Appendices

Appendix 3 – Red Tank - Recycling Containment Geotechnical/Boring Report

Terracon GeoReport

Geotechnical Engineering Report

Proposed Detention Pond Station
Lea County, New Mexico
April 17, 2018
Terracon Project No. A4185061

Prepared for:
Topographic Land Surveyors
Fort Worth, Texas

Prepared by:
Terracon Consultants, Inc.
Midland, Texas

April 17, 2018

Terracon GeoReport

Topographic Land Surveyors
1400 Everman Parkway, Suite 146
Fort Worth, Texas 76140

Attn: Mr. Courtney Coates
P: 817.744.7512
E: courney.coates@topographic.com

Re: Geotechnical Engineering Report
Proposed Detention Pond Station
Delaware Basin Road
Lea County, New Mexico
Terracon Project No. A4185061

Dear Mr. Coates:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PA4185061 dated March 1, 2018. This report presents the findings of the subsurface exploration and provides geotechnical recommendations s for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.
TBPE Firm Registration TX F-3272

Sean E. Davis, MS, EIT
Geotechnical Project Manager

JAMES D. COSPER, II
NEW MEXICO
14417
4-17-18
REGISTERED PROFESSIONAL ENGINEER

James D. Cosper, P.E.
Senior Associate

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon GeoReport logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES
SITE LOCATION AND EXPLORATION PLANS
EXPLORATION RESULTS (Boring Logs and Laboratory Data)
SUPPORTING INFORMATION (General Notes and Unified Soil Classification System)

REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	We understand the Proposed Detention Pond Station site is located approximately 12 miles south of NM-176 on Delaware Basin Road in Lea County, New Mexico. We anticipate that the project will consist of 4 new detention pond structures with associated access roadways and ancillary pumps and related equipment.
Geotechnical Characterization	Very loose to medium dense poorly graded sand and poorly graded sand with silt soils were generally encountered in the upper approximately 2 to 8.5 feet bgs, underlain by dense to very dense cemented caliche materials classified as poorly graded sand with silt and gravel, silty sand clayey sand, and sandy lean clay soils extending to the boring termination depths of approximately 67 to 80 feet bgs.
Below Grade Structures	None
Access Roadways	■ At least 12 inches of Properly prepared subgrade materials ■ Surface Aggregate: 5 inches ■ Base Aggregate: 7 inches
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

Proposed Detention Pond Station
Delaware Basin Road
Lea County, New Mexico

Terracon Project No. A4185061
April 17, 2018

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the Proposed Detention Pond Station located approximately 12 miles south of NM-176 on Delaware Basin Road in Lea County, New Mexico. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Earthwork
- Excavation considerations
- Pond design and construction recommendations

The geotechnical engineering scope of services for this project included the advancement of 20 soil-test borings to depths of 80 feet below existing site grades, however, auger refusal was encountered at depths of approximately 69 feet bgs in borings B-11, B-12, B-13, and B-18 and these borings were terminated at auger refusal depths.

Maps showing the site and boring locations are shown on the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section of this report.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project site consists of approximately 23 acres located approximately 12 miles south of NM-176 on Delaware Basin Road in Lea County, New Mexico See **Site Location**

Item	Description
Existing Improvements	None
Current Ground Cover	Mesquite brush with some grasses and exposed soils
Existing Topography	Relatively level

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed in the project planning stage. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Proposed Construction	We understand that four new surface detention ponds are planned for construction at the project site.
Maximum Loads	Assuming the ponds are 40 feet deep, hydrostatic pressure at the bottom of the pond will be around 2,500 pounds per square foot (psf). However, approximately 4,500-psf overburden pressure will be removed with pond excavation, so net vertical load pressure should be less than zero.
Below Grade Structures	The ponds are considered below-grade structures.

GEOTECHNICAL CHARACTERIZATION

Subsurface Profile

Subsurface conditions at the boring locations can be generalized as follows:

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
1	2 to 8.5	Poorly Graded Sand with Silt [1], or Clayey Sand [1], brown to light brown	Very Loose to Very Dense [3]

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
2	13.5 to 80 [2]	CALICHE, strongly cemented and calcareous, classified as: Silty Sand [1], Clayey Sand [1], Poorly Graded Sand with Silt and Gravel [1], or Silty Sand with Gravel [1], light brown to tan	Dense to Very Dense
3 [5]	69 to 80 [2]	CALICHE, strongly cemented and calcareous, classified as: Sandy Lean Clay [1], Silty Sand [1], or Poorly Graded Sand with Silt [1],	Hard / Very Dense

1. The poorly graded sand with silt, clayey sand, silty sand, silty sand with gravel, poorly graded sand with silt and gravel, sandy lean clay, soils and cemented caliche materials encountered in our borings are not expected to experience substantial volumetric changes with fluctuations in moisture content.
2. Our borings were terminated within these strata following refusal at a depth of approximately 69 feet bgs, or at the planned termination depths of 80 feet bgs.
3. Very loose to very dense surficial soils with standard penetration resistances (N-values) ranging from 2 to over 100 blows per foot (bpf) were encountered in this stratum.
4. Dense to very dense soils and cemented caliche materials with N-values ranging from 31 to over 100 bpf were encountered in these strata.
5. This stratum was only encountered in borings B-4, B-6, and B-13.

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Groundwater Conditions

The borings were advanced in the dry using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater seepage was not observed within the maximum depths of exploration during or at the completion of drilling. We do not believe groundwater will affect construction at this project site.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The area surrounding the project site has been previously developed for various unpaved lease roads and oil & gas applications. Although no construction debris, organics or deleterious materials were encountered during our field exploration or observed in the collected samples, we caution that potential existing fill that contains deleterious materials could exist in areas between or away from our borings. If deleterious materials are detected on the project site during construction, Terracon should be notified immediately to provide consultation.

We encountered cemented calcareous caliche at relatively shallow depths of approximately 2 to 4 feet bgs in all borings for this project. Caliche materials are prevalent in the region of the project site and bear a strong resemblance to rock. Based on the depths of the caliche materials on site, we believe that excavations of any type will likely encounter caliche materials and difficult excavation conditions should be expected and planned for. Additional recommendations including rock definitions for contractor bid documents are provided in **Excavation Considerations**.

Very loose to medium dense poorly graded sand and poorly graded sand with silt soils were generally encountered in the upper approximately 2 to 8.5 feet bgs. We did not encounter loose surficial soils extending deeper than approximately 2 feet bgs in any of our borings. We do not expect the shallow topsoil layer will impact pond construction for this project as we expect they will be undercut during initial site preparation operations. Additionally, the soil types encountered on the project site are expected to experience minimal volumetric changes with fluctuations in moisture content. We estimate that the soils on the project site exhibit a Potential Vertical Rise (PVR) of 1 inch or less in their present condition.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork will include clearing and grubbing, excavations and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria as necessary to render the site in the state considered in our geotechnical engineering evaluation.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 10 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas. Near surface soils at the site, free of vegetation, debris, and rocks less than 4 inches in maximum dimension, are generally suitable for site grading. These soils may be considered for reuse; however, additional

laboratory testing and processing will be required to verify conformance to the requirements presented below. Caliche is present on the project site. Caliche needs to be crushed into sizes less than 4 inches in maximum dimension and thoroughly mixed with soils before it can be used for structural fill.

Fill Type [1]	USCS Classification	Acceptable Locations for Placement
Granular	SP-SM, SP-SC, SM, SC-SM, SP	Pond embankments
Caliche	SM, SP, SP-SM	All locations when Crushed into sizes less than 4 inches in maximum dimension and thoroughly mixed with soils
Imported soils	Varies	Imported soils meeting the gradation presented herein can be considered suitable for use as structural fill.

1. Structural fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation prior to use on this site.

Imported soils should conform to the following:

Gradation	Percent finer by weight (ASTM C136)
4”	100
No. 4 Sieve	50-100
No. 200 Sieve	50 (max.)
Liquid Limit	35 (max.)
Plastic Index	15 (max.)

Fill Compaction Requirements

Structural fill should meet the following compaction requirements.

Item	Description
Subgrade preparation to receive fill	Surface scarified to a minimum depth of 6 inches, moisture conditioned and compacted in place
Maximum fill lift thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used
Minimum compaction requirements [1, 2]	At least 95% of the material’s maximum dry density (modified Proctor – ASTM D698 in all fill areas.
Moisture content range [1]	Granular: -2% to +2%

Item	Description
	1. As determined by the standard Proctor test (ASTM D 698). 2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254).

Excavation Considerations

We encountered cemented calcareous caliche at relatively shallow depths of approximately 2 to 4 feet bgs in all borings for this project. Caliche materials are prevalent in the region of the project site and bear a strong resemblance to rock. Based on the depths of the caliche materials on site, we believe that excavations of any type will likely encounter caliche materials and difficult excavation conditions should be expected and planned for. Excavations for this project will likely require heavy-duty equipment such as a hoe ram, heavy dozer equipped with a ripper, or rock trenching equipment. Excavations may need to be formed due to the possibility of erosion/sloughing of the silt, sand, and gravel in the caliche materials.

The descriptions provided below are a guide to conditions generally encountered in the region of the project site. Required excavation techniques will vary based on weathering of the materials to be excavated, and the fracturing, jointing and overall stratigraphy of the feature. Actual field conditions usually display a gradual weathering progression with poorly defined and uneven boundaries between layers of different materials. We recommend that the following definitions for rock in earthwork excavation be included in bid documents:

In Mass Excavation:	Any material occupying an original volume of more than 1 cubic yard which cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rating of not less than 80,000 pounds usable pull (Caterpillar D-8 or larger).
In Trench Excavation:	Any material occupying an original volume of more than 1/2 cubic yard which cannot be excavated with a backhoe having a bucket curling rate of not less than 40,000 pounds, using a rock bucket and rock teeth (a John Deere 790 or larger).

We recommend that soils that can be excavated with conventional grading equipment be removed first. Blasting should only be conducted where materials cannot be excavated by other methods.

All excavations must comply with the applicable Federal, State, and local safety regulations and codes, and especially with the excavation standards of the Occupational Safety and Health Administration (OSHA). Temporary slopes of 1.5H:1V may be used. Construction site safety, including excavation safety, is the sole responsibility of the Contractor as part of its overall responsibility for the mean, methods, and sequencing of construction operations.

Terracon's recommendations for excavation support are intended for the Client's use in planning the project, and do no relieve the Contractor of its responsibility to construct, support, and maintain safe slopes. Under no circumstances should the following recommendations be interpreted to mean that Terracon is assuming responsibility for either construction site safety or the Contractor's activities.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7-10.

Description	Value
2012 International Building Code Site Classification (IBC) [1]	C [2]

1. Seismic site classification in general accordance with the *2012 International Building Code*, which refers to ASCE 7-10.
2. The 2012 International Building Code (IBC) uses a site profile extending to a depth of 100 feet for seismic site classification. Borings at this site were extended to a maximum depth of 80 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

POND DESIGN AND CONSTRUCTION RECOMMENDATIONS

We understand that the on-site soils generally have relatively high hydraulic conductivity rates. Since the proposed containment pond will be designed to retain water, the pond material is likely required to be impermeable; on-site soils are not considered to be impermeable materials. High density reinforced polypropylene liner material is likely required to install inside the sides and walls of the ponds.

Ponds should be constructed with permanent embankments of no steeper than 3 (horizontal):1(vertical). Any material within 6 inches of the proposed pond liner should be free of any vegetation, debris, and rocks or protrusions greater than 1 inch in maximum dimension. There are many companies that manufacture this type of liner. We recommend the contractor for this project strictly follow the manufacturer's manual for liner installation. The contractor should pay particular attention to orientation/placement of sheeting, overlapping, sealing, seam testing, and top anchorage.

GENERAL COMMENTS

As the project progresses, we address assumptions by incorporating information provided by the design team, if any. Revised project information that reflects actual conditions important to our services is reflected in the final report. The design team should collaborate with Terracon to confirm these assumptions and to prepare the final design plans and specifications. This facilitates the incorporation of our opinions related to implementation of our geotechnical recommendations. Any information conveyed prior to the final report is for informational purposes only and should not be considered or used for decision-making purposes.

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in the final report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our scope of services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third party beneficiaries intended. Any third party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Planned Boring Depth (feet) [1, 2]	Planned Location
20	80 [3]	Within current development area of the proposed pond footprint

1. Below ground surface
2. Borings were advanced to the planned termination depths of approximately 80 feet bgs or to auger refusal depths
3. Borings B-11 through B-13 and B-18 were terminated following auger refusal at depths of approximately 69 feet bgs.

Boring Layout and Elevations: The boring locations were marked prior to mobilization of our exploration crew using handheld GPS equipment with an estimated horizontal accuracy of +/-20 feet. If available, approximate elevations are obtained by interpolation from available topographic maps.

Subsurface Exploration Procedures: We advanced soil borings with a truck-mounted drill rig using continuous flight auger and air rotary advancement techniques. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Soil sampling is performed using the split-barrel sampling procedures. In the split barrel sampling procedure, a standard 2-inch outer diameter split barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. The samples are placed in appropriate containers, taken to our soil laboratory for testing, and classified by a geotechnical engineer. In addition, we observe and record groundwater levels during drilling and sampling.

Our exploration team prepared field boring logs as part of standard drilling operations including sampling depths, penetration distances, and other relevant sampling information. Field logs include visual classifications of materials encountered during drilling, and our interpretation of subsurface conditions between samples. Final boring logs, prepared from field logs, represent the geotechnical engineer's interpretation, and include modifications based on observations and laboratory tests.

Property Disturbance: We backfilled borings with auger cuttings after completion. Our scope did not include repair of the site beyond backfilling our boreholes, Excess auger cuttings were dispersed in the general vicinity of the borehole. Because backfill material often settles below the surface after a period, we recommend boreholes are checked periodically and backfilled, if necessary. We can provide this service, or grout the boreholes for additional fees, at your request.

Laboratory Testing

The project engineer reviews field data and assigns various laboratory tests to better understand the engineering properties of various soil and rock strata. Exact types and number of tests cannot be defined until completion of field work. Procedural standards noted below are for reference to methodology in general. In some cases, local practices and professional judgement require method variations. Standards noted below include reference to other related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils

Our laboratory testing program often includes examination of soil samples by an engineer. Based on the material's texture and plasticity, we describe and classify soil samples in accordance with the Unified Soil Classification System (USCS).

SITE LOCATION AND EXPLORATION PLANS

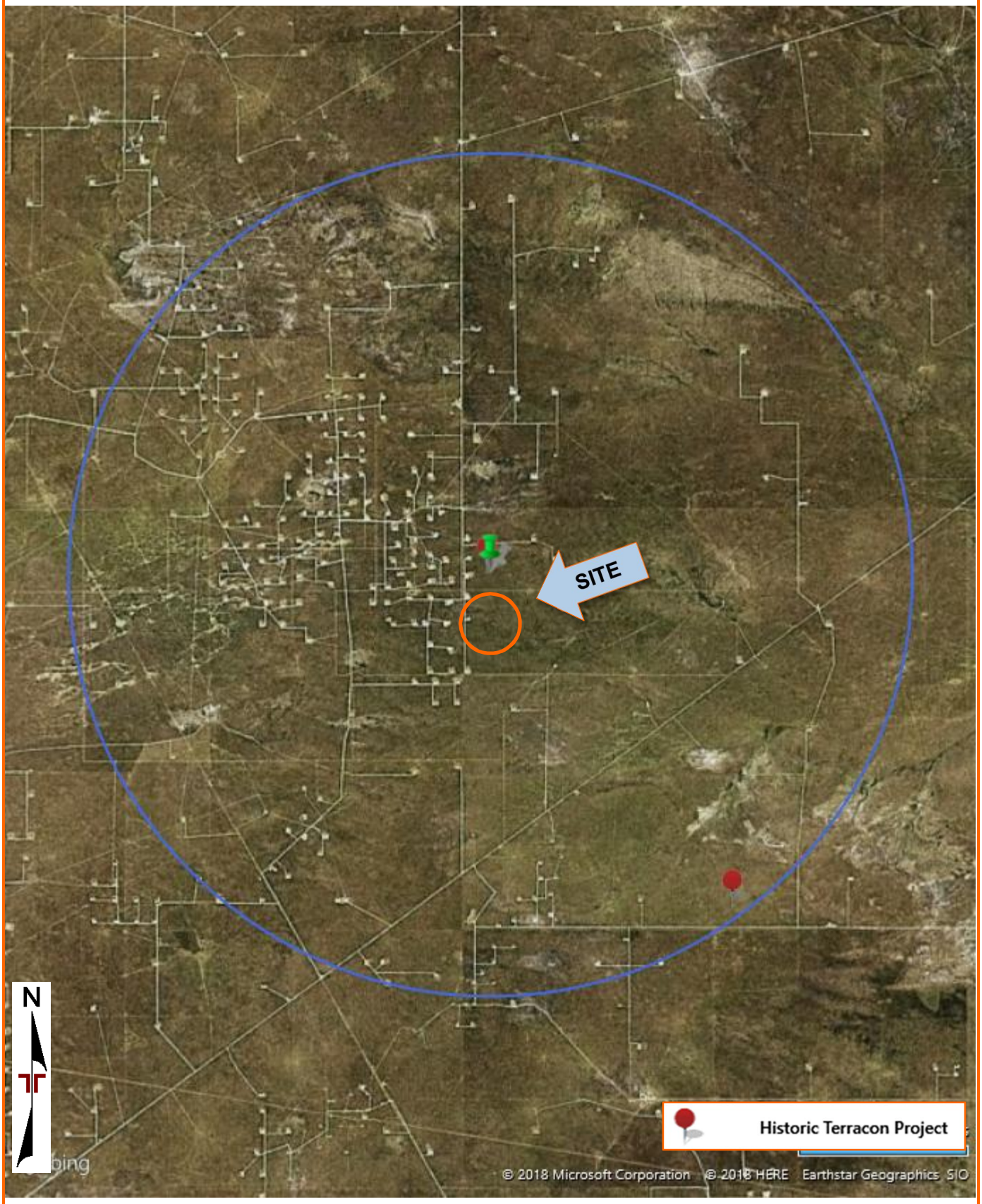


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

BORING LOG NO. B-1

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6155°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		POORLY GRADED SAND WITH SILT (SP-SM), brown to light brown, very loose to loose				2-1-2 N=3	1	NP	6
4.0	3744+/-	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, light brown to tan, medium dense	5			2-2-4 N=6			
		-very dense at 6'				3-8-17 N=25			
		-strongly cemented caliche materials encounterd below 6'	10			23-42-50/3"			
						50/5"			
			15			28-42-49 N=91			
			20			33-50/4"	5	NP	12
			25			18-26-27 N=53			
		-dense at 28.5'	30			14-26-23 N=49			
		-very dense at 33.5'	35			35-29-32 N=61			
		-dense at 38.5'	40			10-14-20 N=34			
		-very dense at 43.5'	45			31-22-40 N=62			
			50			50/5"			
		-dense at 53.5'	55			7-16-32 N=48			
		-very dense at 58.5'	60			10-19-33 N=52			
			65			31-50/4"			
			70			23-50/3"			
			75			20-43-50/4"			
80.0	3668+/-		80			25-42-50/4"			
		Boring Terminated at 80 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-17-2018 | Boring Completed: 03-19-2018

Drill Rig: CME 55 | Driller: Brian

Project No.: A4185061

BORING LOG NO. B-2

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6151°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
0.0	3748+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
4.0	3744+/-	**SILTY SAND (SM)**, light brown to tan, very dense -dense at 6' -very dense at 8.5' **-strongly cemented caliche materials encounterd below 8.5'**
80.0	3668+/-	***Boring Terminated at 80 Feet***

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	1-3-3 N=6			
	1-3-6 N=9			
10	50/4"			
	17-21-23 N=44			
15	32-33-50 N=83	8	33-24-9	43
	50/5"			
20	38-50/5"			
25	30-38-48 N=86			
30	21-38-42 N=80			
35	50/2"	7	NP	34
40	20-27-35 N=62			
45	50/1"			
50	50/5"			
55	33-47-46 N=93			
60	30-42-50/2"			
65	18-36-50/1"			
70	30-50/2"			
75	37-50/5"			
80	50/1"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-19-2018 | Boring Completed: 03-20-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-3

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6155°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.0	3741+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, very loose	1-1-2 N=3			
4.0		**SILTY SAND (SM)**, light brown to tan, very dense **-strongly cemented caliche materials encounterd below 4'**	3-4-6 N=10			
			10-30-50/5"			
			39-50/5"			
			50/6"			
			50/5"			
			36-41-50 N=91	6	32-24-8	38
			31-50/5"			
			50/5"			
			29-50/5"			
			33-50	3	NP	29
			22-43-50/1"			
			17-30-50/5"			
			45-50/3"			
			31-50/5"			
			50/5"			
			50/6"			
			16-50/5"			
80.0	3665+/-		50/2"			
		Boring Terminated at 80 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-26-2018 | Boring Completed: 03-27-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-4

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.615°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0	3741+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose to medium dense	1-2-2 N=4			
4.0			4-5-8 N=13			
		SILTY SAND (SM), light brown, very dense	8-27-50/5"			
		-strongly cemented caliche materials encounterd below 4'	30-50			
			27-50/4"			
			40-50/4"			
			29-33-36 N=69			
			25-50/6"	6	NP	24
			50/4"			
			35-50/1"			
			26-43-50/5"			
			27-50/5"			
48.5	3696.5+/-	**SANDY LEAN CLAY (CL)**, light brown to tan, hard	30-46-50/1"	6	26-12-14	54
			50/5"			
			50/5"			
			50/6"			
			42-50/1"			
			50/1"			
80.0	3665+/-		50/0"			
		Boring Terminated at 80 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-25-2018 | Boring Completed: 03-26-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-5

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3581° Longitude: -103.6153°

Approximate Surface Elev: 3746 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
0.0	3746+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
4.0	3742+/-	**SILTY SAND (SM)**, light brown, very dense **-strongly cemented caliche materials encounterd below 4'**
80.0	3666+/-	***Boring Terminated at 80 Feet***

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	1-2-2 N=4	2	NP	6
	4-4-5 N=9			
10	9-23-50/4"			
	50/5"			
	50/2"			
15	30-50/5"			
20	37-50/5"			
25	26-37-42 N=79	4	NP	15
30	40-50/5"			
35	42-50/4"			
40	50/1"			
45	14-50/3"			
50	18-50			
55	50/1"			
60	50/3"			
65	50/5"			
70	50/2"			
75	50/3"			
80	50/1"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-23-2018 | Boring Completed: 03-23-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-6

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6145°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.0	3746+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose	1-3-4 N=7			
		CLAYEY SAND (SC), light brown, very dense **-strongly cemented caliche materials encounterd below 2'**	5-50/5"			
			50/1"			
			50/1"	9	29-18-11	48
			50/1"			
			50/1"			
			50			
			27-44-50/5"			
			28-44-50/5"			
			50/4"			
			31-50/5"			
			21-50/3"			
48.5	3699.5+/-	**SILTY SAND (SM)**, light brown to tan, very dense	24-41-46 N=87	3	NP	19
			16-30-50 N=80			
			50/4"			
			30-50/4"			
			50/3"			
			50/5"			
80.0	3668+/-		50/1"			
		Boring Terminated at 80 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-20-2018 | Boring Completed: 03-20-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-7

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6141°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
0.0	3744+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, very loose
2.0		-dense at 2'
4.0		**SILTY SAND (SM)**, light brown to tan, very dense
		-strongly cemented caliche materials encounterd below 4'
80.0	3668+/-	***Boring Terminated at 80 Feet***

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0	1-1-2			
	N=3	5	NP	16
5	4-5-27			
	N=32			
	30-50/6"			
10	50/2"			
	24-45-50/1"			
15	38-50/5"			
20	50/5"			
25	46-50/5"			
30	30-42-50/5"	4	NP	18
35	39-47-50/1"			
40	43-50/5"			
45	50/4"			
50	32-46-50/2"			
55	41-50/5"			
60	25-50/4"			
65	50/5"			
70	18-50/2"			
75	50/3"			
80	50/1"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-23-2018 | Boring Completed: 03-23-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-8

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6146°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
		POORLY GRADED SAND WITH SILT (SP-SM), brown to light brown, loose
		-very dense at 2'
		-strongly cemented caliche materials encounterd below 2'
6.0	3739+/-	
		SILTY SAND (SM), light brown to tan, very dense
80.0	3665+/-	
		Boring Terminated at 80 Feet

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		1-2-3 N=5			
		3-44-40 N=84	6	NP	32
10		24-30-38 N=68			
		50/4"			
		50/5"			
15		35-50/5"			
20		20-25-30 N=55	6	NP	20
25		50/6"			
30		36-50/5"			
35		50/6"			
40		41-50/4"			
45		29-50/2"			
50		30-50/3"			
55		50/5"			
60		50/0"			
65		50/0"			
70		50/1"			
75		50/2"			
80		50/1"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-27-2018 | Boring Completed: 03-27-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-9

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6141°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH		ELEVATION (Ft.)
2.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose	3743+/-
	SILTY SAND (SM), light brown to tan, very dense **-strongly cemented caliche materials encounterd below 2'**	
80.0		3665+/-
	Boring Terminated at 80 Feet	

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		1-2-5 N=7	7	NP	23
		7-11-50/5"			
		50/0"			
		50/1"			
10		35-39-35 N=74			
15		37-50/5"			
20		31-50/5"			
25		20-50/6"			
30		50/6"			
35		21-27-30 N=57			
40		10-25-50/5"	2	NP	17
45		8-50/6"			
50		50/5"			
55		39-50/3"			
60		50/2"			
65		50/5"			
70		39-50/3"			
75		50/0"			
80		50/2"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-28-2018 | Boring Completed: 03-28-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-10

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3581° Longitude: -103.6143°

Approximate Surface Elev: 3746 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.0	3744+/-					1-2-2 N=4	2	NP	6
			5			4-7-50/2"			
						50/0"			
						50/1"			
			10			50/2"			
			15			39-40-50/5"	7	NP	24
			20			38-50/5"			
			25			30-50/4"			
			30			43-50/5"			
			35			37-50/3"			
			40			50/3"			
			45			44-50/2"			
			50			50/5"			
			55			41-50/5"			
			60			50/3"			
			65			50/1"			
			70			50/0"			
			75			50/4"			
80.0	3666+/-		80			50/2"			

POORLY GRADED SAND WITH SILT (SP-SM), brown to light brown, loose

SILTY SAND (SM), light brown, very dense

-strongly cemented caliche materials encounterd below 2'

Boring Terminated at 80 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-24-2018 | Boring Completed: 03-24-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-11

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6136°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
2.0	3746+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
		SILTY SAND (SM), light brown, very dense
		-strongly cemented caliche materials encounterd below 2'
68.9	3679+/-	***Boring Terminated at 68.9 Feet***

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	2-2-4 N=6	1	NP	5
	24-50/5"			
	42-50/4"			
	50/5"			
10	50/4"			
15	32-50/5"			
20	50/5"			
25	50/5"			
30	50/4"			
35	50/5"			
40	26-50/4"			
45	20-38-43 N=81	3	NP	17
50	18-50/6"			
55	20-50/1"			
60	30-50/4"			
65	16-30-50/4"			
	50/5"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-22-2018 | Boring Completed: 03-22-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-12

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6132°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		POORLY GRADED SAND WITH SILT (SP-SM), brown to light brown, loose		1-2-3			
4.0	3744+/-	**-strongly cemented caliche materials encounterd below 2'**		N=5			
		SILTY SAND (SM), light brown to tan, very dense	5	19-50/5"			
				50/4"			
				50/6"			
			10	32-32-35 N=67	10	34-27-7	46
			15	31-50/5"			
			20	50/5"			
			25	50/4"			
			30	50/6"			
			35	50/5"			
			40	50/3"			
			45	50/5"			
			50	24-34-50/4"	4	NP	27
			55	50/4"			
			60	35-50/4"			
			65	50/3"			
69.4	3678.5+/-			25-50/5"			
		Boring Terminated at 69.4 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-22-2018 | Boring Completed: 03-22-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-13

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6136°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
2.0	3743+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
		CLAYEY SAND (SC), brown to light brown, very dense
		-strongly cemented caliche materials encounterd below 2'
13.5	3731.5+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, light brown, very dense
68.7	3676.5+/-	***Boring Terminated at 68.7 Feet***

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	2-2-3 N=5			
	50/5"			
	50/5"			
	38-50/4"			
10	22-32-39 N=71	7	24-16-8	41
15	50/5"			
20	20-28-35 N=63			
25	17-24-30 N=54			
30	50/4"			
35	19-28-33 N=61			
40	16-27-34 N=61			
45	22-26-38 N=64	2	NP	9
50	36-50/5"			
55	50/5"			
60	50/4"			
65	50/5"			
	50/3"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-28-2018 | Boring Completed: 03-28-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-14

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6131°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
0	3745+/-	**CLAYEY SAND (SC)**, brown to light brown, loose to medium dense
		-very dense at 4'
		-strongly cemented caliche materials encounterd below 4'
8.5	3736.5+/-	**SILTY SAND (SM)**, light brown to tan, very dense
80.0	3665+/-	***Boring Terminated at 80 Feet***

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		1-3-2 N=5			
5		8-9-11 N=20			
		50/5"	8	30-20-10	44
10		11-19-32 N=51			
		14-29-33 N=62			
15		50/5"			
20		30-45-50/5"			
25		37-48-50/5"			
30		17-29-36 N=65			
35		19-31-40 N=71			
40		23-29-42 N=71			
45		26-32-44 N=76			
50		31-38-44 N=82			
55		37-47-50/5"	3	NP	16
60		50/4"			
65		50/5"			
70		50/5"			
75		50/4"			
80		50/6"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-27-2018 | Boring Completed: 03-27-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-15

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3581° Longitude: -103.6134°

Approximate Surface Elev: 3746 (Ft.) +/-

DEPTH		ELEVATION (Ft.)
2.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose	3744+/-
	SILTY SAND (SM), light brown to tan, very dense **-strongly cemented caliche materials encounterd below 2'**	
80.0		3666+/-
	Boring Terminated at 80 Feet	

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		2-2-3 N=5	1	NP	5
5		4-35-50/1"			
		18-30-50 N=80			
10		38-50/1"			
		50/5"			
15		50/6"			
20		18-50/6"			
25		20-36-50/6"	5	NP	29
30		23-45-50/4"			
35		23-38-44 N=82			
40		50/4"			
45		23-40-50/1"			
50		30-44-50/4"			
55		29-50/1"			
60		50/5"			
65		20-50/4"			
70		40-50/1"			
75		50/2"			
80		50/5"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-25-2018 | Boring Completed: 03-25-2018

Drill Rig: D-80 | Driller: Mike

Project No.: A4185061

BORING LOG NO. B-16

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6126°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH		ELEVATION (Ft.)
2.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose	3746+/-
	SILTY SAND WITH GRAVEL (SM), light brown to tan, very dense **-strongly cemented caliche materials encounterd below 2'**	
80.0		3668+/-
	Boring Terminated at 80 Feet	

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	2-2-6 N=8			
	50/5"	5	NP	32
10	26-33-35 N=68			
	28-32-37 N=69			
15	31-38-42 N=80			
	50/6"			
20	50/4"			
25	50/5"			
30	42-50/4"			
35	50/5"			
40	18-36-47 N=83	4	NP	17
45	24-41-50/5"			
50	16-50/5"			
55	50/5"			
60	50/2"			
65	50/6"			
70	50/4"			
75	50/4"			
80	50/5"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-21-2018 | Boring Completed: 03-21-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-17

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3587° Longitude: -103.6122°

Approximate Surface Elev: 3748 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
4.0	3744+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose to medium dense					
		SILTY SAND (SM), light brown to tan, very dense **-strongly cemented caliche materials encounterd below 4'**	5	1-2-2 N=4			
				8-9-9 N=18			
			10	22-33-39 N=72			
				27-38-45 N=83			
			15	27-38-45 N=83	9	43-27-16	37
				21-35-39 N=74			
			20	50/5"			
			25	50/4"			
			30	50/4"			
			35	50/5"			
			40	21-41-50/5"	4	NP	14
			45	40-50/4"			
			50	37-50/5"			
			55	43-50/4"			
			60	36-50/5"			
			65	32-50/5"			
			70	44-50/4"			
			75	47-50/4"			
80.0	3668+/-		80	45-50/5"			
		Boring Terminated at 80 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-20-2018 | Boring Completed: 03-20-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-18

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6127°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
2.0	3743+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
		SILTY SAND (SM), light brown to tan, very dense
		-strongly cemented caliche materials encounterd below 2'
68.8	3676+/-	***Boring Terminated at 68.8 Feet***

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		2-3-3 N=6	3	NP	11
		50/5"			
		50/3"			
		28-50/-1"			
10		50/4"			
15		50/5"			
20		50/5"			
25		30-50/5"			
30		33-50/5"			
35		22-35-50/5"	1	NP	7
40		23-32-50/5"			
45		28-34-50/4"			
50		40-50/4"			
55		50/4"			
60		50/5"			
65		50/5"			
		50/4"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-25-2018 | Boring Completed: 03-25-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-19

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3575° Longitude: -103.6122°

Approximate Surface Elev: 3745 (Ft.) +/-

DEPTH		ELEVATION (Ft.)
2.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose	3743+/-
	SILTY SAND (SM), light brown to tan, very dense **-strongly cemented caliche materials encounterd below 2'**	
80.0		3665+/-
	Boring Terminated at 80 Feet	

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5	1-2-3 N=5	1	NP	7
	50/2"			
	50/6"			
	21-50/4"			
10	50/6"			
15	50/5"			
20	50/5"			
25	32-50/5"			
30	28-45-50/4"	4	NP	17
35	32-48-50/4"			
40	37-40-50/5"			
45	36-50/5"			
50	39-50/4"			
55	43-50/5"			
60	40-50/5"			
65	50/5"			
70	50/5"			
75	50/5"			
80	50/2"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

Boring Started: 03-24-2018 | Boring Completed: 03-24-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

BORING LOG NO. B-20

PROJECT: Detention Pond Station

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

LOCATION See Exploration Plan

Latitude: 32.3581° Longitude: -103.6124°

Approximate Surface Elev: 3746 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
2.0	3744+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to light brown, loose
		SILTY SAND (SM), light brown to tan, very dense
		-strongly cemented caliche materials encounterd below 2'
80.0	3666+/-	***Boring Terminated at 80 Feet***

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		2-3-5 N=8			
		50/2"			
		33-50/5"			
		50/5"			
10		50/4"			
15		50/5"			
20		50/4"			
25		41-50/5"			
30		21-35-50/5"	4	NP	17
35		26-38-50/4"			
40		27-36-42 N=78			
45		38-42-50/4"			
50		39-50/5"			
55		44-50/6"	2	NP	15
60		24-50/2"			
65		30-50/4"			
70		50/4"			
75		50/5"			
80		50/4"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous flight auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations are approximate

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
10400 State Highway 191
Midland, TX

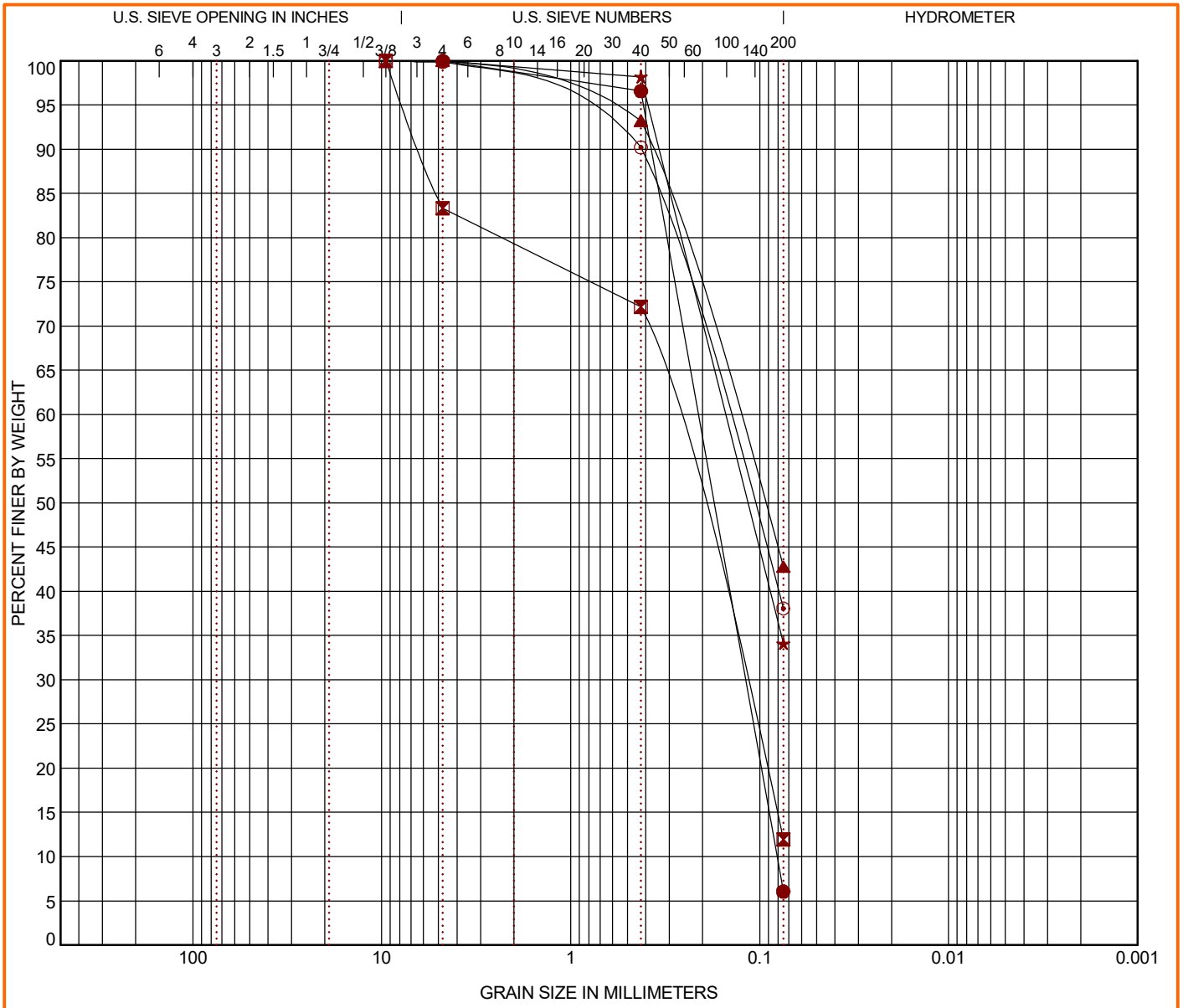
Boring Started: 03-23-2018 | Boring Completed: 03-24-2018

Drill Rig: CME 55 | Driller: Bobby

Project No.: A4185061

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-1	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	1	NP	NP	NP	0.83	2.61
⊠	B-1	18.5 - 19.3	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	5	NP	NP	NP	0.75	4.22
▲	B-2	13.5 - 13.9	SILTY SAND (SM)	8	33	24	9		
★	B-2	33.5 - 33.7	SILTY SAND (SM)	7	NP	NP	NP		
⊙	B-3	18.5 - 20	SILTY SAND (SM)	6	32	24	8		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-1	0 - 1.5	4.75	0.211	0.119	0.081	0.0	94.0		6.0	
⊠	B-1	18.5 - 19.3	9.5	0.299	0.126		16.6	71.4		11.9	
▲	B-2	13.5 - 13.9	4.75	0.136			0.0	57.2		42.8	
★	B-2	33.5 - 33.7	4.75	0.151			0.0	65.9		34.1	
⊙	B-3	18.5 - 20	9.5	0.156			0.1	61.8		38.1	

PROJECT: Detention Pond Station

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

Terracon
10400 State Highway 191
Midland, TX

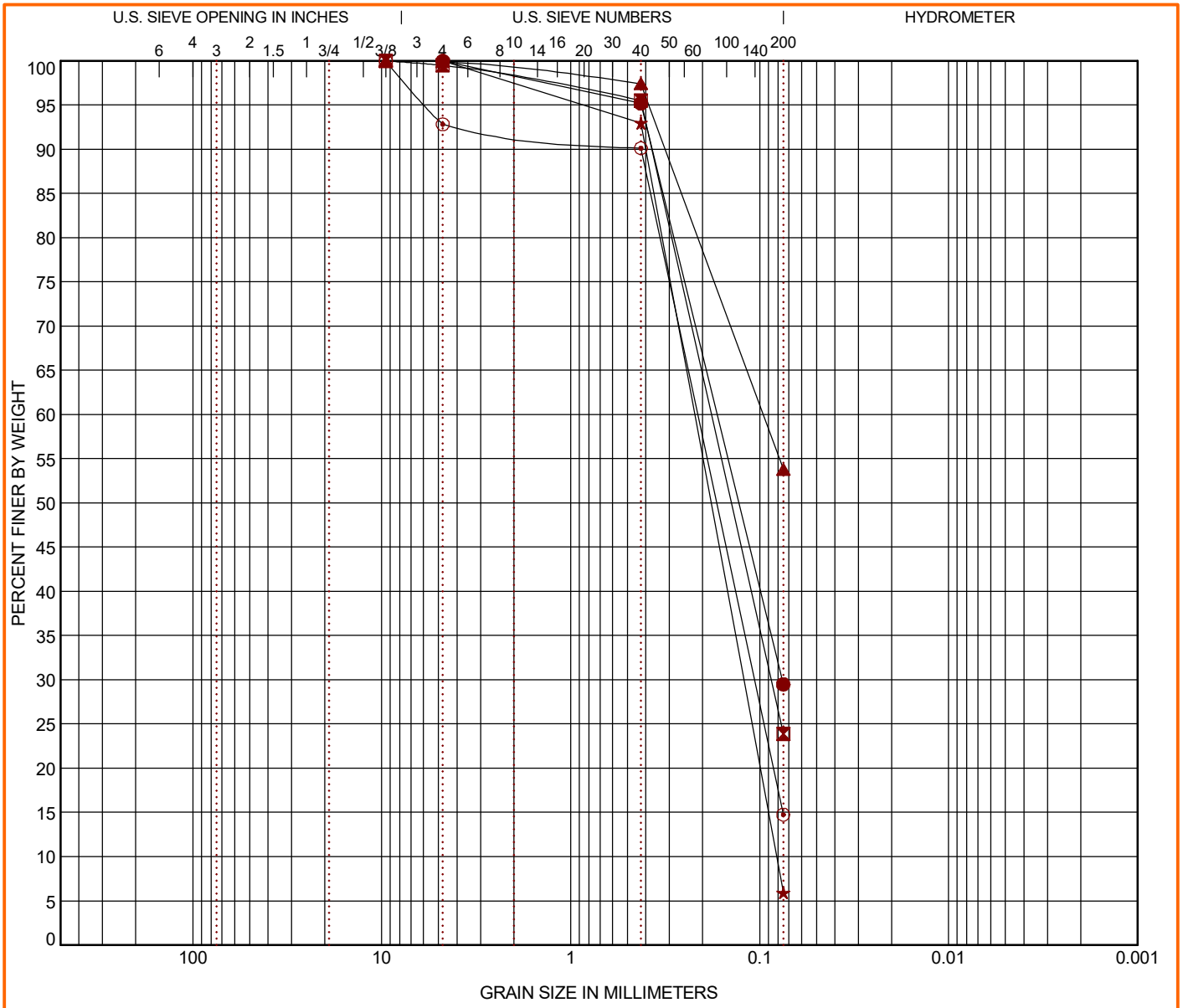
PROJECT NUMBER: A4185061

CLIENT: Topographic Land Surveyors
Fort Worth, TX

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 A4185061 DETENTION POND ST.GPJ TERRACON_DATATEMPLATE.GDT 4/13/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-3	38.5 - 39.5	SILTY SAND (SM)	3	NP	NP	NP		
⊠	B-4	23.5 - 24.5	SILTY SAND (SM)	6	NP	NP	NP		
▲	B-4	48.5 - 49.6	SANDY LEAN CLAY (CL)	6	26	12	14		
★	B-5	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	2	NP	NP	NP	0.82	2.71
⊙	B-5	23.5 - 25	SILTY SAND (SM)	4	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-3	38.5 - 39.5	4.75	0.168	0.076		0.0	70.5		29.5	
⊠	B-4	23.5 - 24.5	9.5	0.18	0.087		0.5	75.6		23.9	
▲	B-4	48.5 - 49.6	9.5	0.096			0.1	46.1		53.8	
★	B-5	0 - 1.5	4.75	0.22	0.121	0.081	0.0	94.1		5.9	
⊙	B-5	23.5 - 25	9.5	0.212	0.107		7.2	78.1		14.7	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

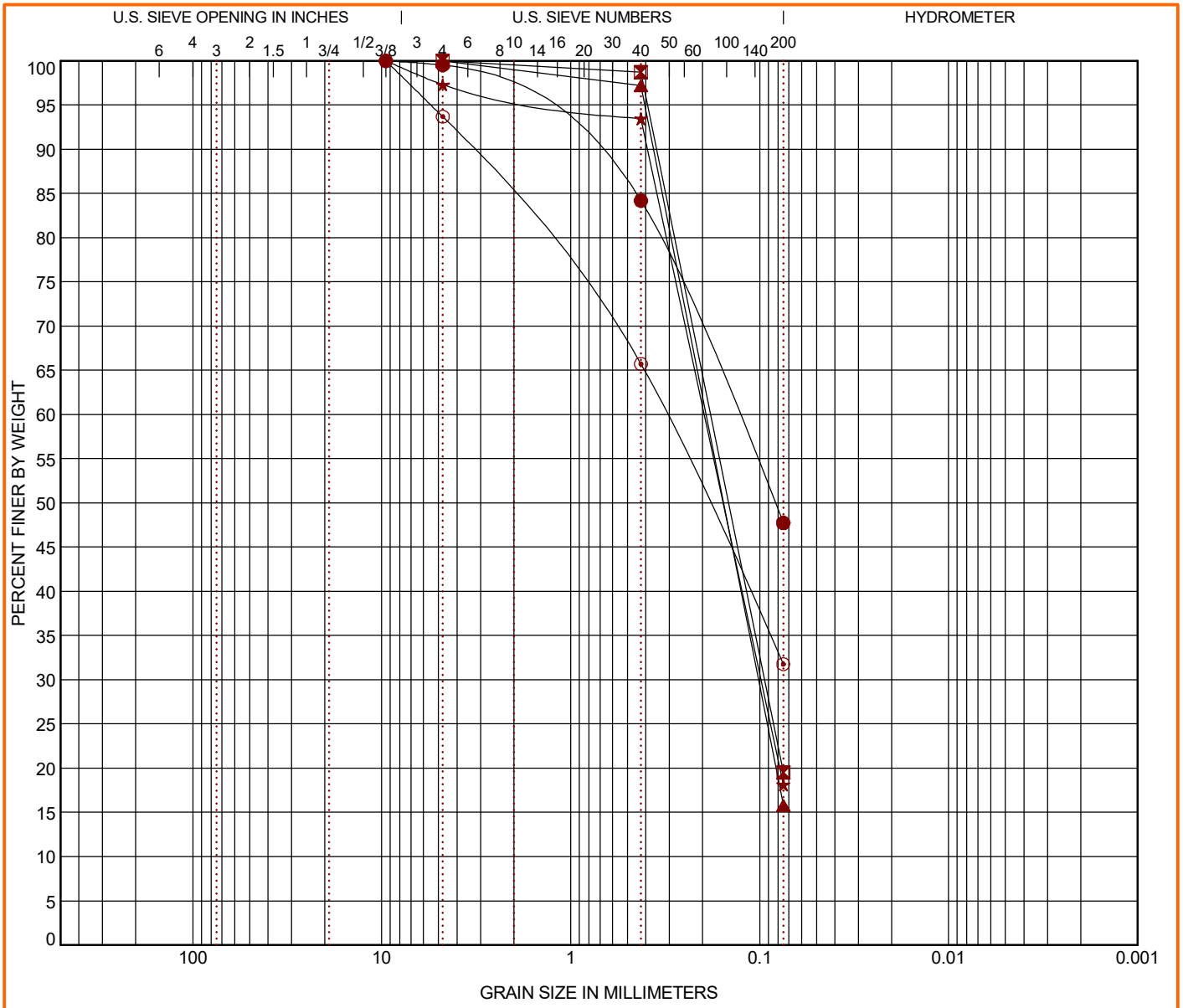
SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-6	6 - 6.1	CLAYEY SAND (SC)	9	29	18	11		
⊠	B-6	48.5 - 50	SILTY SAND (SM)	3	NP	NP	NP		
▲	B-7	2 - 3.5	SILTY SAND (SM)	5	NP	NP	NP		
★	B-7	28.5 - 29.9	SILTY SAND (SM)	4	NP	NP	NP		
⊙	B-8	4 - 5.5	SILTY SAND (SM)	6	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-6	6 - 6.1	9.5	0.134			0.5	51.8		47.7	
⊠	B-6	48.5 - 50	4.75	0.182	0.094		0.0	80.5		19.5	
▲	B-7	2 - 3.5	4.75	0.192	0.102		0.0	84.2		15.8	
★	B-7	28.5 - 29.9	9.5	0.197	0.099		2.7	79.2		18.1	
⊙	B-8	4 - 5.5	9.5	0.317			6.3	61.9		31.8	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

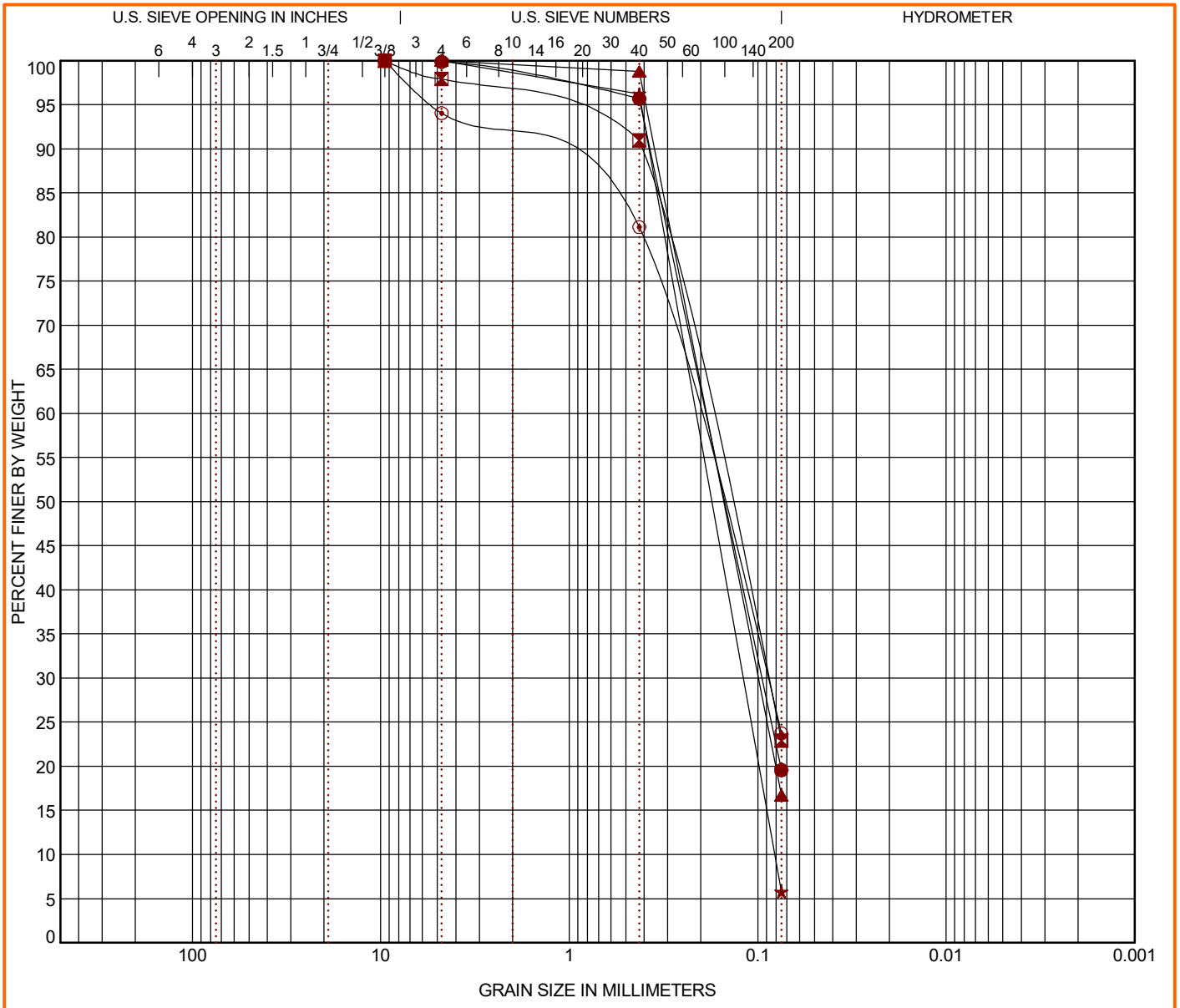
Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 A4185061 DETENTION POND ST.GPJ TERRACON_DATATEMPLATE.GDT 4/13/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-8	18.5 - 20	SILTY SAND (SM)	6	NP	NP	NP		
⊠	B-9	2 - 3.4	SILTY SAND (SM)	7	NP	NP	NP		
▲	B-9	38.5 - 39.9	SILTY SAND (SM)	2	NP	NP	NP		
★	B-10	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	2	NP	NP	NP	0.83	2.61
⊙	B-10	13.5 - 14.9	SILTY SAND (SM)	7	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-8	18.5 - 20	9.5	0.188	0.095		0.1	80.3		19.6	
⊠	B-9	2 - 3.4	9.5	0.193	0.09		2.0	75.0		22.9	
▲	B-9	38.5 - 39.9	4.75	0.187	0.099		0.0	83.3		16.7	
★	B-10	0 - 1.5	4.75	0.212	0.119	0.081	0.0	94.2		5.8	
⊙	B-10	13.5 - 14.9	9.5	0.224	0.091		5.9	70.3		23.7	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

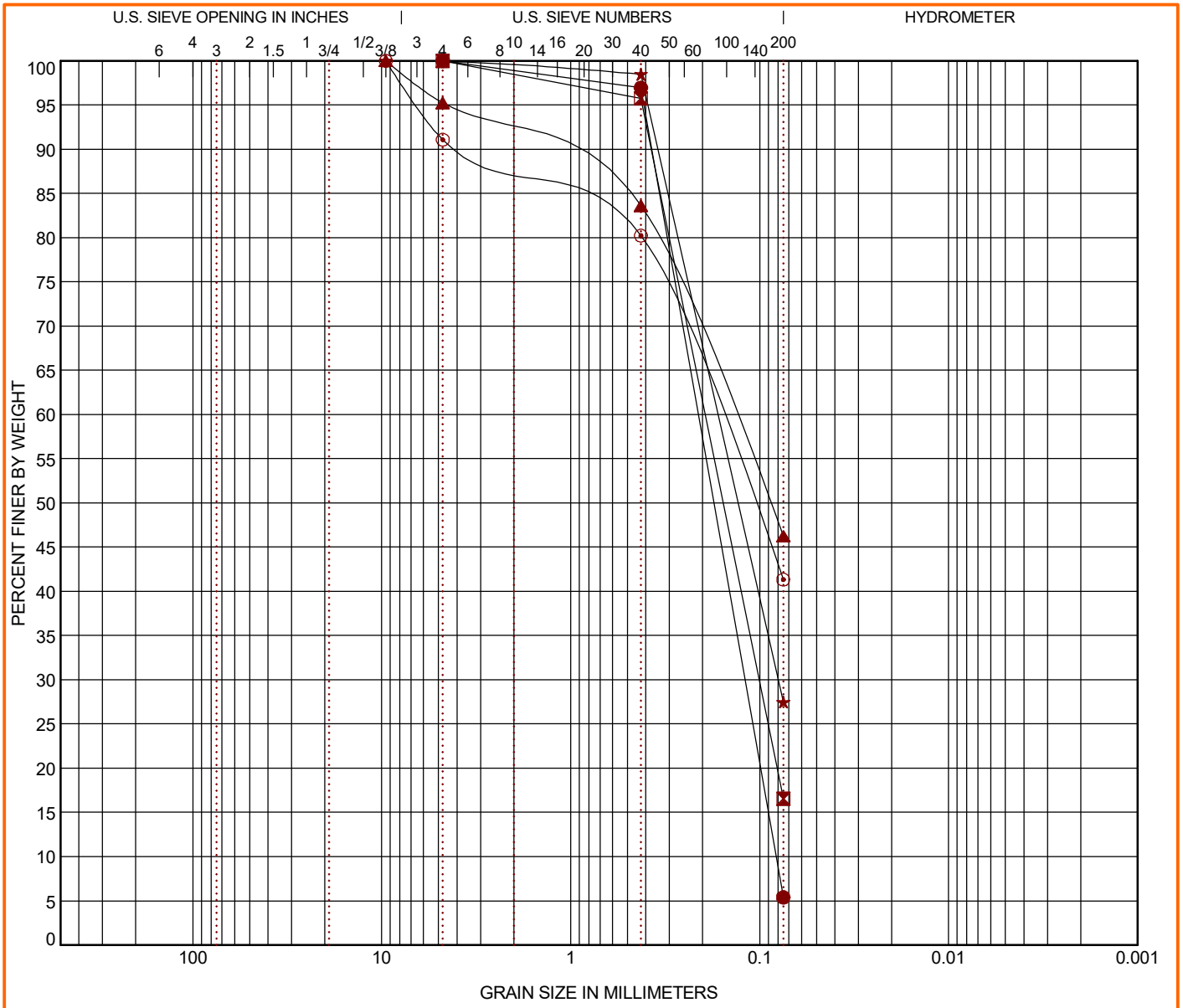
SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-11	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	1	NP	NP	NP	0.83	2.58
⊠	B-11	43.5 - 45	SILTY SAND (SM)	3	NP	NP	NP		
▲	B-12	8.5 - 10	SILTY SAND (SM)	10	34	27	7		
★	B-12	48.5 - 49.8	SILTY SAND (SM)	4	NP	NP	NP		
⊙	B-13	8.5 - 10	CLAYEY SAND (SC)	7	24	16	8		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-11	0 - 1.5	4.75	0.211	0.12	0.082	0.0	94.6		5.4	
⊠	B-11	43.5 - 45	4.75	0.194	0.101		0.0	83.4		16.6	
▲	B-12	8.5 - 10	9.5	0.142			4.7	49.0		46.2	
★	B-12	48.5 - 49.8	9.5	0.166	0.08		0.1	72.5		27.5	
⊙	B-13	8.5 - 10	9.5	0.172			8.9	49.8		41.3	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

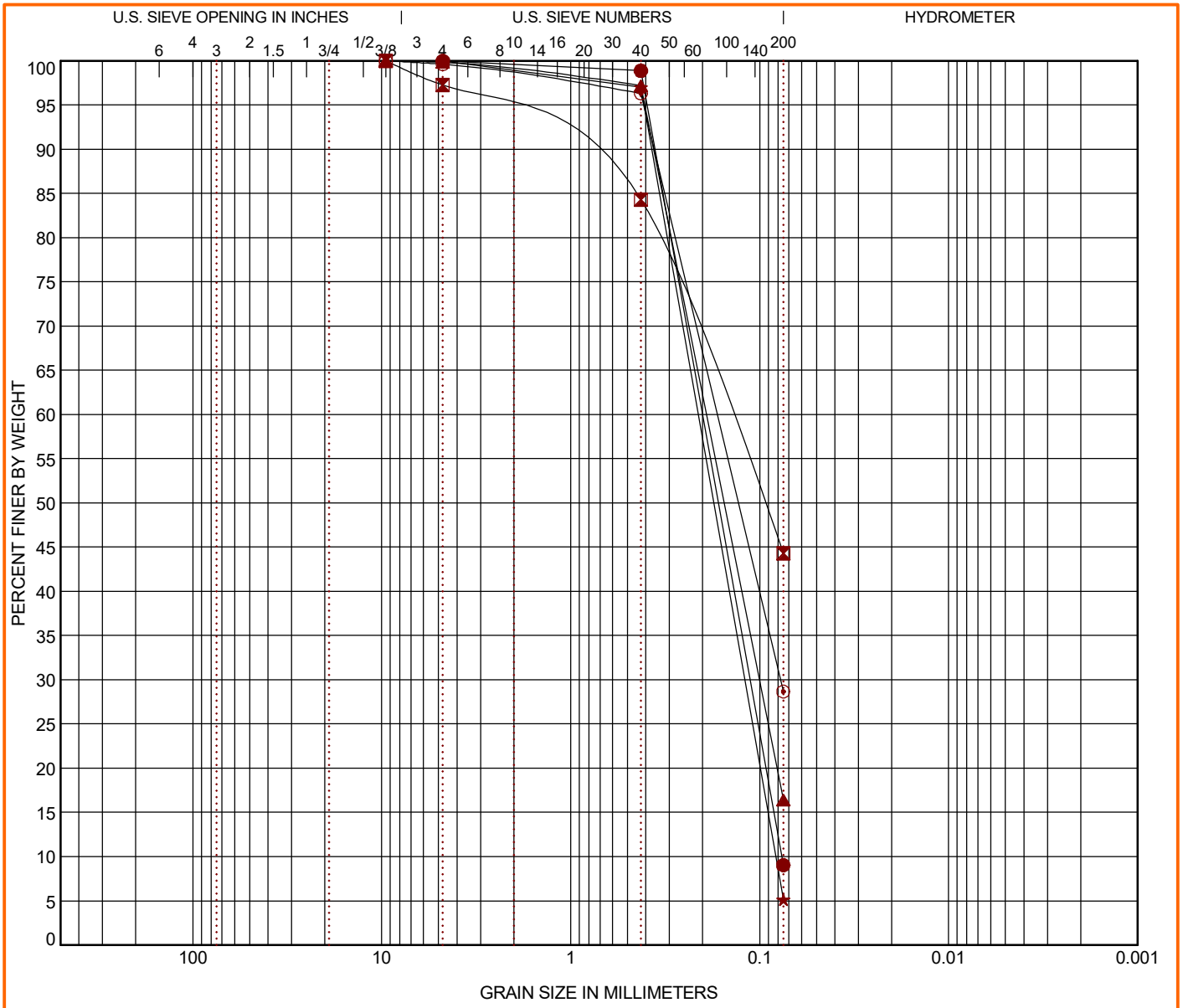
Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 A4185061 DETENTION POND ST.GPJ TERRACON_DATATEMPLATE.GDT 4/13/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-13	43.5 - 45	POORLY GRADED SAND with SILT (SP-SM)	2	NP	NP	NP	0.82	2.63
⊠	B-14	6 - 7.5	CLAYEY SAND (SC)	8	30	20	10		
▲	B-14	53.5 - 54.9	SILTY SAND (SM)	3	NP	NP	NP		
★	B-15	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	1	NP	NP	NP	0.83	2.57
⊙	B-15	23.5 - 25	SILTY SAND (SM)	5	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-13	43.5 - 45	4.75	0.201	0.112	0.076	0.0	91.0		9.0	
⊠	B-14	6 - 7.5	9.5	0.148			2.7	53.0		44.3	
▲	B-14	53.5 - 54.9	9.5	0.191	0.1		0.2	83.4		16.4	
★	B-15	0 - 1.5	4.75	0.211	0.12	0.082	0.0	94.9		5.1	
⊙	B-15	23.5 - 25	9.5	0.167	0.078		0.4	71.0		28.7	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

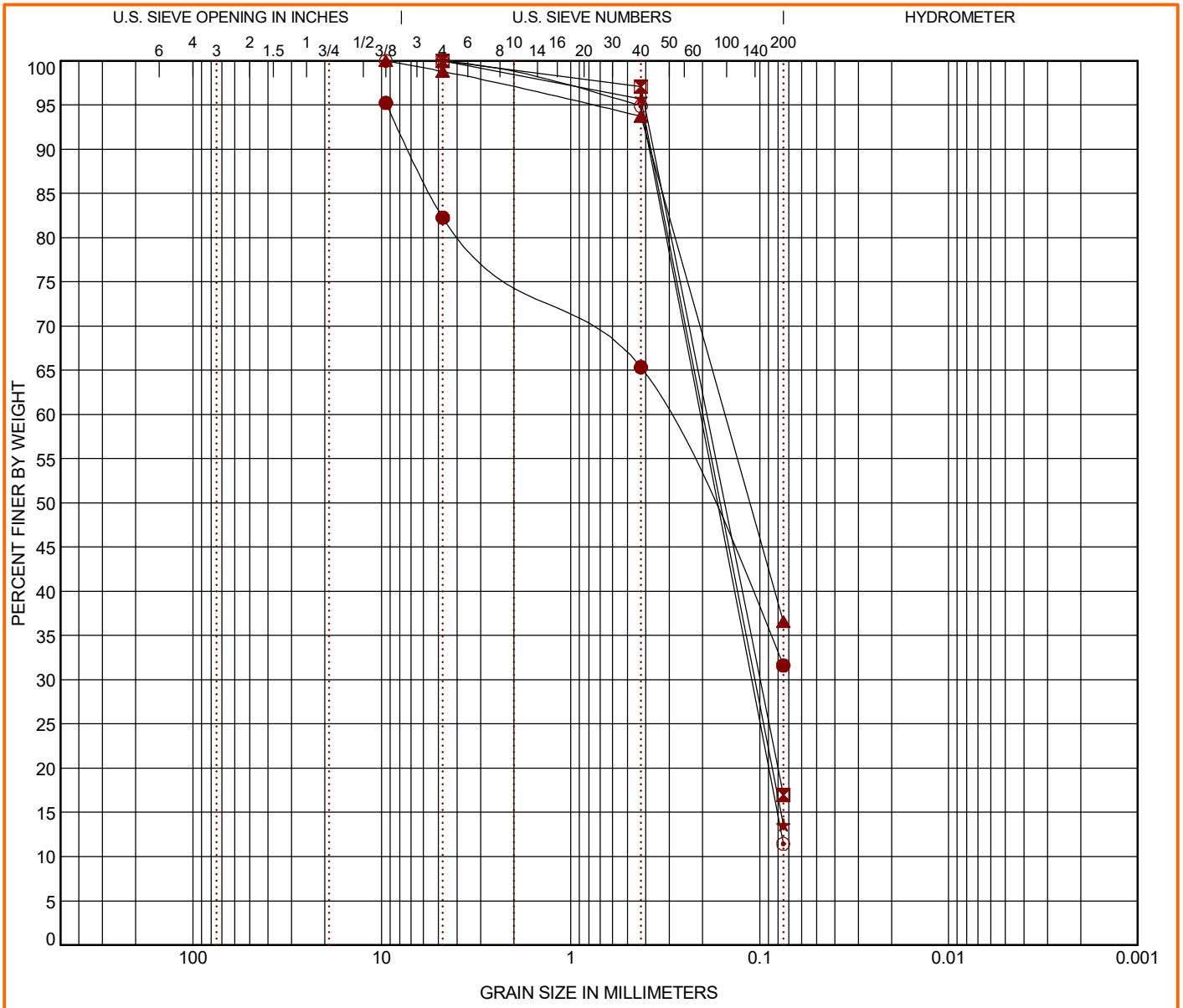
Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 A4185061 DETENTION POND ST.GPJ TERRACON_DATATEMPLATE.GDT 4/13/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-16	4 - 5.5	SILTY SAND with GRAVEL (SM)	5	NP	NP	NP		
⊠	B-16	38.5 - 40	SILTY SAND (SM)	4	NP	NP	NP		
▲	B-17	13.5 - 15	SILTY SAND (SM)	9	43	27	16		
★	B-17	38.5 - 39.9	SILTY SAND (SM)	4	NP	NP	NP		
⊙	B-18	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	3	NP	NP	NP	0.81	2.83

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-16	4 - 5.5	9.5	0.323			13.0	50.7		31.6	
⊠	B-16	38.5 - 40	4.75	0.19	0.099		0.0	83.1		16.9	
▲	B-17	13.5 - 15	9.5	0.153			1.2	62.2		36.6	
★	B-17	38.5 - 39.9	4.75	0.2	0.106		0.0	86.4		13.6	
⊙	B-18	0 - 1.5	9.5	0.206	0.11		0.1	88.5		11.4	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

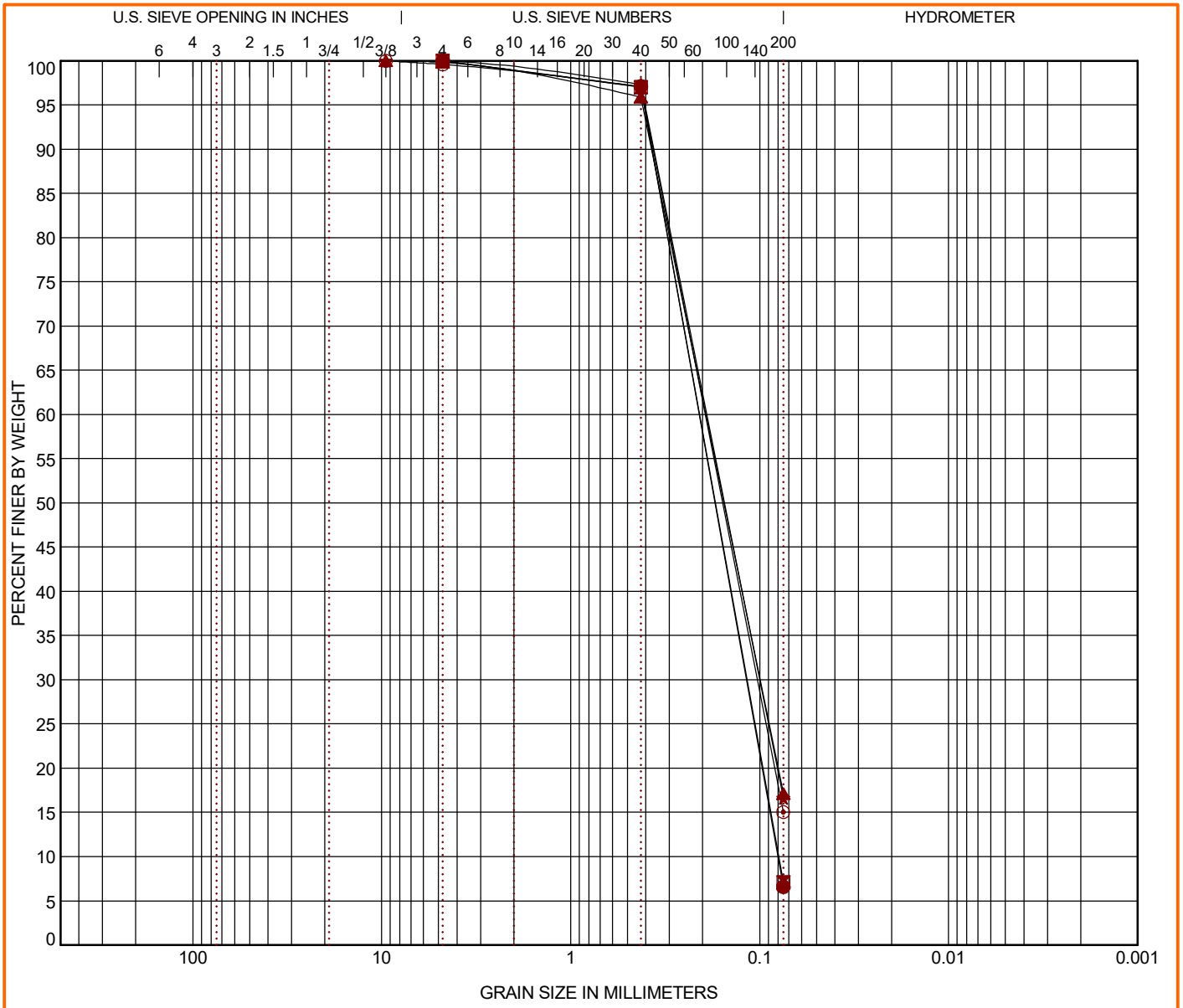
SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-18	33.5 - 34.9	POORLY GRADED SAND with SILT (SP-SM)	1	NP	NP	NP	0.83	2.61
⊠	B-19	0 - 1.5	POORLY GRADED SAND with SILT (SP-SM)	1	NP	NP	NP	0.82	2.62
▲	B-19	28.5 - 29.8	SILTY SAND (SM)	4	NP	NP	NP		
★	B-20	28.5 - 29.9	SILTY SAND (SM)	4	NP	NP	NP		
⊙	B-20	53.5 - 54.5	SILTY SAND (SM)	2	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-18	33.5 - 34.9	4.75	0.209	0.117	0.08	0.0	93.4		6.6	
⊠	B-19	0 - 1.5	4.75	0.208	0.117	0.079	0.0	92.9		7.1	
▲	B-19	28.5 - 29.8	9.5	0.193	0.1		0.2	82.7		17.1	
★	B-20	28.5 - 29.9	9.5	0.191	0.1		0.0	83.4		16.6	
⊙	B-20	53.5 - 54.5	9.5	0.194	0.103		0.4	84.6		15.0	

PROJECT: Detention Pond Station

PROJECT NUMBER: A4185061

SITE: 12 Miles S of NM-176 on Delaware Basin Rd.
Lea County, NM

Terracon
10400 State Highway 191
Midland, TX

CLIENT: Topographic Land Surveyors
Fort Worth, TX

SUPPORTING INFORMATION

UNIFIED SOIL CLASSIFICATION SYSTEM

Proposed Detention Pond Station ■ Lea County, New Mexico

April 17, 2018 ■ Terracon Project No. A4185061

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ³ 4 and 1 £ Cc £ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or 1 > Cc > 3 [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ³ 6 and 1 £ Cc £ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or 1 > Cc > 3 [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A”		CL	Lean clay [K, L, M]
			PI < 4 or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K, L, M, N] / Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K, L, M, P] / Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ³ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ³ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ³ 30% plus No. 200 predominantly sand, add “sandy” to group name.

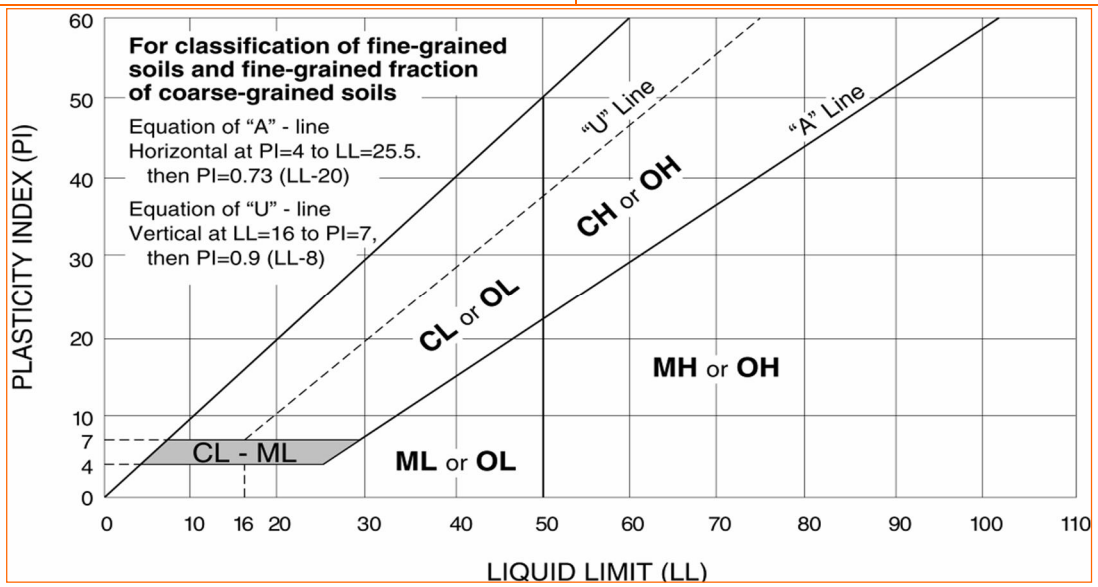
[M] If soil contains ³ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ³ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.



Appendices

Appendix 4 – Red Tank - Recycling Containment Engineering Drawings

RED TANK RECYCLING FACILITY
AND CONTAINMENTS
PRELIMINARY SITE PLAN

OXY U.S.A., INC.
LEA COUNTY, NEW MEXICO
SECTION 30, T22S-R34E

INDEX	
Sheet Number	Sheet Title
C-1.0	COVER SHEET
C-1.1	GENERAL NOTES
C-2.1	OVERALL SITE LAYOUT
C-3.1	PROPOSED PHASE I POND LAYOUT
C-3.2	PROPOSED PHASE I POND CUT AND FILL
C-4.1	STAGING/STORAGE/GRADING CALCULATIONS
C-5.1	PROPOSED PHASE I POND PROFILES
C-6.1	CONSTRUCTION DETAILS
C-6.2	CONSTRUCTION DETAILS

ENGINEER/SURVEYOR:

TOPOGRAPHIC LAND SURVEYORS
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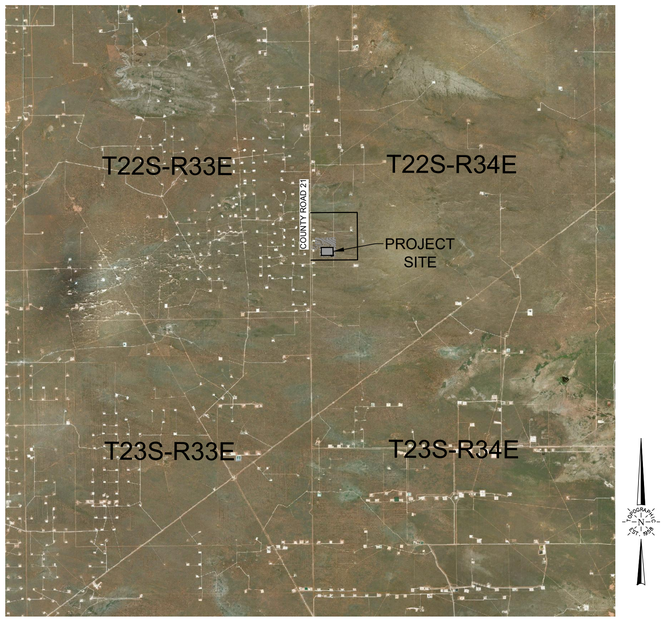
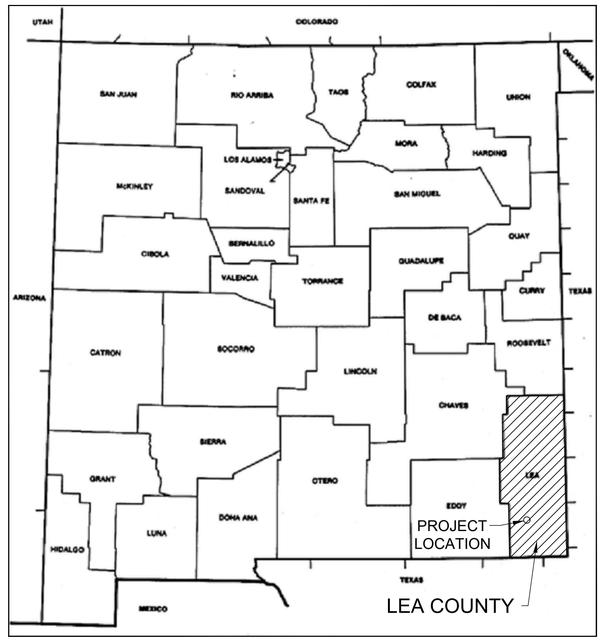
FORT WORTH, TEXAS 76140
CONTACT: COURTNEY COATES, P.E.
PHONE: 817-744-7512

OWNER:

OXY- NM DEVELOPMENT
1502 W. COMMERCE DRIVE
CARLSBAD, NEW MEXICO 88220
CONTACT: LOGAN MILLSAPS
PHONE: 713-350-4730



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

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OXY U.S.A. INC.
HOUSTON, TEXAS

COVER SHEET

NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

COURTNEY C. COATES
NEW MEXICO
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.

C-1.0

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT. NEW MEXICO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION SHALL APPLY TO THIS PROJECT.

2. ALL DATA SHOWN HEREIN CONCERNING EXISTING PRIVATE AND/OR PUBLIC OWNED UTILITIES HAVE BEEN OBTAINED FROM THE OWNERS AND/OR FIELD OBSERVATIONS. THESE MAY OR MAY NOT BE ACCURATE. THE CONTRACTOR IS CAUTIONED THAT HE IS RESPONSIBLE FOR THE EXACT LOCATION AND PROTECTION OF ALL LINES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING, IN ADVANCE OF HIS/HER CONSTRUCTION OPERATIONS, IF OVERHEAD UTILITY LINES, SUPPORT STRUCTURES, POLES, GUYS, ETC. ARE AN OBSTRUCTION TO CONSTRUCTION OPERATIONS. IF ANY OBSTRUCTION IS EVIDENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE UTILITY OWNER TO REMOVE OR SUPPORT THE UTILITY OBSTRUCTION. ANY COST ASSOCIATED WITH THIS EFFORT IS INCIDENTAL TO THE PROJECT.

3. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO SECURE AND SUPPLY WATER FOR THE PROJECT.

4. THE BOTTOM OF PIT SHALL BE SLOPED AT A MINIMUM 1.30% AS SHOWN.

5. THE PERIMETER OF THE SITE SHALL BE ENCLOSED WITH CHAINLINK FENCE AS PRESCRIBED BY DESIGN/CONSTRUCTION PLAN IN REGISTRATION/PERMIT APPLICATION.

6. STRIP AND STOCKPILE TOP SOIL FOR FUTURE CLOSURE USE AND ENSURE EXCESS MATERIAL IS SEGREGATED FROM TOPSOIL MATERIAL. NEW MEXICO ADMINISTRATIVE CODE 19.15.34 AND (DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT IN REGISTRATION/PERMIT) SHALL APPLY TO THIS PROJECT.

7. THE RECYCLING CONTAINMENT SHALL HAVE A PROPERLY CONSTRUCTED FOUNDATION AND INTERIOR SLOPES CONSISTING OF A FIRM, UNYIELDING BASE, SMOOTH AND FREE OF ROCKS, DEBRIS, SHARP EDGES OR IRREGULARITIES TO PREVENT THE LINER'S RUPTURE OR TEAR. GEOTEXTILE IS REQUIRED UNDER AND OVER THE LINER WHEN NEEDED TO REDUCE LOCALIZED STRESS-STRAIN OR PROTUBERANCES THAT OTHERWISE MAY COMPROMISE THE LINER'S INTEGRITY.

8. AS DESCRIBED IN THE DESIGN/CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT, ALL PRIMARY (UPPER) LINERS IN A RECYCLING CONTAINMENT SHALL BE GEOMEMBRANE LINERS COMPOSED OF AN IMPERVIOUS, SYNTHETIC MATERIAL THAT IS RESISTANT TO ULTRAVIOLET LIGHT, PETROLEUM HYDROCARBONS, SALTS AND ACIDIC AND ALKALINE SOLUTIONS. ALL PRIMARY LINERS SHALL BE 60-MIL HDPE LINERS. SECONDARY LINERS SHALL BE 60-MIL HDPE. LINER COMPATIBILITY SHALL MEET OR EXCEED THE EPA SW-846 METHOD 9090A OR SUBSEQUENT RELEVANT PUBLICATIONS.

9. LINER SEAMS SHALL BE MINIMIZED AND ORIENTED UP AND DOWN, NOT ACROSS THE SLOPE.

10. EXPANSION WRINKLE SHALL BE INSTALLED IF NECESSARY INSIDE POND FOR THERMAL EXPANSION / CONTRACTION.

11. UNLESS DIFFERENTLY STATED IN THE CONSTRUCTION PLAN OF THE REGISTRATION PERMIT,THE OPERATOR SHALL ENSURE FIELD SEAMS IN GEOSYNTHETIC MATERIAL ARE THERMALLY SEAMED. PRIOR TO FIELD SEAMING, THE OPERATOR SHALL OVERLAP LINERS FOUR TO SIX INCHES. THE OPERATOR SHALL MINIMIZE THE NUMBER OF FIELD SEAMS AND CORNERS AND IRREGULARLY SHAPED AREAS. THERE SHALL BE NO HORIZONTAL SEAMS WITHIN FIVE FEET OF THE SLOPE'S TOE. QUALIFIED PERSONNEL HAVING MORE THAN 1,000,000 SQ.FT. EXPERIENCE SHALL PERFORM FIELD WELDING AND TESTING. DOCUMENTATION OF LINER WELDERS EXPERIENCE IS REQUIRED TO BE PRESENT.

12. AT POINTS OF DISCHARGE INTO OR SUCTION FROM THE RECYCLING CONTAINMENT, THE OPERATOR SHALL INSURE THAT THE LINER IS PROTECTED FROM EXCESSIVE HYDROSTATIC FORCE OR MECHANICAL DAMAGE. EXTERNAL DISCHARGE OR SUCTION LINES SHALL NOT PENETRATE THE LINER.

13. THE OPERATOR SHALL POST AN UPRIGHT SIGN NO LESS THAN 12 INCHES BY 24 INCHES WITH LETTERING NOT LESS THAN TWO INCHES IN HEIGHT IN A CONSPICUOUS PLACE ON THE FENCE SURROUNDING THE CONTAINMENT. THE OPERATOR SHALL POST THE SIGN IN A MANNER AND LOCATION SUCH THAT A PERSON CAN EASILY READ THE LEGEND. THE SIGN SHALL PROVIDE THE FOLLOWING INFORMATION: THE OPERATOR'S NAME, THE LOCATION OF THE SITE BY QUARTER-QUARTER OR UNIT LETTER, SECTION, TOWNSHIP AND RANGE, AND EMERGENCY TELEPHONE NUMBERS.

14. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT NEW MEXICO 811 (FORMERLY NEW MEXICO ONE CALL) A MINIMUM OF 48 HOURS BEFORE EXCAVATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL DESIGNATED UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

15. DURING CONSTRUCTION OF THE CONTAINMENT, THE CONTRACTOR WILL REPORT AND RESPOND TO ANY SPILLS OF HAZARDOUS MATERIALS SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS. TOXIC OR CORROSIVE SUBSTANCES, ETC. A SPILL IS DEFINED AS ANY RELEASE OF A CORROSIVE, HAZARDOUS, TOXIC OR RADIOACTIVE SUBSTANCE THAT MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. REPORTS OF SPILLS WILL BE MADE IMMEDIATELY TO BOTH THE NEW MEXICO ENVIRONMENT DEPARTMENT EMERGENCY RESPONSE TEAM (505-827-9329 OR 866-428-6535). THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING AND CLEANUP OF ANY SPILL ASSOCIATED WITH PROJECT CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING ANY DISCOVERIES OF PAST SPILLS OR CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION.

16. CONTRACTOR MUST OBTAIN CLIENT PERMISSION BEFORE SALVAGING ANY ITEMS SPECIFIED FOR REMOVAL AND DISPOSAL AFTER COMPLETION OF CONSTRUCTION OF THE CONTAINMENT.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING DISPOSAL SITES THAT ARE ENVIRONMENTALLY SUITABLE FOR DISPOSAL OF ITEMS NOT SPECIFIED TO BE SALVAGED. THE CONTRACTOR IS EXPECTED TO ABIDE BY ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS IN OBTAINING THE NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES AND/OR PRIVATE PROPERTY OWNERS. ALL COSTS ASSOCIATED WITH OBTAINING THESE PERMITS SHALL BE INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO DIRECT MEASUREMENT OR PAYMENT SHALL BE MADE THEREFORE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH COPIES OF ALL PERTINENT INFORMATION, AGREEMENTS, AND PERMITS RELATED TO DISPOSAL SITES UTILIZED. BORROW MATERIAL, ROCK WASTE, AND VEGETATIVE DEBRIS SHALL NOT BE PLACED IN WETLANDS, ARROYOS, OR AREAS THAT MAY IMPACT THREATENED OR ENDANGERED SPECIES. ARCHEOLOGICAL AND ENVIRONMENTAL CLEARANCES MUST BE OBTAINED BEFORE DISPOSAL.

18. ALL MATERIALS SHALL BE APPROVED BY OXY CONSTRUCTION REPRESENTATIVES PRIOR TO PURCHASING AND SHALL BE DISCLOSED IN BID.

19. LINER INSTALLATION SHALL BE PERFORMED PER INDUSTRY BEST PRACTICES, STANDARDS AND OXY PROVIDED GUIDELINES.

RUB SHEET, LADDER AND FLAP VENT GENERAL NOTES

1. RUB SHEETS TO BE INSTALLED WELDED TO THE PRIMARY LINER EXTENDING OUTWARDS 5.00' FROM TOP EDGE OF SUMP COVERING 100% OF THE SUMP BOTTOM AS SHOWN IN THE RUB SHEET GENERAL LAYOUT. THE MATERIAL DESIGNATION FOR RUB SHEETS SHALL BE (60 MIL HDPE TEXTURED ONE SIDE).

2. HDPE LADDER SHEETING TO BE WELDED TO THE PRIMARY LINER AND SHALL TIE INTO ANCHOR TRENCH TOGETHER. LADDER SHALL START AT THE BOTTOM OF SUMP ELEVATION SHOWN IN THE PLANS. THE LADDER STEPS SHALL BE OF HDPE MATERIAL. THE SPACING BETWEEN STEPS SHALL BE 1.00' O.C. STARTING AT THE SUMP AND BASED OFF THE DESIGN ELEVATION MAJOR CONTOURS, THE LADDER SHALL BE LABELED IN 5.00' INTERVALS AS SHOWN ON THE PLANS.

3. AIR RELEASE FLAP VENTS SHALL BE INSTALLED PER DIMENSIONS SHOWN ON THE PLANS (MAXIMUM SPACING 100.00' TYPICAL).

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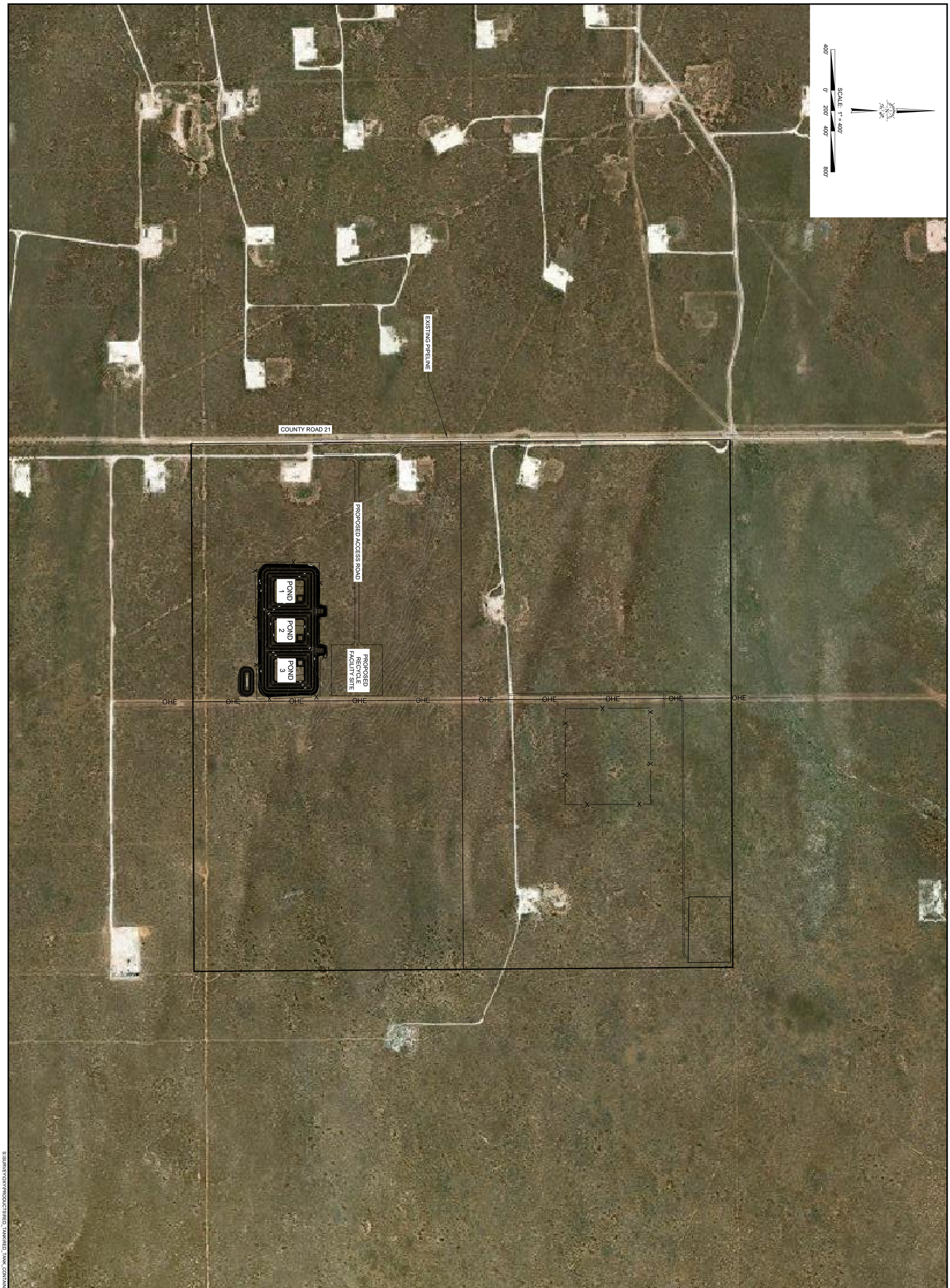
GENERAL NOTES

NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

COURTNEY C. COMBS
NEW MEXICO
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.

C-1.1



SHEET NO.
C-2.1

NO.	DATE	REVISION DESCRIPTION
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2	04/24/18	REDLINE REVISIONS

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HOUSTON, TEXAS

OVERALL LAYOUT

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PROPOSED ROAD
PROPOSED ACCESS DRIVE
PROPOSED RUB SHEET
PROPOSED HDPE LADDER
PROPOSED FENCE
EXISTING MINOR CONTOUR
EXISTING MAJOR CONTOUR
PROPOSED MINOR CONTOUR
PROPOSED MAJOR CONTOUR

SCALE: 1" = 50'
50' 0' 25' 50' 100'

PROPOSED RECYCLE FACILITY SITE

DRAINAGE DAYLIGHT

24" CMP CULVERT

CURVE RADIUS: 50'

HDPE LADDER

72'X72'X4 SUMP

PROPOSED 20' ROAD AROUND PERIMETER OF POND

TOPSOIL - APPROX. 13,000 CY

FLAP VENT GENERAL NOTES

1. AIR RELEASE FLAP VENTS SHALL BE INSTALLED PER DIMENSIONS SHOWN ON THE PLANS (MAXIMUM SPACING 100.00' TYPICAL).

KEYED NOTES

1 INSTALL AIR RELEASE VENTS PER DETAIL 5, SHEET C-6.2
2 INSTALL HDPE LADDER PER DETAIL 2, SHEET C-6.2

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PRELIMINARY PHASE I POND LAYOUT

NO.	DATE	REVISION DESCRIPTION
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2	04/24/18	REDLINE REVISIONS

COURTNEY C. COMPTON
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.
C-3.1

PROPOSED ROAD
PROPOSED ACCESS DRIVE
PROPOSED FENCE
EXISTING MINOR CONTOUR
EXISTING MAJOR CONTOUR
PROPOSED MINOR CONTOUR
PROPOSED MAJOR CONTOUR

SCALE: 1" = 50'
50' 0' 25' 50' 100'

PROPOSED RECYCLE FACILITY SITE

DITCH FLOWLINE ELEV: 3,740.13'
DITCH FLOWLINE ELEV: 3,740.39'
Z: 3,744.17' FILL: 0.50'
3740.13'
Z: 3,744.15' FILL: 0.49'
DITCH FLOWLINE ELEV: 3,739.90'
DITCH FLOWLINE ELEV: 3,740.62'
Z: 3,744.31' FILL: 0.53'
Z: 3,744.25' FILL: 0.41'
DITCH FLOWLINE ELEV: 3,738.98'
Z: 3,744.00' FILL: 0.46'
DITCH FLOWLINE ELEV: 3,738.79'
DITCH FLOWLINE ELEV: 3,738.57'
Z: 3,743.87' FILL: 0.47'
DITCH FLOWLINE ELEV: 3,738.11'
DITCH FLOWLINE ELEV: 3,737.29'
Z: 3,740.86' FILL: 0.38'
DITCH FLOWLINE ELEV: 3,737.04'
Z: 3,739.70' FILL: 0.46'
DITCH FLOWLINE ELEV: 3,736.78'
DITCH DAYLIGHT ELEV: 3,736.00'

DITCH FLOWLINE ELEV: 3,741.64'
Z: 3,743.66' FILL: 0.56'
Z: 3,743.14' FILL: 0.59'
DITCH DAYLIGHT ELEV: 3,742.00'
DITCH FLOWLINE ELEV: 3,741.42'
Z: 3,477.19' FILL: 0.57'
Z: 3,744.02' FILL: 0.59'
Z: 3,743.43' FILL: 0.80'
Z: 3,744.62' FILL: 0.53'
Z: 3,739.59' FILL: 0.61'
Z: 3,738.54' FILL: 0.68'

Z: 3,752.40' FILL: 8.94'
Z: 3,752.40' FILL: 8.72'
Z: 3,752.40' FILL: 8.81'
Z: 3,752.40' FILL: 8.55'
Z: 3,752.40' FILL: 8.76'
Z: 3,752.40' FILL: 8.42'

Z: 3,727.05' CUT: 15.29'
Z: 3,727.05' CUT: 15.62'
Z: 3,728.64' CUT: 13.63'
Z: 3,723.00' CUT: 19.19'
Z: 3,727.05' CUT: 14.89'
Z: 3,727.05' CUT: 14.80'
Z: 3,728.42' CUT: 10.73'
Z: 3,728.60' CUT: 10.17'

Z: 3,727.05' CUT: 15.01'
Z: 3,727.05' CUT: 15.58'
Z: 3,728.64' CUT: 13.21'
Z: 3,723.00' CUT: 18.79'
Z: 3,727.05' CUT: 13.96'
Z: 3,727.05' CUT: 13.85'
Z: 3,728.42' CUT: 9.59'
Z: 3,728.60' CUT: 10.47'

Z: 3,727.05' CUT: 15.56'
Z: 3,727.05' CUT: 15.98'
Z: 3,728.64' CUT: 15.48'
Z: 3,723.00' CUT: 19.00'
Z: 3,727.05' CUT: 14.11'
Z: 3,727.05' CUT: 14.40'
Z: 3,728.60' CUT: 11.23'
Z: 3,728.42' CUT: 12.00'

Z: 3,752.40' FILL: 12.69'
Z: 3,750.40' FILL: 15.50'
Z: 3,752.40' FILL: 15.55'
Z: 3,752.40' FILL: 13.73'
Z: 3,752.40' FILL: 13.37'
Z: 3,752.40' FILL: 13.12'

TOPSOIL - APPROX. 13,000 CY

OHE

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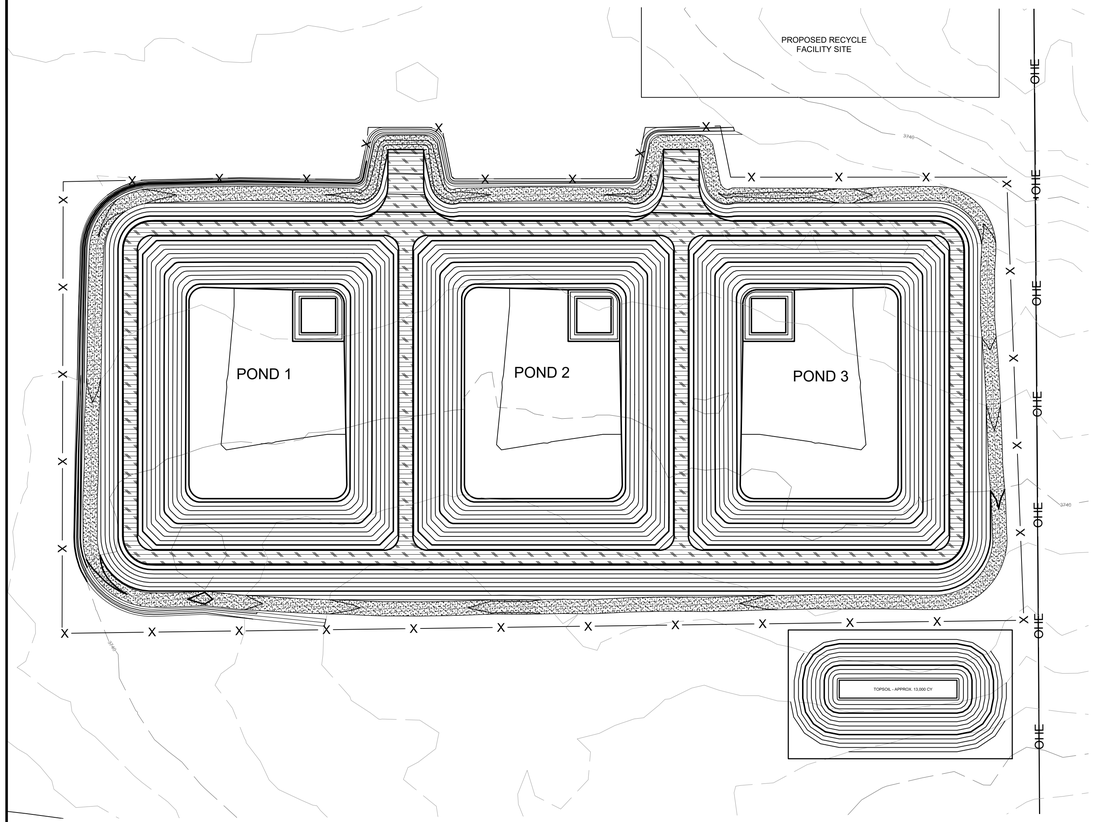
HOUSTON, TEXAS
PRELIMINARY PHASE I POND CUT AND FILL

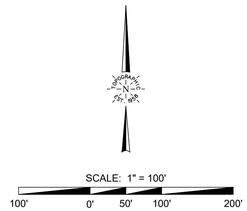
NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

COURTNEY C. COMPTON
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.
C-3.2

S:\SURVEY\OXY\PRODUCTS\RED_TANK\RED_TANK_CONTAINMENT_2.DWG 4/24/2018 1:26:34 PM agruenstein





- PROPOSED ROAD
- PROPOSED ACCESS DRIVE
- PROPOSED FENCE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR

RECYCLING CONTAINMENT	
TOP OF BERM ELEVATION	3,752.40 FT
HIGH WATER ELEVATION	3,749.40 FT
BOTTOM OF POND ELEVATION	3,727.05 FT
SUMP ELEVATION	3,723.00 FT
TOTAL CONTAINMENT VOLUME	474,268 BBLS
TOTAL CONTAINMENT VOLUME - 3 FT FREEBOARD	392,470 BBLS

EARTHWORK QUANTITIES	
CUT VOLUME	123,735 CY
FILL VOLUME	110,750 CY
TOPSOIL (6" Stockpiled)	12,760 CY
TOTAL EXPORT (IMPORT)	225 CY
TOTAL GRADING AREA	15.82 ACRES
*CUT VOLUME INCLUDES TOPSOIL QUANTITY.	
**A FILL FACTOR OF 1.15 HAS BEEN INCLUDED IN THE QUANTITIES.	

POND 1

STAGE STORAGE TABLE

ELEV	DEPTH (FT)	AREA (ACRES)	VOLUME (BBLS)	VOLUME (ACRE FT)	VOLUME (CY)	
3,723.00	0.00	0.00	0.00	0.00	0.00	BOTTOM OF SUMP
3,724.00	1.00	0.05	412.63	0.05	85.81	
3,725.00	2.00	0.07	976.08	0.12	202.97	
3,726.00	3.00	0.09	1,670.70	0.21	347.42	
3,727.00	4.00	0.11	2,525.87	0.32	525.25	
3,728.00	5.00	0.78	5,514.71	0.71	1,146.77	
3,729.00	6.00	1.50	15,474.49	1.99	3,217.88	
3,730.00	7.00	1.59	27,564.12	3.55	5,731.90	
3,731.00	8.00	1.67	40,254.55	5.19	8,370.84	
3,732.00	9.00	1.74	53,538.28	6.90	11,133.16	
3,733.00	10.00	1.83	67,423.95	8.69	14,020.66	
3,734.00	11.00	1.91	81,924.13	10.56	17,035.94	
3,735.00	12.00	1.99	97,051.72	12.51	20,181.69	
3,736.00	13.00	2.08	112,821.23	14.54	23,460.92	
3,737.00	14.00	2.16	129,243.67	16.66	26,875.93	
3,738.00	15.00	2.25	146,329.82	18.86	30,428.96	
3,739.00	16.00	2.34	164,093.15	21.15	34,122.80	
3,740.00	17.00	2.43	182,543.08	23.53	37,959.42	
3,741.00	18.00	2.52	201,695.84	25.99	41,942.20	
3,742.00	19.00	2.62	221,563.79	28.55	46,073.69	
3,743.00	20.00	2.72	242,155.75	31.21	50,355.75	
3,744.00	21.00	2.82	263,487.80	33.96	54,791.70	
3,745.00	22.00	2.92	285,571.11	36.80	59,383.87	
3,746.00	23.00	3.03	308,424.17	39.75	64,136.12	
3,747.00	24.00	3.15	332,081.26	42.80	69,055.56	
3,748.00	25.00	3.27	356,573.29	45.96	74,148.62	
3,749.00	26.00	3.43	381,985.01	49.23	79,432.93	
3,749.40	26.40	3.52	392,469.71	50.58	81,613.20	3 FT FREEBOARD
3,750.00	27.00	3.62	408,599.55	52.66	84,967.36	
3,751.00	28.00	3.64	435,906.44	56.18	90,645.77	
3,752.00	29.00	3.65	463,293.34	59.71	96,340.81	
3,752.40	29.40	3.66	474,268.22	61.13	98,623.01	

SUB-GRADE VOLUME
112,821.23 BBLS - 14.54 ACRE FT
SHOWN GRAPHICALLY LEFT

BREACH VOLUME
279,648.48 BBLS - 36.04 ACRE FT
SHOWN GRAPHICALLY LEFT

POND 2

STAGE STORAGE TABLE

ELEV	DEPTH (FT)	AREA (ACRES)	VOLUME (BBLS)	VOLUME (ACRE FT)	VOLUME (CY)	
3,723.00	0.00	0.00	0.00	0.00	0.00	BOTTOM OF SUMP
3,724.00	1.00	0.05	412.63	0.05	85.81	
3,725.00	2.00	0.07	976.08	0.12	202.97	
3,726.00	3.00	0.09	1,670.70	0.21	347.42	
3,727.00	4.00	0.11	2,525.87	0.32	525.25	
3,728.00	5.00	0.78	5,514.71	0.71	1,146.77	
3,729.00	6.00	1.50	15,474.49	1.99	3,217.88	
3,730.00	7.00	1.59	27,564.12	3.55	5,731.90	
3,731.00	8.00	1.67	40,254.55	5.19	8,370.84	
3,732.00	9.00	1.74	53,538.28	6.90	11,133.16	
3,733.00	10.00	1.83	67,423.95	8.69	14,020.66	
3,734.00	11.00	1.91	81,924.13	10.56	17,035.94	
3,735.00	12.00	1.99	97,051.72	12.51	20,181.69	
3,736.00	13.00	2.08	112,821.23	14.54	23,460.92	
3,737.00	14.00	2.16	129,243.67	16.66	26,875.93	
3,738.00	15.00	2.25	146,329.82	18.86	30,428.96	
3,739.00	16.00	2.34	164,093.15	21.15	34,122.80	
3,740.00	17.00	2.43	182,543.08	23.53	37,959.42	
3,741.00	18.00	2.52	201,695.84	25.99	41,942.20	
3,742.00	19.00	2.62	221,563.79	28.55	46,073.69	
3,743.00	20.00	2.72	242,155.75	31.21	50,355.75	
3,744.00	21.00	2.82	263,487.80	33.96	54,791.70	
3,745.00	22.00	2.92	285,571.11	36.80	59,383.87	
3,746.00	23.00	3.03	308,424.17	39.75	64,136.12	
3,747.00	24.00	3.15	332,081.26	42.80	69,055.56	
3,748.00	25.00	3.27	356,573.29	45.96	74,148.62	
3,749.00	26.00	3.43	381,985.01	49.23	79,432.93	
3,749.40	26.40	3.52	392,469.71	50.58	81,613.20	3 FT FREEBOARD
3,750.00	27.00	3.62	408,599.55	52.66	84,967.36	
3,751.00	28.00	3.64	435,906.44	56.18	90,645.77	
3,752.00	29.00	3.65	463,293.34	59.71	96,340.81	
3,752.40	29.40	3.66	474,268.22	61.13	98,623.01	

SUB-GRADE VOLUME
112,821.23 BBLS - 14.54 ACRE FT
SHOWN GRAPHICALLY LEFT

BREACH VOLUME
279,648.48 BBLS - 36.04 ACRE FT
SHOWN GRAPHICALLY LEFT

POND 3

STAGE STORAGE TABLE

ELEV	DEPTH (FT)	AREA (ACRES)	VOLUME (BBLS)	VOLUME (ACRE FT)	VOLUME (CY)	
3,723.00	0.00	0.00	0.00	0.00	0.00	BOTTOM OF SUMP
3,724.00	1.00	0.05	412.63	0.05	85.81	
3,725.00	2.00	0.07	976.08	0.12	202.97	
3,726.00	3.00	0.09	1,670.70	0.21	347.42	
3,727.00	4.00	0.11	2,525.87	0.32	525.25	
3,728.00	5.00	0.78	5,514.71	0.71	1,146.77	
3,729.00	6.00	1.50	15,474.49	1.99	3,217.88	
3,730.00	7.00	1.59	27,564.12	3.55	5,731.90	
3,731.00	8.00	1.67	40,254.55	5.19	8,370.84	
3,732.00	9.00	1.74	53,538.28	6.90	11,133.16	
3,733.00	10.00	1.83	67,423.95	8.69	14,020.66	
3,734.00	11.00	1.91	81,924.13	10.56	17,035.94	
3,735.00	12.00	1.99	97,051.72	12.51	20,181.69	
3,736.00	13.00	2.08	112,821.23	14.54	23,460.92	
3,737.00	14.00	2.16	129,243.67	16.66	26,875.93	
3,738.00	15.00	2.25	146,329.82	18.86	30,428.96	
3,739.00	16.00	2.34	164,093.15	21.15	34,122.80	
3,740.00	17.00	2.43	182,543.08	23.53	37,959.42	
3,741.00	18.00	2.52	201,695.84	25.99	41,942.20	
3,742.00	19.00	2.62	221,563.79	28.55	46,073.69	
3,743.00	20.00	2.72	242,155.75	31.21	50,355.75	
3,744.00	21.00	2.82	263,487.80	33.96	54,791.70	
3,745.00	22.00	2.92	285,571.11	36.80	59,383.87	
3,746.00	23.00	3.03	308,424.17	39.75	64,136.12	
3,747.00	24.00	3.15	332,081.26	42.80	69,055.56	
3,748.00	25.00	3.27	356,573.29	45.96	74,148.62	
3,749.00	26.00	3.43	381,985.01	49.23	79,432.93	
3,749.40	26.40	3.52	392,469.71	50.58	81,613.20	3 FT FREEBOARD
3,750.00	27.00	3.62	408,599.55	52.66	84,967.36	
3,751.00	28.00	3.64	435,906.44	56.18	90,645.77	
3,752.00	29.00	3.65	463,293.34	59.71	96,340.81	
3,752.40	29.40	3.66	474,268.22	61.13	98,623.01	

SUB-GRADE VOLUME
146,329.82 BBLS - 18.86 ACRE FT
SHOWN GRAPHICALLY LEFT

BREACH VOLUME
246,138.80 BBLS - 31.72 ACRE FT
SHOWN GRAPHICALLY LEFT

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
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OXY U.S.A. INC.
HOUSTON, TEXAS

STAGE/STORAGE/GRADING CALCULATIONS

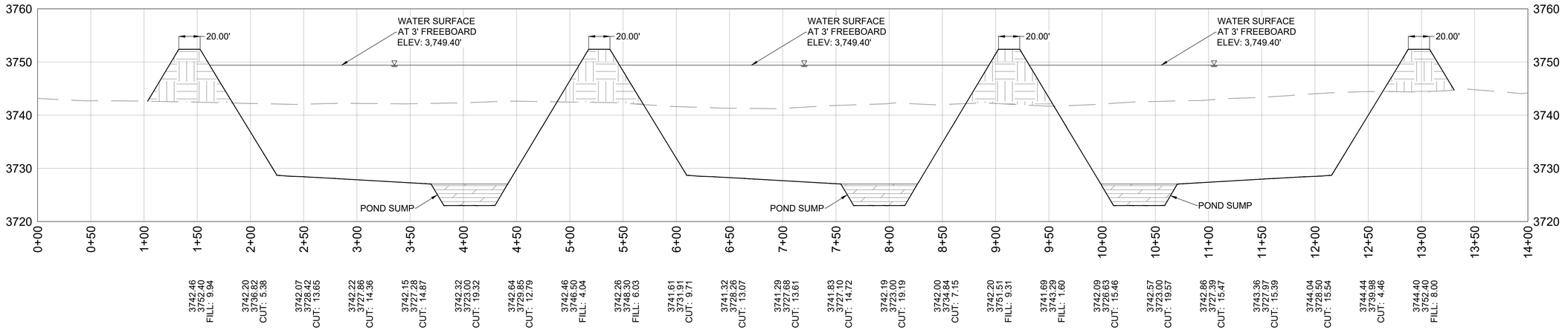
NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

COURTNEY C. COMER
NEW MEXICO
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.

C-4.1

SECTION A-A



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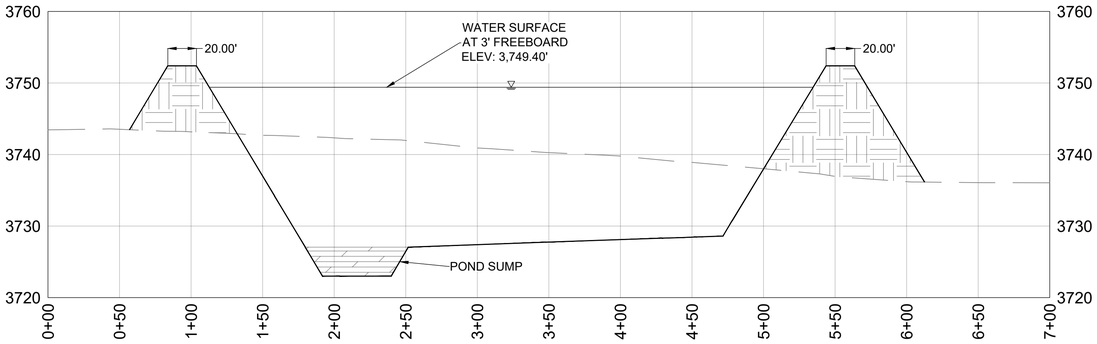

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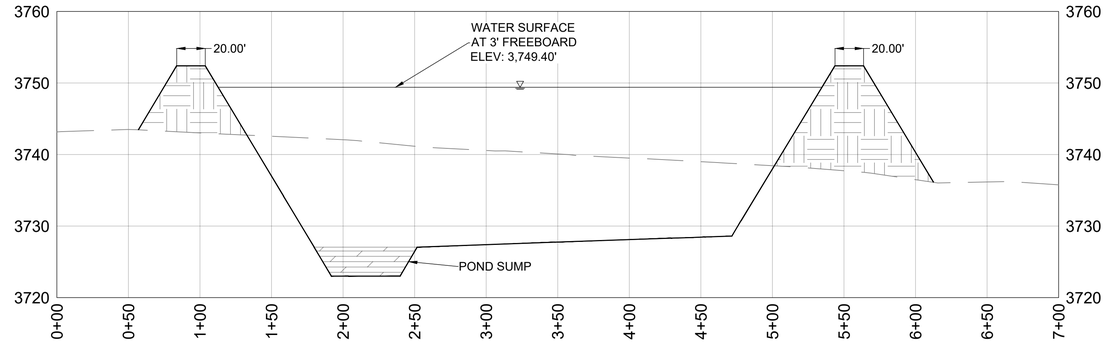
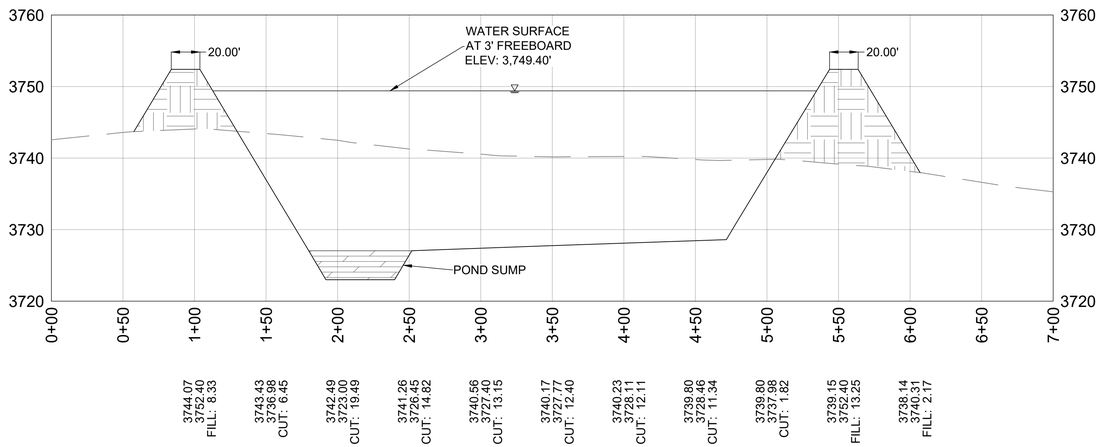


SECTION D-D



EXISTING GROUND
PROPOSED GROUND

SCALE: 1" = 10'
0' 5' 10'
VERTICAL SCALE

SCALE: 1" = 50'
0' 25' 50'
HORIZONTAL SCALE

VOLUME CALCULATIONS

USABLE POND VOLUME (3' FREEBOARD)	392,470 BBLS	50.58 AC-FT
TOTAL VOLUME	474,268 BBLS	61.13 AC-FT

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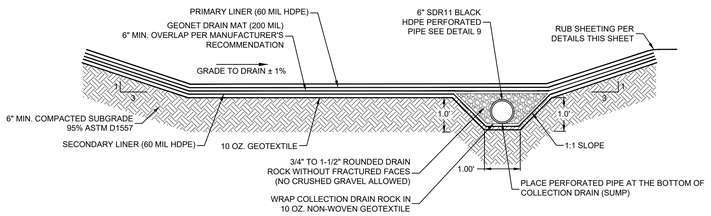
OXY U.S.A. INC.
HOUSTON, TEXAS
PHASE II CROSS SECTIONS

NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

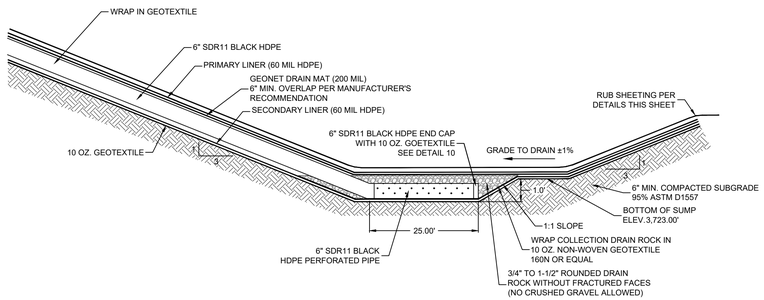
COURTNEY C. COMBS
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.
C-5.1

S:\SURVEY\OXY\PRODUCTS\RED_TANK\RED_TANK_CONTAINMENT_2.DWG 4/24/2018 1:26:39 PM agruenstein



1 LEAK DETECTION SYSTEM SECTION 'A-A'
NOT TO SCALE



2 LEAK DETECTION SYSTEM SECTION 'B-B'
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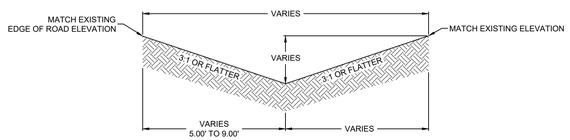

3 TYPICAL DRAINAGE DITCH DETAIL
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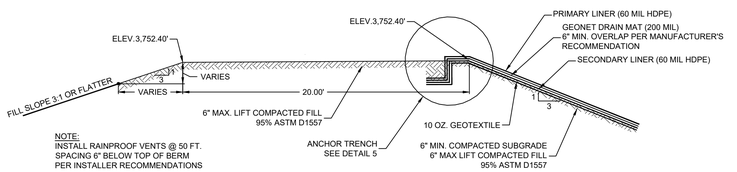
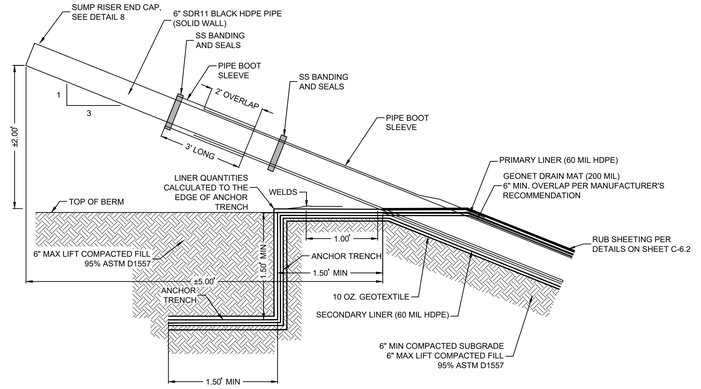
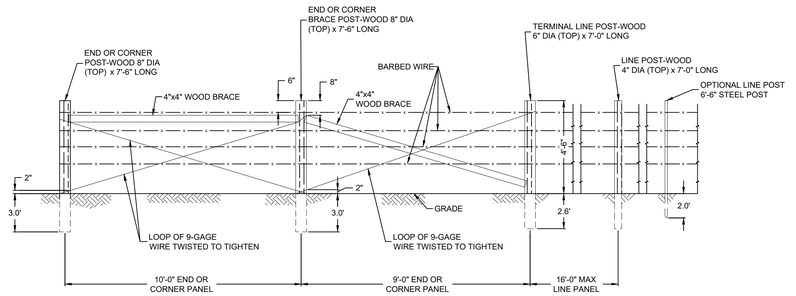


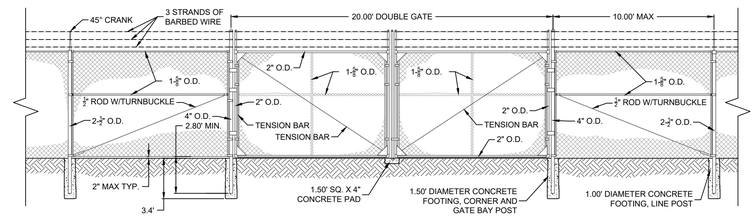
4 TYPICAL TOP OF BERM AND EDGE DETAIL
NOT TO SCALE



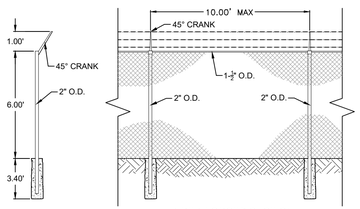
5 LEAK DETECTION SYSTEM TYPICAL ANCHOR TRENCH AND RISER DETAIL
NOT TO SCALE



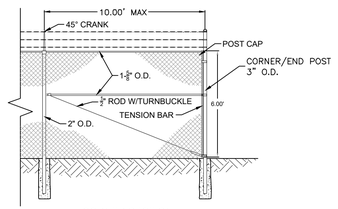
6 TEMPORARY 4 STRAND BARBED WIRE FENCE
NOT TO SCALE



GATE

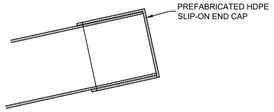


UNREINFORCED SECTION

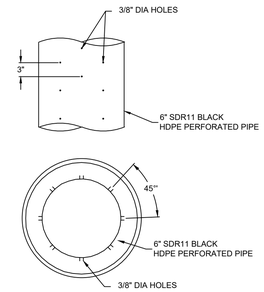


CORNER SECTION

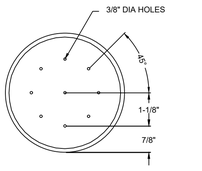
7 PERMANENT 6' CHAINLINK FENCE WITH BARBED WIRE DETAIL
NOT TO SCALE



8 SUMP RISER END CAP
NOT TO SCALE



9 LEAK DETECTION SYSTEM PIPE PERFORATION DETAIL
NOT TO SCALE



10 LEAK DETECTION SYSTEM PERFORATED END CAP DETAIL
NOT TO SCALE

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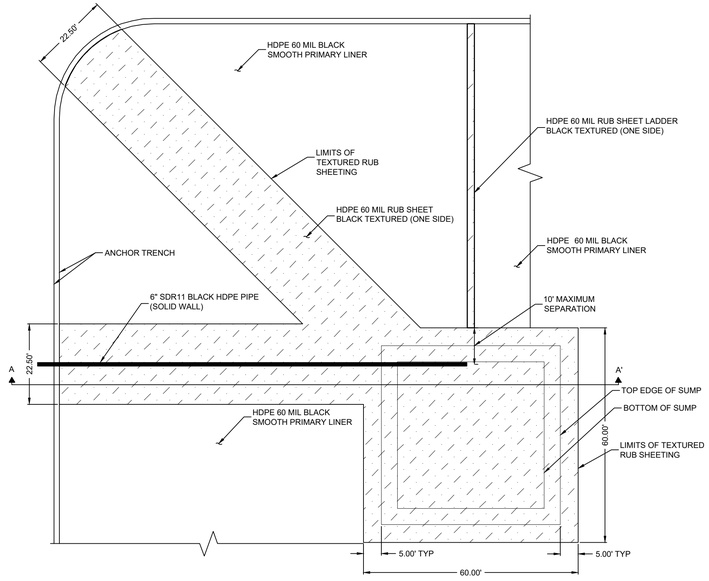
OXY U.S.A. INC.
HOUSTON, TEXAS

CONSTRUCTION DETAILS

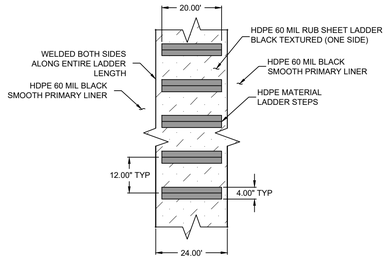
NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

SHEET NO.
C-6.1

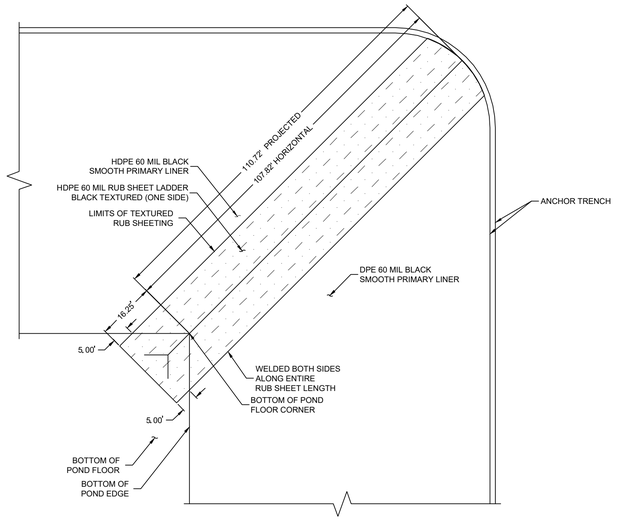


1 RUB SHEET SUMP DETAIL
PLAN VIEW
NOT TO SCALE

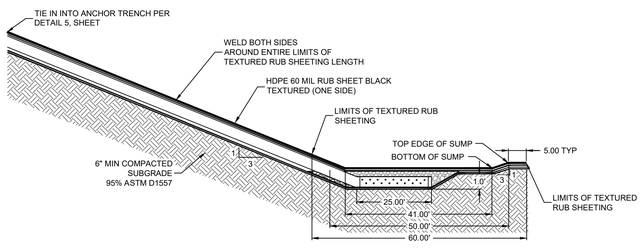
NOTES:
1. HDPE 60 MIL RUB SHEET BLACK TEXTURED (ONE SIDE) TO BE WELDED TO PRIMARY HDPE 7000 60 MIL BLACK SMOOTH LINER AND TIE IN AT ANCHOR TRENCH TOGETHER.
2. HDPE 60 MIL RUB SHEET LADDER BLACK TEXTURED (ONE SIDE) TO BE WELDED TO PRIMARY HDPE 7000 60 MIL BLACK SMOOTH LINER AND TIE IN AT ANCHOR TRENCH TOGETHER.



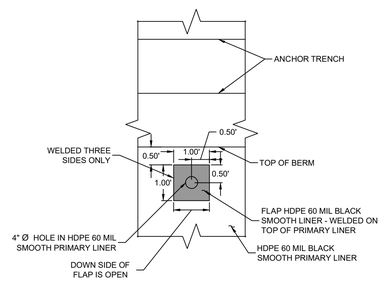
2 HDPE LADDER
DETAIL
NOT TO SCALE



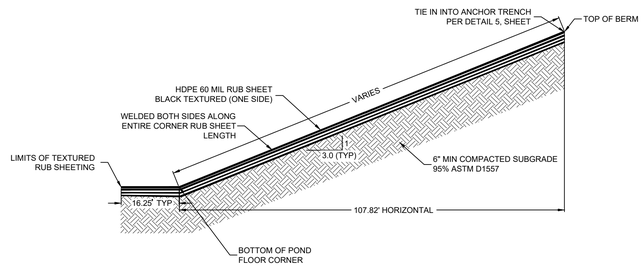
3 RUB SHEET CORNER DETAIL
PLAN VIEW
NOT TO SCALE



4 RUB SHEET SUMP DETAIL
ELEVATION VIEW, A-A'
NOT TO SCALE



5 VENT DETAIL
NOT TO SCALE



6 RUB SHEET CORNER DETAIL
ELEVATION VIEW
NOT TO SCALE

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CONSTRUCTION DETAILS

NO.	DATE	REVISION DESCRIPTION
1	03/22/18	POND DESIGN REVISION
2	04/24/18	REDLINE REVISIONS

COURTNEY C. COMPTON
MEXICO
24108
4-24-18
PROFESSIONAL ENGINEER

SHEET NO.
C-6.2