

STATE OF TEXAS WELL REPORT for Tracking #276294

Owner:	CONOCO PHILLIPS	Owner Well #:	JN 2723
Address:	4001 PENBROOK ODESSA, TX 79760	Grid #:	46-03-1
Well Location:	MENTONE, TX 79754	Latitude:	31° 59' 56" N
Well County:	Loving	Longitude:	103° 42' 50" W
Elevation:	No Data	GPS Brand Used:	GARMIN GPS III PLUS
Type of Work:	New Well	Proposed Use:	Rig Supply

Drilling Date: Started: 1/6/2012
Completed: 1/6/2012

Diameter of Hole: Diameter: 8.75 in From Surface To 340 ft

Drilling Method: Air Rotary

Borehole Completion: Gravel Packed From: (No Data) ft to (No Data) ft
Gravel Pack Size:

Annular Seal Data: 1st Interval: No Data
2nd Interval: No Data
3rd Interval: No Data

Surface Completion: No Data

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: The well was plugged within 48 hours.
Casing left in well: Cement/Bentonite left in well:
From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used
NO CASING
FILLED HOLE WITH DIRT

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No Data

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: R DARRELL CRASS
PO BOX 60031
MIDLAND, TX 79711

Driller License Number: 2752

Licensed Well Driller Signature: **R DARRELL CRASS**

Registered Driller Apprentice Signature: **RON MOTT**

Apprentice Registration Number: **56409**

Comments: **9 - 14 NOT APPLICABLE**
16 - 18 NOT APPLICABLE

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #276294) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

CASING, BLANK PIPE & WELL SCREEN DATA

From (ft) To (ft) Description
0 - 25 CALCHIE
25 - 90 SANDY CLAY
90 - 100 SANDSTONE
100 - 340 CLAY & RED BED

No Data

APPENDIX C

Casing Advance and Coring Procedures

The Air Rotary Casing Hammer System (ARCH) consists of a non-rotating flush-threaded casing driven in conjunction with a conventional air rotary drill string. Cuttings are cleared from the hole by the bit rotation and air circulation. The material is discharged through a hose into a cyclone, which separates the air from the formation cuttings to facilitate sampling and drill cuttings containment. The advanced drive casing is a heavy wall flush-threaded pipe. Six diameters are available to accommodate different well diameters and depth requirements. The casing is driven with a pneumatic or hydraulic drill-through casing hammer, which is rated up to 9700 foot-pounds of energy.

Upon completion of drilling, the drill rod and bit are extracted from the center of the drive casing to allow the installation of permanent well construction materials. A hydraulic casing puller rated up to 250 tons extracts the drive casing. After the well casing is placed, the sand, bentonite pellets, and cement are installed in the annulus as the drive casing is pulled.

Primary Benefits

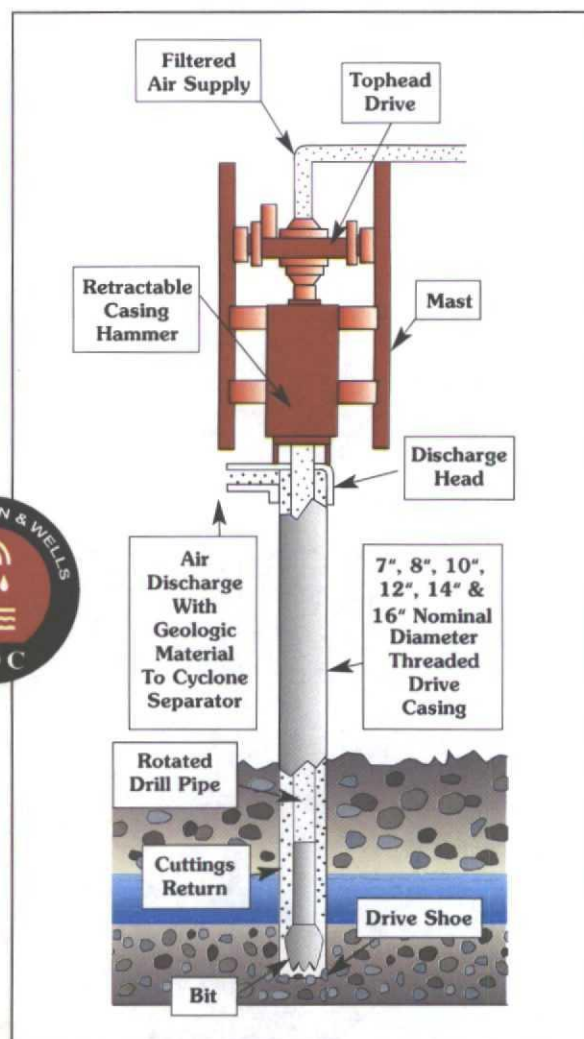
Eliminates the need to set cemented-in conductor casing in upper aquifers in order to drill into lower aquifers.

The flush-threaded drive casing seals off formations in the borehole as drilling progresses, eliminating the potential for cross contamination of the aquifers.

Eliminates the need for drilling fluids.

The casing can be driven to a specified depth allowing continued borehole advancement with direct air/mud rotary methods.

Depth discreet water, vapor, and soil samples can be taken at selected intervals.



CASING HAMMERair rotary

Drill cuttings discharged from the cyclone provide representative stratigraphy while drilling progresses.

Drills through most geologic formations and is superior over other methods in conglomerate.

Provides a clean borehole for well construction. This eliminates problems during well installation.

The completed well does not have any drilling mud to remove; thus the well develops quicker and is more efficient.

The method has been approved and utilized for over fifteen years on projects for the Environmental Protection Agency, California Department of Health Services, Arizona Department of Environmental Quality, Regional Water Quality Boards, Department of Energy, Department of Defense and private clients throughout the Western States.

Sample specifications and references are available upon request.

General Information

Nominal Casing Diameter	Well Diameter	Nominal Depth Capacity	Telescoped Casing Diameter	Telescoped Depth Capacity
7"	2"	600'	10" x 7"	1000'
8"	4"	500'	10" x 8"	900'
10"	5"	400'	12" x 10"	750'
12"	6"	350'	16" x 12"	550'
14"	8"	250'	16" x 14"	450'
16"	10"	200'		

The actual depth capacity will vary

Albuquerque 800.914.7506 • Indianapolis 317.872.1203

Las Vegas 702.558.9800 • Los Angeles 800.974.2769

Phoenix 800.584.6471 • Sacramento 800.873.3073

San Francisco 510.236.6282

wdcexploration.com

The 94mm wireline system collects core in a steel inner tube that is "latched" inside an outer core barrel attached to rotating, advancing drill pipe. Core samples are typically collected continuously in 5' lengths as drilling progresses. After each coring "run", the inner barrel is lifted to the surface by a retrieval device connected to a steel wireline cable. The wireline retrieval method greatly improves production rates compared to sonic drilling by not requiring the removal of the entire downhole tooling assembly for each core sample.

Primarily used for alluvial coring applications, the 94mm wireline coring system excels where site conditions, boring depths or geologic formations exclude the use of direct push/geoprobe, sonic, hollow stem auger or other commonly used coring methods. When coring alluvial formations, an adjustable coiled spring provides the tension against the inner sample tube required to penetrate soils. Tooling and bit configurations can also be adapted to collect HQ hard rock core samples, or to "drill-ahead" in rotary fashion when core sampling is not required.

94MM WIRELINE CORING

Boring depths are limited by the rotational torque and/or hoisting pullback capabilities of the drilling rig. Depths to 1,000' are commonly reached using readily available equipment. The 94mm coring system is readily adapted to operate with many types of drilling rigs including Speedstar and CME manufactured rotary and hollow stem auger drilling rigs.

The 94mm coring method is particularly effective when high recovery core samples are desired to depths far exceeding the capabilities of sonic, direct push or hollow stem auger. Drill cuttings are removed from borings by the flushing action of drilling fluid or filtered compressed air, with fluid circulation being the preferred method of cuttings removal and boring stabilization. The capability to use drilling fluid as a circulation medium can eliminate difficulties caused by heaving, flowing sand or artesian geologic conditions.

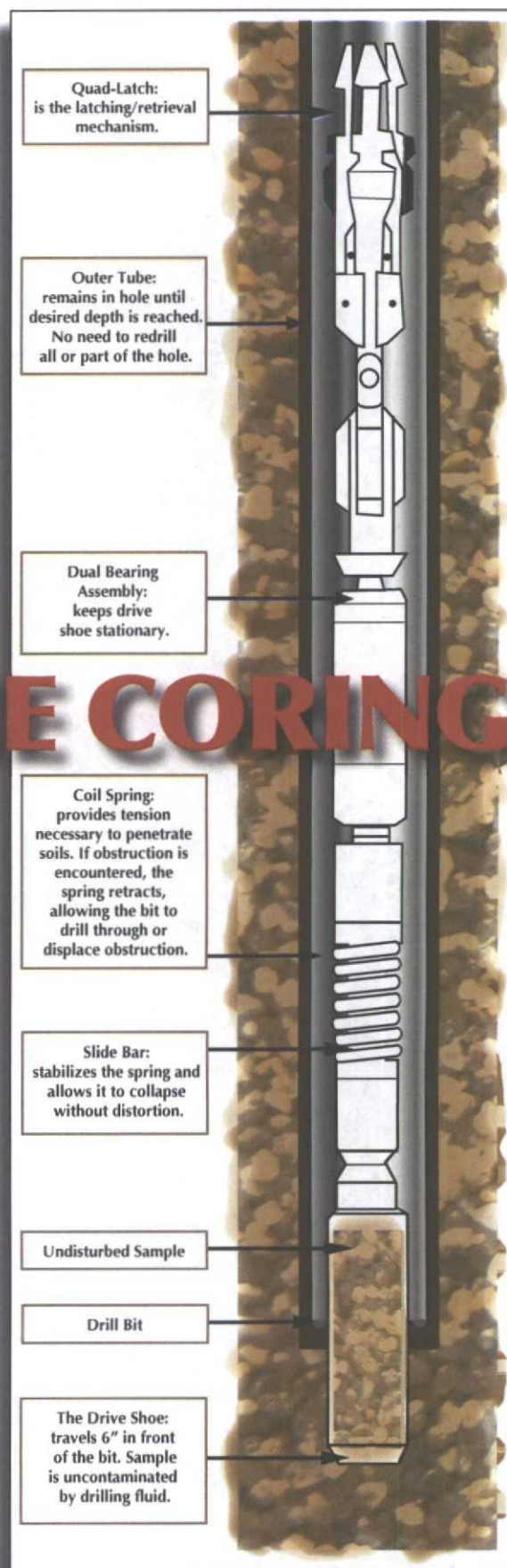


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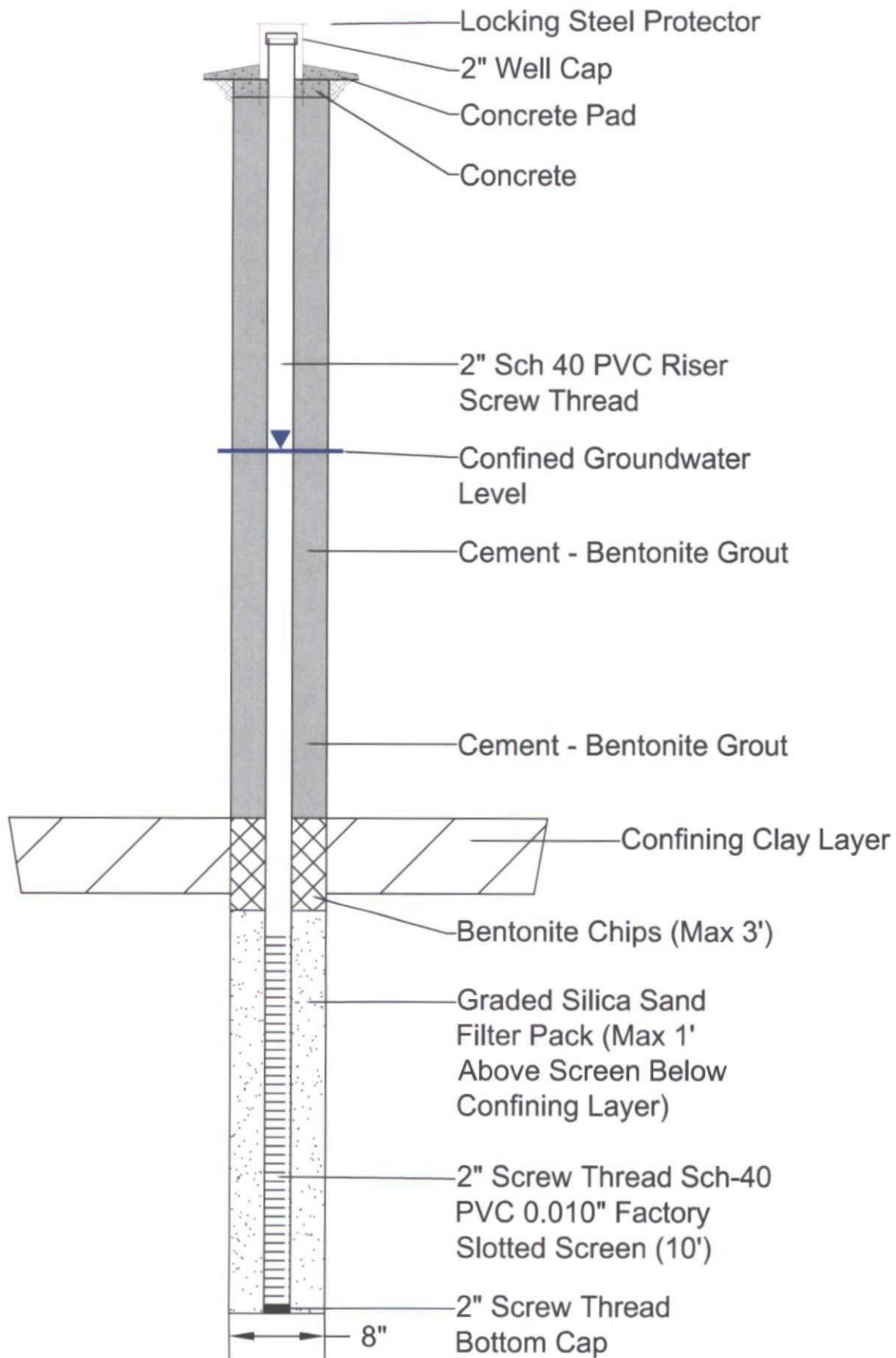
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APPENDIX D

Confined and Unconfined Monitoring Well Diagrams

Typical Confined Monitoring Well Diagram



Typical Unconfined Monitoring Well Diagram

